AGENDA

STATE BUILDING CODE TECHNICAL REVIEW BOARD

Friday, May 21, 2021 - 10:00am (Virtual Meeting)
https://vadhcd.adobeconnect.com/lbbca/

I. Roll Call **(TAB 1)**

II. Approval of March 19, 2021 Minutes **(TAB 2)**

III. Approval of April 16, 2021 Minutes **(TAB 3)**

IV. Approval of Final Order **(TAB 4)**

In Re: Fairfax County
Appeal No 21-01

V. Public Comment

VI. Appeal Hearing **(TAB 5)**

In Re: Monica and Michael Davis
Appeal No 21-02

VII. Appeal Hearing **(TAB 6)**

In Re: Anthony T. Grant Jr.
Appeal No 21-03

VIII. Secretary's Report

a. July 2021 meeting update

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STATE BUILDING CODE TECHNICAL REVIEW BOARD

James R. Dawson, Chair
(Virginia Fire Chiefs Association)

W. Shaun Pharr, Esq., Vice-Chair
(The Apartment and Office Building Association of Metropolitan Washington)

Vince Butler
(Virginia Home Builders Association)

J. Daniel Crigler
(Virginia Association of Plumbing-Heating-Cooling Contractors and the Virginia Chapters of the Air Conditioning Contractors of America)

Alan D. Givens
(Virginia Association of Plumbing-Heating-Cooling Contractors and the Virginia Chapters of the Air Conditioning Contractors of America

David V. Hutchins
(Electrical Contractor)

Christina Jackson
(Commonwealth at large)

Joseph A. Kessler, III
(Associated General Contractors)

Eric Mays
(Virginia Building and Code Officials Association)

Joanne D. Monday
(Virginia Building Owners and Managers Association)

J. Kenneth Payne, Jr., AIA, LEED AP BD+C
(American Institute of Architects Virginia)

Richard C. Witt
(Virginia Building and Code Officials Association)

Aaron Zdinak, PE
(Virginia Society of Professional Engineers)

Vacant
(Commonwealth at large)

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STATE BUILDING CODE TECHNICAL REVIEW BOARD
MEETING MINUTES
March 19, 2021
Virtual Meeting
https://vadhcd.adobeconnect.com/lbbca/

Members Present	Members Absent
Mr. James R. Dawson, Chairman	
Mr. W. Shaun Pharr, Esq., Vice-Chairman	
Mr. Vince Butler	
Mr. Daniel Crigler	
Mr. Alan D. Givens	
Mr. David V. Hutchins	
Ms. Christina Jackson	
Mr. Joseph Kessler	
Mr. Eric Mays, PE	
Ms. Joanne Monday	
Mr. J. Kenneth Payne, Jr., AIA	
Mr. Richard C. Witt	
Mr. Aaron Zdinak, PE	

Call to Order

The meeting of the State Building Code Technical Review Board ("Review Board") was called to order at approximately 10:00 a.m. by Secretary Travis Luter.

Roll Call

The roll was called by Mr. Luter and a quorum was present. Mr. Justin I. Bell, legal counsel for the Board from the Attorney General's Office, was also present.

Approval of Minutes

The draft minutes of the January 22, 2021 meeting in the Review Board members' agenda package were considered. Mr. Butler moved to approve the minutes as presented with the addition of the word "of" in the public comment section of the minutes. The motion was seconded by Ms. Jackson and passed with Mr. Hutchins abstaining.

Interpretations

Approval of Interpretation 01/2021:

After review and consideration of Interpretation 01/2021 presented in the Review Board members' agenda package, Mr. Mays moved to approve Interpretation 01/2021 as amended to read:

*"**QUESTION #1:** If open stud framing has been installed without drywall or other covering under the stairway in an unfinished basement, is the area considered enclosed?*

***ANSWER:** No.*

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The motion was seconded by Mr. Witt and passed with Mr. Givens abstaining.

Public Comment

Chair Dawson opened the meeting for public comment. Mr. Luter advised that no one had contacted him to speak. With no one requesting to speak, requesting to be acknowledged to speak by use of the raised hand feature of the Adobe Connect meeting platform, or requesting to speak in the chat box section of the Adobe Connect meeting platform, Chair Dawson closed the public comment period.

Final Orders

<u>Appeal of Sidney Harris; Appeal No. 20-02:</u>

After review and consideration of the final order presented in the Review Board members' agenda package, Mr. Payne moved to approve the final order as presented in the agenda package. The motion was seconded by Ms. Monday and passed with Messrs. Pharr and Hutchins abstaining.

<u>Appeal of Monica and Michael Davis; Appeal No. 20-03:</u>

After review and consideration of the final order presented in the Review Board members' agenda package, Mr. Payne moved to approve the final order with the suggested editorial change to delete "d" for the word "required", creating the word "require", in line 100 on page 37 and remove the word "do" and replace it with the word "may" in line 157 of page 43 of the agenda package. The motion was seconded by Ms. Jackson and passed with Messrs. Pharr, Givens, Hutchins, and Mays abstaining.

<u>Appeal of Patrick and Jean Sartori; Appeal No. 20-04:</u>

After review and consideration of the final order presented in the Review Board members' agenda package, Mr. Mays moved to approve the final order with the suggested editorial change to delete the letters "ed" in the word "underlined" and replace it with the letters "ing", creating the word "underlining", in line 28 on page 47 of the agenda package. The motion was seconded by Ms. Jackson and passed with Messrs. Pharr, Hutchins, and Witt abstaining.

New Business

<u>Fairfax County; Appeal No. 21-01:</u>

A hearing convened with Chair Dawson serving as the presiding officer. The hearing was related to buildings located at 6231 Nelway Drive in McLean, Virginia which is in Fairfax County.

The following persons were sworn in and given an opportunity to present testimony:

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Ricky Salinas, Freedom Plumbers Corporation
Manuel Felipe, Fairfax County Code Investigator
Richard Grace, Fairfax County Code Specialist III
James Canter, Fairfax County Chief of Land Develop. Services

Also present was:

Paul Emerick, legal counsel for Fairfax County

After testimony concluded, Chair Dawson closed the hearing and stated a decision from the Review Board members would be forthcoming and the deliberations would be conducted in open session. It was further noted that a final order reflecting the decision would be considered at a subsequent meeting and, when approved, would be distributed to the parties, and would contain a statement of further right of appeal.

<u>Decision: Fairfax County; Appeal No. 21-01:</u>

<u>Motion #1</u>
After deliberations, Mr. Mays moved to overturn the local appeals board and uphold the local building official on the failed video submission which was based on bullet item #5 of the modification approval letter dated October 9, 2020 by the local building official under the 2015 VCC. The motion was seconded by Mr. Kessler.

After additional deliberations, Mr. Kessler moved to substitute for the pending motion the following: To overturn the decision of the local appeals board that a violation of the October 9, 2020 code modification issued under the VRC 2015 regarding insufficient slope of the pipe does exist. The substitute was seconded by Mr. Mays. The motion to substitute was passed. The motion failed with Messrs. Givens, Kessler, Mays, and Payne and Ms. Jackson voting in favor of approval.

<u>Motion #2</u>
After further deliberations, Mr. Witt moved to remand the matter back to the local appeals board for a re-hearing on the matter to clarify the appropriate codes for which the modification request should have been issued under, evaluate the matter under that identified code edition, and clarify the decision being made. The motion was seconded by Ms. Jackson. After further deliberation the motion and second were withdrawn.

<u>Motion #3</u>
After additional deliberations, Mr. Witt moved to uphold the decision of the local appeals board. The motion was seconded by Mr. Butler. The motion failed with Chair Dawson casting the deciding vote in

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opposition while Messrs. Pharr, Crigler, Hutchins, Witt, and Zdinak and Ms. Monday voting in favor of approval.

Motion #4

After further deliberations, Mr. Witt moved to remand the matter back to the local building official for re-evaluation under the 2015 VEBC and to work with Mr. Salinas to develop the proper submission. The motion was seconded by Ms. Monday.

After additional deliberations, Mr. Pharr moved to substitute for the pending motion the following: To remand the matter to the local board of appeals to specifically address whether standing water in the host pipe constitutes a defect that would prohibit relining of that pipe or whether the presence of any standing water in the host pipe did not constitute such a defect that relining should be prohibited. No second was received for the substitute.

Motion #4 passed with Mr. Kessler voting in opposition.

Interpretation Request

Interpretation Request of Chris Childress (Radford); Interpretation Request No. 01-21:

An interpretation request from Chris Childress of Radford was considered concerning the 2015 Virginia Construction Code (VCC), on Section 108.4 related to whether a duly licensed contractor (Class A, B, or C) who carries a DPOR issued journeyman's card, can apply for and obtain a permit from the local building department.

After deliberations, Mr. Mays moved that no interpretation was needed. The motion was seconded by Mr. Witt and passed unanimously.

Secretary's Report

Mr. Luter informed the Board of the current caseload for the upcoming meeting scheduled for May 21, 2021.

Attorney Bell provided legal updates to the Board.

Adjournment

There being no further business, the meeting was adjourned by proper motion at approximately 4:45 p.m.

Approved: May 21, 2021

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Chairman, State Building Code Technical Review Board

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Secretary, State Building Code Technical Review Board

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STATE BUILDING CODE TECHNICAL REVIEW BOARD
MEETING MINUTES
April 16, 2021
Virtual Meeting
https://vadhcd.adobeconnect.com/lbbca/

Members Present	Members Absent
Mr. James R. Dawson, Chairman	Mr. Vince Butler
Mr. W. Shaun Pharr, Esq., Vice-Chairman	Mr. Alan D. Givens
Mr. Daniel Crigler	Mr. David V. Hutchins
Ms. Christina Jackson	Mr. Richard C. Witt
Mr. Joseph Kessler	
Mr. Eric Mays, PE	
Ms. Joanne Monday	
Mr. J. Kenneth Payne, Jr., AIA	
Mr. Aaron Zdinak, PE	

Call to Order

The meeting of the State Building Code Technical Review Board ("Review Board") was called to order at approximately 10:00 a.m. by Secretary Travis Luter.

Roll Call

The roll was called by Mr. Luter and a quorum was present. Mr. Justin I. Bell, legal counsel for the Board from the Attorney General's Office, was also present.

Request for Reconsideration

Reconsideration for Patrick and Jean Sartori; Appeal No. 20-04:

A petition for reconsideration for Appeal No. 20-04 was presented in the Review Board members' agenda package.

After discussion, Mr. Mays moved to uphold the original decision of the Board, as outlined in the approved final order, and deny the request for consideration. The motion was seconded by Ms. Jackson and passed with Mr. Pharr voting in opposition.

Recess

The Review Board Chair called for a short recess to allow the Secretary time needed to draft the Reconsideration Order for consideration.

Reconsideration Order

Reconsideration for Patrick and Jean Sartori; Appeal No. 20-04:

After review and consideration of the reconsideration order presented to the Review Board members, in the Adobe Connect virtual meeting platform, Ms. Monday moved to approve the reconsideration order as

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revised and presented. The motion was seconded by Mr. Pharr and passed unanimously.

Public Comment

Chair Dawson opened the meeting for public comment. Mr. Luter advised that no one had contacted him to speak. Mr. Sartori and Ms. Alexis requested to speak in the chat box section of the Adobe Connect meeting platform. Chair Dawson acknowledged and allowed each of them to speak. With no one else requesting to speak in the chat box section of the Adobe Connect meeting platform or requesting to be acknowledged to speak by use of the raised hand feature of the Adobe Connect meeting platform, Chair Dawson closed the public comment period.

Adjournment

There being no further business, the meeting was adjourned by proper motion at approximately 1:10 p.m.

Approved: May 21, 2021

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Chairman, State Building Code Technical Review Board

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Secretary, State Building Code Technical Review Board

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VIRGINIA:

BEFORE THE
STATE BUILDING CODE TECHNICAL REVIEW BOARD

IN RE: Appeal of Fairfax County
Appeal No. 21-01

DECISION OF THE REVIEW BOARD

I. Procedural Background

The State Building Code Technical Review Board (Review Board) is a Governor-appointed board established to rule on disputes arising from application of regulations of the Department of Housing and Community Development. See §§ 36-108 and 36-114 of the Code of Virginia. The Review Board's proceedings are governed by the Virginia Administrative Process Act (§ 2.2-4000 et seq. of the Code of Virginia).

II. Case History

On September 29, 2020, Freedom Plumbers Corporation (Freedom) filed a code modification request to the Fairfax County Department of Code Compliance (County), the agency responsible for the enforcement of Part 1 of the 2015 Virginia Uniform Statewide Building Code (Virginia Construction Code or VCC), for the home, located at 6231 Nelway Drive, McLean, Virginia in Fairfax County. The modification request was for VCC Sections P3002.1 (Piping within a building), P3002.2 (Building sewer), and P3002.3 (Fittings) which require drain, waste, vent, and sewer piping and fittings to comply with the materials and reference standards listed in VCC Tables P3002.1(1), P3002.1(2), and P3002.3 for the installation of Cured in place pipe (CIPP) in 95' of sewer piping. In October of 2020, the County approved the modification request contingent on eleven (11) conditions. A short time later in October of 2020, Freedom submitted the pre-lining video pursuant to the County contingency listed in the modification approval letter. The pre-lining video was failed by the County due to the pipe holding water.

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Freedom filed a timely appeal to the Fairfax County Board of Building Code Appeals (local appeals board). The local appeals board approved the appeal for the installation of the CIPP on in December of 2020.

On January 4, 2021, the County further appealed to the Review Board. A virtual Review Board hearing was held March 19, 2021. Appearing for Fairfax County were Richard Grace, James Canter, Manuel Felipe, and Paul Emerick, legal counsel. Ricky Salinas attended on behalf of Freedom. The property owner, Leonard Leo, was properly notified but did not attend the hearing.

<u>Findings of the Review Board</u>

<u>Whether to uphold the decision of the local appeals board and overturn the County that the conditions of the modification granted by the County, under the 2015 VCC, were met regarding pipe slope.</u>

The County, through legal counsel, argued that the decision of the local appeals board was not influenced by any application of the USBC; rather by sympathy for the property owner who would likely have to endure a costly excavation and replacement of the sewer lateral to correct an insufficient slope in the pipe. The County further argued that after review of the required pre-installation video, the County failed the inspection noting that the pipe had insufficient slope and was holding water. Lastly, the County argued that the CIPP installation was a non-compliant installation based on the USBC requirements.

Freedom argued that it disagreed with the County's insinuation that the local appeals board made its decision solely on sympathy for the property owner having to endure a costly repair of the sewer pipe through conventional means, rather than a correction to the sewer pipe that is back graded and appropriate enforcement of the USBC. Freedom also argued that the sewer pipe had been working properly for the past 11 months since the CIPP installation. Freedom argued that

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the standards laid out by the County in the modification approval letter were not consistent with the variety of uses of CIPP and that the approval standards of the County were limiting and prohibitive for great candidate host pipes for the installation of CIPP. Freedom also argued that the County preapproval requirements for lining require the host pipes to be in "perfect, like new" condition for approval. Freedom further stated that the County treats the installation of CIPP as a replacement procedure rather than a rehabilitation product for deteriorating pipe. Lastly, Freedom argued that in absence of back grade or a belly in the pipe, CIPP installation should be allowed.

The Review Board finds that the matter needs to be remanded back to the County to re-evaluate the matter under the 2015 Virginia Existing Building Code (VEBC) and to work with Freedom to develop the proper submission

III. Final Order

The appeal having been given due regard, and for the reasons set out herein, the Review Board orders as follows:

Whether to uphold the decision of the local appeals board and overturn the County that the conditions of the modification granted by the County, under the 2015 VCC, were met regarding pipe slope.

The decision of the County and local appeals board is remanded back to the County for reevaluation under the 2015 VEBC and to work with Freedom to develop the proper submission.

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Chair, State Building Code Technical Review Board

Date entered _____May 21, 2021__________

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As provided by Rule 2A:2 of the Supreme Court of Virginia, you have thirty (30) days from the date of service (the date you actually received this decision or the date it was mailed to you, whichever occurred first) within which to appeal this decision by filing a Notice of Appeal with W. Travis Luter, Sr., Secretary of the Review Board. In the event that this decision is served on you by mail, three (3) days are added to that period.

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VIRGINIA:

BEFORE THE
STATE BUILDING CODE TECHNICAL REVIEW BOARD

IN RE: Appeal of Monica and Michael Davis
Appeal No. 21-02

CONTENTS

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VIRGINIA:

BEFORE THE
STATE BUILDING CODE TECHNICAL REVIEW BOARD

IN RE: Appeal of Monica and Michael Davis
Appeal No. 21-02

REVIEW BOARD STAFF DOCUMENT

Suggested Statement of Case History and Pertinent Facts

1. In March of 2020, the County of Augusta Department of Community Development (County Building Official), the agency responsible for the enforcement of Part 1 of the 2012 Virginia Uniform Statewide Building Code (Virginia Construction Code or VCC), issued a final inspection and a subsequent Certificate of Occupancy to Monica and Michael Davis (Davis), for a single-family dwelling located at 1002 Round Hill School Road, in Augusta County.

2. Shortly after moving into their new home, Davis contacted the County Building Official requesting he come to their home to inspect a variety of issues they had found with the home with attached garage and detached garage.

3. In June and July of 2020, the County Building Official visited the property several times investigating the issues brought forth by Davis. During one or more of these inspections, the County Building Official found several violations. On July 16, 2020, the County Building Official issued a letter to Hendricks and Son General Contractor, LLC citing seventeen (17) code violations.

4. On September 29, 2020, Schnitzhofer Structural Engineers visited the Davis home to evaluate the residence with detached garage and detached garage related to the cited violations in the July 16, 2020 letter from the County Building Official. Schnitzhofer Structural Engineers

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drafted a letter dated November 3, 2020, which was received by Augusta County on November 9, 2020. The Schnitzhofer Structural Engineers letter was reviewed and accepted by the County Building Official.

5. Davis filed a timely appeal to the Augusta County Board of Building Code Appeals (local appeals board) for the acceptance and approval of the Schnitzhofer Structural Engineers letter. Davis further appealed to the local appeals board to consider the proposal report from Engineer Solutions and require the builder to approach the cited violations with the suggested analysis process set forth in that report. The local appeals board upheld the decisions of the County Building Official finding that the Schnitzhofer Structural Engineers report was a valid engineering report for the Davis' structure.

6. On February 1, 2021, Davis further appealed to the Review Board.

7. This staff document, along with a copy of all documents submitted, will be sent to the parties and opportunity given for the submittal of additions, corrections, or objections to the staff document, and the submittal of additional documents or written arguments to be included in the information distributed to the Review Board members for the appeal hearing before the Review Board.

Suggested Issues for Resolution by the Review Board

1. Whether to uphold the decision of the County Building Official and the local appeals board that the Schnitzhofer Structural Engineers report is a valid report for the Davis structure.

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Basic Documents

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CERTIFICATE OF OCCUPANCY
COUNTY OF AUGUSTA
BUILDING INSPECTION

This certificate issued pursuant to the requirements of Section 118 of the Virginia Uniform Statewide Building Code certifying that at the time of issuance this structure was in compliance with the Building Code, Zoning Code and various ordinances of the county regulating building construction or use. This Certificate must be posted, as required by the Uniform Statewide building Code and permanently maintained in a conspicuous place at or near the entrance of the building. Any change of use voids this certificate of occupancy.

OWNER OF BUILDING Michael E. & Monica M. Davis TENANT Same

BUILDING LOCATIONS 1002 Round Hill School Road

BUILDING PERMIT NO 718-2019 TAX MAP NO. 48-116

BUILDING USE Single Family Dwelling ZONING DISTRICT General Agriculture

USE GROUP R-5 TYPE OF CONSTRUCTION 5B OCCUPANCY LOAD N/A FLOOR LOAD 30/40/50

CONSTRUCTED UNDER THE 2012 EDITION OF THE UNIFORM STATEWIDE BUILDING CODE

SPECIAL CONDITIONS None

NO. OF BEDROOMS 3 SPRINKLER REQUIRED N/A

BUILDING OFFICIAL Granville Wiseman /SES DATE March 27, 2020

SERVICE AUTHORITY N/A DATE N/A

COMMUNITY DEVELOPMENT N/A DATE N/A

COUNTY OF AUGUSTA

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF COMMUNITY DEVELOPMENT
P.O. BOX 590
COUNTY GOVERNMENT CENTER
VERONA, VA 24482-0590

20-735

July 16, 2020

CERTIFIED MAIL

Hendricks & Son General Contractor, LLC
604 Hilltop Drive
Staunton, VA 24401

Dear Mr. Hendricks:

On 6/10/20, 6/25/20 and 7/8/20 our office visited the Davis house, located at 1002 Round Hill School Road, to inspect concerns they have with the house you constructed under permit #718-2019. This house was constructed under the 2012 edition of the International Residential Code as amended by the Uniform Statewide Building Code. This letter is a report on our findings based on those inspections.

After review of the owner's concerns, inspections of those items, and inspections of the structures, I have concluded that the following items are not in compliance with the building code and need to be corrected:

1. The foundation on the detached garage does not comply with code sections R403.1.1 and R403.1.4.1.
2. Floor in detached garage is not sloping to the doors in accordance with section R309.1.
3. Sill plates in detached garage and house need anchor bolts within 12 inches of each sill plate splice in accordance with section R403.1.6. Need to correct to section R403.1.6 or provide an engineered design and approval in accordance with section R301.3.
4. Fascia trim on detached garage does not extend up behind the drip edge on the detached garage and the fascia is not protected per section R703.
5. Vinyl siding on detached garage and house not installed in accordance with the manufacturer's installation instructions.
6. Some of the roof trusses are not installed in accordance to the manufacturer's specifications. An engineer will need to evaluate and design the necessary repairs and approve those repairs once made.
7. Back porch floor beams not properly anchored with appropriate hangers to band board of house. Second option is to provide post with proper connector to beam to an approved foundation. Third option is to provide engineered design and approval in accordance with section R301.1.3.
8. Floor joist are not all installed in the joist hangers to manufacturer's specifications. Need to correct to manufacturer's requirements or provide engineers design and approval in accordance with section R301.1.3.

Staunton (540) 245-5700 TOLL FREE NUMBERS From Deerfield (540) 939-4111 FAX (540) 245-5066 Waynesboro (540) 942-5113

9. Need an architect or engineer to evaluate, design and approve the walls of the attached and detached garage as shears walls per section R301.1.3 as these walls cannot meet the prescriptive requirements for wall bracing in the residential code.
10. Front stairs exceed allowed slope of 2 percent per section R311.7.7.
11. Provide manufacturer's installation instructions that PVC trim boards are installed in accordance with manufacturer's specifications. They show excessive uncontrolled expansion.
12. Per numerous photos of owner's taken after drywall finishing but before paint, the drywall was not secured in accordance with table R702.3.5. Need to correct to table R702.3.5 or provide an engineered design and approval in accordance with section R301.1.3.
13. Header at master bath toilet where floor joist was cut was not installed to code. Need to correct to R502.10 or provide engineered design and approval in accordance with section R301.1.3.
14. Door in half bath in garage does not meet fire resistant requirements of R302.5.1. Need to replace with 1 3/8" solid core wood door, steel door or 20 minute fire door in accordance with section R302.5.1.
15. Grade to left of front stair needs to have proper grade in accordance with section R401.3 so that water will not pond behind sidewalk. (grade currently lower than sidewalk)
16. Dryer vent is installed in violation to section M1502.3 as it is within 3 feet of foundation vent which is a building opening. It needs to be rerouted to an approved location. Screws holding the duct together cannot protrude more than 1/8" into the duct. Duct cannot exceed 35 feet in equivalent length taking into account reductions for fittings in accordance with section M1502.4.4.1.
17. In addition we have been contacted by the owner that the attic access door is 22" X 22" instead of the 22" X 30" as required by section R807.1. You will need to check and correct if necessary.

Please contact our office within 14 days of receipt of this letter with a timetable to correct these violations.

Sincerely,

G.W. Wiseman

G.W. Wiseman
Building Official

300 EAST WATER STREET CHARLOTTESVILLE, VA 22902
SCHNITZHOFER
STRUCTURAL | ENGINEERS
434.220.1035 SCHNITZHOFERANDASSOC.COM

NOVEMBER 03, 2020

SCHNITZHOFER & ASSOCIATES, LLC.
300 E WATER STREET
CHARLOTTESVILLE, VA 22902

9 N. NEW STREET
STAUNTON, VA 24401

REPORT ISSUE DATE:	11.03.2020
PROJECT NAME:	1002 ROUNDHILL SCHOOL RD
S&A PROJECT ID:	20-081

REGARDING: **STRUCTURAL ASSESSMENT**

Dear Jay:

A licensed structural engineer (P.E.) from Schnitzhofer & Associates, LLC (S&A) visited the residence located at the above listed location on September 29, 2020. The purpose of the site visit was to document the condition of the exposed, visible, in-place structural elements related to the following:

Primary House

- **Foyer Foundation**
- **Simpson Hanger Connection**
- **Roof Beam**
- **Overbuilt Trusses**
- **Roof Sheathing Plane**
- **Drywall**
- **Roof Truss at Front Bedroom**
- **Crawlspace Pier Location**
- **Joist Blocking at Crawlspace Plumbing**
- **Crawlspace Ventilation**
- **Anchor Bolt Spacing**

Detached Garage

- **Garage Portal Frame**
- **Concrete at Corner of Foundation**

Dear Jay,

A licensed structural engineer for Schnitzhofer & Associates, LLC, further referred to as S&A, has visited the project jobsite, in the interest of addressing the potential framing issues presented to us. The purpose of our site visit and subsequent report is to provide our opinion regarding the acceptability of the visible structural foundation and framing element conditions present in the field.

Introduction

James R. Schnitzhofer, P.E. visited the home on September 29th 2020. Mr. Schnitzhofer was accompanied by Nate McConaughey, a licensed structural engineer from our Staunton branch. The owners of the property were also present. Mr. Schnitzhofer is an expert in structural consulting and has overseen 1500 structural engineering design projects throughout Virginia, and the "Valley". During his tenure at the head of Schnitzhofer & Associates, he has become intimately familiar with all aspects of local construction norms, standards of practice, standard of care, and construction craftsmanship. During the site visit completed recently, Mr. Schnitzhofer immediately noticed the high caliber construction that was in place. Generally, the quality of detail with regards to craftsmanship, and overall quality installation of the in place primary house framing and foundation systems, all appeared to be exceptional, compared to many counterpart contractors within this area.

Findings and Recommendations (Primary Residence)

1. Foyer Foundation

   S&A Response: The front foyer framing appears to bear directly onto the CMU foundation wall. It is our understanding that this condition was inspected by, and approved by, the building inspector. Given the visible framing conditions present at the site, it is the opinion that this foundation system has been installed in general conformance with standard construction practice for this region.

2. Simpson Connections/Hangers At Floor Joists

   S&A Response: The floor joists appear to adequately bear into the joist hanger seat. It is our understanding that this condition was inspected by, and approved by, the building inspector. The shear nails appear to be attached through the shear hanger fasteners holes, and potentially fall short of penetrating the supporting beam. In the interest of making a final determination regarding the adequacy of this connection, a licensed structural engineer from our firm contacted the technical/engineering division of Simpson Strong Tie. We discussed in detail the condition present at this location. Based upon the outcome of that conversation, it is our opinion that the connection is acceptable for safe and continued occupancy. For further clarification regarding this matter, we suggest that the owner contact a licensed structural engineer, in the interest of having them explain the material behavior and stress dynamics that Simpson uses for their load tables.

3. Roof Beam

S&A Response: The roof beam in question appears to be installed in general conformance with industry standards. It is our understanding that this condition was inspected by, and approved by, the building inspector. From a structural standpoint, we have determined that though a structural analysis of the subject beam, the beam is adequate to safely support the gravity loads at this location. From a construction standpoint, it is the opinion of S&A that the beam is installed in general conformance with the standard of care of this region.

4. Overbuilt Trusses

S&A Response: The overbuilt trusses in question appear to be installed in general conformance with industry standards. It is our understanding that this condition was inspected by, and approved by, the building inspector. From a structural standpoint, it is the opinion of S&A that the overbuilt trusses are installed in conformance with standard construction practice. In fact, the method in which the overbuilt trusses have been installed, is the method our firm recommends. In light of this, it is our opinion that this is not a structural issue.

5. Roof sheathing Plane at Overbuilt Trusses

S&A Response: The sheathing over the overbuilt trusses in question appear to be installed in general conformance with industry standards. It is our understanding that this condition was inspected by, and approved by, the building inspector. From a structural standpoint, it is the opinion of S&A that the sheathing at this area is installed in conformance with standard construction practice. It is very common that minor fluctuations within the roof sheathing plane occur with a complicated roof truss system such as the one present at this home. More specifically, it is our opinion that the roof sheathing installation is within generally acceptable tolerable limits for a framing project of this type.

6. Drywall – Bonus Room

S&A Response: It is our understanding that a majority of the drywall hanging installation at this area was completed by the homeowner – not the contractor. Generally speaking, drywall installation within pre-engineered bonus room truss web members is more complicated than installation onto a standard stick framed structure. As a result of the variations in roof truss profiles and anticipated movement/expansion/contraction of the truss web and chord members, it is generally understood that the anticipated likelihood of a perfect "finish plane" is very low. In light of this, it is the opinion of S&A that the drywall at this area is in a condition that one would expect for installation at the interior of the pre-engineered wood truss web members. The drywall within the primary structure, however, appears to have been installed in an exceptionally well manner, and appears to have a very high quality "finish plane" overall.

7. Roof Truss at Front Bedroom:

S&A Response:

While at the site, the homeowner indicated to our engineer that there was a potential problem with the truss bearing over the front bedroom. It is our understanding that this condition was inspected by, and approved by, the building inspector. However, it is our pinion that the homeowner misunderstood the behavior of pre-engineered trusses, and appears to have applied a faulty understanding of this condition. It is our opinion that the truss bearing does not occur as the homeowner suggested, and that the trusses within his area appear to have been installed correctly, and in accordance with generally accepted practice. Overall, we found that the roof system framing is in very good condition, and was installed in conformance with generally accepted construction practices for this area.

8. Crawlspace Pier

S&A Response: Based upon the assessment of the piers within the crawlspace, we found that the piers have been installed in conformance with generally accepted construction practices. It is our understanding that this condition was inspected by, and approved by, the building inspector. Additionally, based upon our assessment of the adjusted loading condition as a result of the 2" offset mentioned by the owner, it is our opinion that this condition is acceptable and is not in need of structural reinforcements.

9. Joist Blocking at Crawlspace Plumbing

S&A Response: It is common that alternate framing configurations are used in construction of this type. These are commonly referred to as "field adjustments". In this case it appears that the contractor supported the plumbing supporting joists with a standard "bulkhead" framing adjustment. It is our understanding that this condition was inspected by, and approved by, the building inspector. However, this minor framing adjustment could easily be strengthened by the installation of one new joist, immediately adjacent to the compromised joist. Given the circumstances, this repair would entail about $50 in materials, and about 20 minutes to complete. A new Simpson face mount joist hanger could then support the cross member(s), 'bulkhead". Finally, this issue is extremely minor and, under no circumstances would this rise to the level of a legal dispute, or the idea that the contractor has provided work that is not in conformance with the standard of care of this area. Additionally, this does not indicate that the structure is "unsafe".

10. Crawlspace Ventilation

S&A Response: Based upon our calculations, Schnitzhofer and Associates, LLC found that the crawl space ventilation area provided does exceed the required area. We recommend review by the building official, in the interest of approving the removal of the vent adjacent to the dryer vent. Specifically, the building official will need to approve the removal of a vent within 3 feet of a building corner.

11. Anchor Rods

S&A Response: Based upon our assessment, Schnitzhofer and Associates, LLC found that the anchor rods are spaced as needed to satisfy the spacing requirements within the building code. However, there may be the need for additional anchors to be installed at the locations where the sill terminates. This operation is relatively easy and cost effective to accomplish. It is our understanding that this condition was inspected and approved by the building department. However, if you are in need of this reinforcement design, please contact S&A and we will prepare a quote for the retro-fit anchor installation specifications.

Findings and Recommendations (Detached Garage)

12. Braced Frame/Portal Frame at Garage Doors

S&A Response: It is the understanding of S&A that the garage portal frames have been installed as directed by the building inspector, have been inspected, and ultimately approved by the County. However, we understand that the inspector now believes the framing is inadequate. In light of this, we believe that, by the introduction of additional shear wall length (Approximately 4 feet) , new hold down anchors, and minor foundation reinforcement, the portal wall can be reinforced to adequately support the anticipated lateral loads. Specifically, we suggest the removal of the 10 ft x 10 ft doors, installation of two new, 2 foot braced walls in each bay, removing and infilling the man door, then replace the existing garage doors with new doors to fit the adjusted openings. This work would be completed in conjunction with foundation reinforcements as needed to provide adequate anchorage for load path to foundation continuity, in the interest of resisting overturning forces present in the shear walls. Contact S&A for a design of the final braced wall and foundation reinforcement specifications, if needed.

13. Concrete at Corner of Foundation

S&A Response: It is the understanding of S&A that the corner of the garage foundation has been exposed to reveal the slab edge. During the time of the site visit, approximately 2-3 feet of the turn down slab foundation was exposed. If the frost depth needs to be met at this location, we suggest pouring additional concrete at this area, to comply with the local building department frost depth requirements. This is a very easy solution to this condition. We have not reviewed or commented on any foundations that were not exposed during the time of the site visit.

Executive Summary

- A licensed structural engineer from Schnitzhofer & Associates, LLC visited the home and completed a visual assessment of the in-place framing within the interior of the primary home, including the bonus room and the attic framing area. Based upon our many years of review of residential construction in this area, other than the minor recommendations for framing adjustments listed above, we have found that the overall framing we were asked to review within the primary home is in conformance with generally accepted construction practices for this area. Additionally, we believe that workmanship represents an appreciation for the standard of care one would expect under the conditions present of this home.

LIMITATIONS

While Schnitzhofer & Associates, LLC has completed a visual assessment of the above listed items, we were not provided the photographs shown to our staff during the site visit. A review of these photographs would be beneficial to resolving the framing questions posed by the owner. If you would like us to comment on the framing that is covered up, we suggest providing our engineers with the photographs showing the areas in question. Otherwise, it may be useful for the home occupants to demo the interior finishes where they believe a structural framing issue exists, and have their engineer review these framing elements. If their engineer then believes that there is a framing deficiency, then they could forward those findings to you for additional review. Overall, it is our understanding that neither the building official, our engineer, nor any other engineer, has found a framing issue within the roof framing viewed by our staff while inspecting the attic framing during the site visit, and, as such, it is logical to assume that demolishing the drywall is not warranted at this time. Generally, there would need to be significantly more damage to the interior finishes, for an engineer to believe there is a structural defect in the overall framing system. Currently, the evidence of a framing deficiency is not visible. We have only completed an assessment of the items in question listed above. We are happy to provide a full structural analysis of the home. However, based upon our assessment while at the site, we don't feel this is necessary. Should you be in need in of a full analysis of the home, please contact us and we will prepare a proposal for services.

Schnitzhofer & Associates, LLC are happy to provide this structural assessment report with regards to the project located in Crimora, VA. Please feel free to contact us at 540-448-8321 at any time to discuss this structural report.

COMMONWEALTH OF VIRGINIA
11.03.2020
JAMES R. SCHNITZHOFER
Lic. No. 43910
PROFESSIONAL ENGINEER

Sincerely,

James Ray Schnitzhofer P.E.
President

Cc: file

COUNTY OF AUGUSTA
COMMONWEALTH OF VIRGINIA
DEPARTMENT OF COMMUNITY DEVELOPMENT
P.O. BOX 590
COUNTY GOVERNMENT CENTER
VERONA, VA 24482-0590

Appeal No. ________________

REVISION Dropped Off @ the Government Center, Tuesday December 8, 2020 @ 8:00 AM

Application for Appeal

Augusta County
Locality

I (we) Monica and Michael Davis of 1002 Round Hill School Road Crimora VA 24431
(name) (mailing address)

respectfully request that the Local Board of Appeals review the decision made on

November 16, 2020 , by the code official. Via email to the Davis November 17,2020

Description of Decision Being Appealed: All items on report dated November 03, 2020 from James Schnitzhofer with Schnitzhofer & Associates, LLC. Report was received at the Augusta County Office November 9, 2020

Location of Property Involved: 1002 Round Hill School Rad

What is the applicant's interest in the property?
X Owner

Relief Sought: We request the board review the provided report and determine that the proper required analyzes and new design in reference to the structures current state was not provided that was required by the county official in the notice of violations that was served. As stated only visual inspection were performed. Visual inspections were performed by the Head County Building Inspector and determined to be in violation of the USBC. We request the board consider the proposal report provided by Engineer Solution and require the builder to approach the issues at hand with the appropriate analysis that Engineer Solutions is suggesting in their report and be the new requirement for the required analysis and new design. That decision would require the builder to utilize the proposal set forth by Engineer Solutions and hire that party to compete the analysis process that we the homeowners have already started.

Attach the Decision of the Code Official and Any Other Pertinent Documents.

Filed at________________, Virginia, the________-day of______________________-, 20__

COUNTY OF AUGUSTA

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF COMMUNITY DEVELOPMENT
P.O. BOX 590
COUNTY GOVERNMENT CENTER
VERONA, VA 24482-0590

WRITTEN DECISION

Appeal No. 20-2

Michael & Monica Davis **v.** Building Official

The Building Official's decision is hereby upheld**, for the reasons set out below:**

We find the engineer's report from Schnitzhofer Structural Engineers, Schnitzhofer project number 20-081 dated 11-3-2020 to be a valid engineer's report on the Davis structure.

Date: 1/13/21

Signature:
Chairman of Local Board of Appeals

Note: **Any person who was a party to the appeal may appeal to the State Building Code Technical Review Board by submitting an application to such board within 21 calendar days upon receipt by certified mail of this resolution. Application forms are available from the Office of the State Review Board, 600 East Main Street, Richmond, VA 23219, (804)371-7150.**

Staunton (540) 245-5700 Deerfield (540) 939-4111 FAX (540) 245-5066 Waynesboro (540) 942-5

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
State Building Codes Office and Office of the State Technical Review Board
Main Street Centre, 600 E. Main Street, Suite 300, Richmond, Virginia 23219
Tel: (804) 371-7150, Fax: (804) 371-7092, Email: sbco@dhcd.virginia.gov

APPLICATION FOR ADMINISTRATATIVE APPEAL

Regulation Serving as Basis of Appeal (check one):

X Uniform Statewide Building Code
- X Virginia Construction Code
- ☐ Virginia Existing Building Code
- ☐ Virginia Maintenance Code

☐ Statewide Fire Prevention Code

☐ Industrialized Building Safety Regulations

☐ Amusement Device Regulations

RECEIVED
FEB 1 2021
OFFICE OF THE REVIEW BOARD

Appealing Party Information (name, address, telephone number and email address):
Monica Davis & Michael Davis
1002 Round Hill School Road Crimora, Virginia 24431
1(540)810-2532
Monica.davis27@comcast.net

Opposing Party Information (name, address, telephone number and email address of all other parties):
Augusta County Building Official PO BOX 590 County Government Center, Verona VA 24482
G.W. Wiseman 1(540)245-5717 or 1(540)245-5700
gwiseman@co.augusta.va.us

Additional Information (to be submitted with this application) o
Copy of enforcement decision being appealed
Copy of the decision of local government appeals board (if applicable) o
Statement of specific relief sought
All items are attached in the email submitted

CERTIFICATE OF SERVICE

I hereby certify that on the 01 day of ,February 20,21 a completed copy of this application, including the additional information required above, was either mailed, hand delivered, emailed or sent by facsimile to the Office of the State Technical Review Board and to all opposing parties listed.

> **Note:** This application must be received by the Office of the State Technical Review Board within five (5) working days of the date on the above certificate of service for that date to be considered as the filing date of the appeal. If not received within five (5) working days, the date this application is actually received by the Office of the Review Board will be considered to be the filing date.

Signature of Applicant: __ Michael [signature] Monica Davis

Name of Applicant: _Monica Davis & Michael Davis_________________________________
(please print or type)

Statement of specific relief sought

Our request for specific relief sought is to require the proper inspections be performed and require penetration of walls and other parts of the structure and requiring analysis with mathematic calculations and new design to be provided for all the items on the engineers report. Some items called out on the engineer report do not actually address the code violation so we request the board review those as still being in violation and review attached documents to support the violation in review. The codes that are referred to are reference to what we the homeowners think is the general direction for the violation BUT if the board views other issue that are in violation we request that the code that has been sighted be changed to address any new direction for violations or add additional items to the appeals.

Item 1: on the NOV for the foundation on the detached garage **Code R403.1.4.1**Frost protection. Except where otherwise protected from frost, foundation walls, piers and other permanent supports of buildings and structures shall be protected from frost by one or more of the following methods, as well as **Code R403.1.1**Minimum size. Minimum sizes for concrete and masonry footings shall be as set forth in Table R403.1 and Figure R403.1(1). The footing width, W, shall be based on the load-bearing value of the soil in accordance with Table R401.4.1. Spread footings shall be at least 6 inches (152 mm) in thickness, T. Footing projections, P, shall be at least 2 inches (51 mm) and shall not exceed the thickness of the footing. The size of footings supporting piers and columns shall be based on the tributary load and allowable soil pressure in accordance with Table R401.4.1. Footings for wood foundations shall be in accordance with the details set forth in Section R403.2, and Figures R403.1(2) and R403.1(3). YOU WILL FIND THIS UNDER NUMBER 13 ON THE ENGINNERS REPORT FROM SCHNITZHOFER. Be informed per number 13 verbiage the only part of the garage foundation that was addressed was a 2-3 foot corner that was exposed. Code R403.1.4.1 speaks to the foundation as a uniform unit not a just a small portion that is being addressed in the engineers report.

The provided images will show two different locations of the supposed footing that was exposed on opposite ends of the same wall of the structure and will show the same findings in both locations, that there is no footer. After reviewing the provided engineers report from our builder and the abnormal suggested repair for pouring additional concrete in the hole IF the frost depth needs to be met. The engineer clearly confirms an issue with the concrete as did the County Building Official. The engineer states only approximately 3 feet of the slab was exposed which is accurate. TO show the slab has the same nonexistent footing the slab was exposed on the opposite end if the same wall of the of the structure and it was discovered to be just as the same findings in the other exposed location that there is no turn down footer on this structure as code requires. We request proper analysis be performed on the entire perimeter of the concrete slab requiring it to be exposed and require a new design be provided if a new design cannot be provided to utilize the space as its original intentions the we request a honest approach to what should be the outcome of the structure.

Please be advised that the concrete itself also fails under item 2 on the NOV letter for code R309.1 as it indicates on the report the concrete does not slope toward the doors. Sadly the violations for this structure do not stop there. Again it failed under item 3 R403.1.6 for sill plate anchor bolts. Yet again under number 4 on the NOV per code R703 for weather-resistant exterior wall envelope, number 5 for the vinyl siding fall off, number 9 for the 12 foot walls with no additional bracing. Last but not least not on any report because it was just discovered the required wall blocking for wind in code R??????? For the detach garage structure is in violation of that code as well. At what point in relation to the code do you determine that the structure is in violation of entirely too many key structure codes that compromises the safety and integrity of the structure is in no way sound and should be demolition and rebuilt? The structure was to be designed to utilize and install an automotive lift to be able to perform maintenance to our own automobiles. As well as house and park our oversized truck. The need for the 10x10 foot doors on this structure is a must as the automobile we want to house in it is measure over 7 ½ feet in height and 8 1/2 feet in width.


Image taken 01/12/21 by Monica Davis
Back corner of garage no footing close up


Image taken 01/12/21 by Monica Davis
Back corner of garage no footing


Image taken 01/12/21 @3:00 PM by Monica Davis Image show front left corner no footer


Image taken 1/12/21 @ 3 PM by Monica Davis image shows close up of front left corner no footing

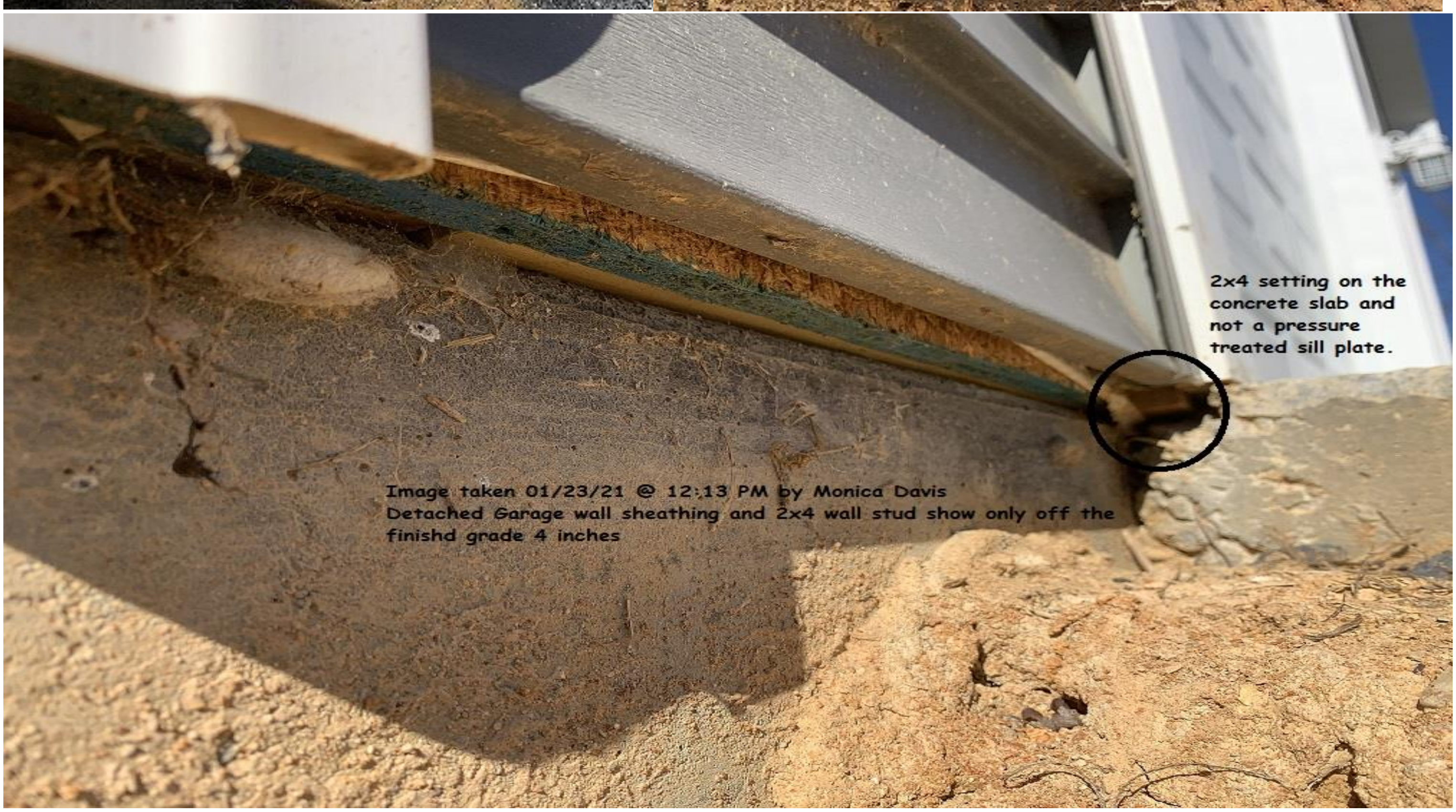

2x4 setting on the concrete slab and not a pressure treated sill plate.
Image taken 01/23/21 @ 12:13 PM by Monica Davis
Detached Garage wall sheathing and 2x4 wall stud show only off the finishd grade 4 inches


Image taken 01/23/21 @ 12:13 PM by
Monica Davis Detached Garage left back
corner dug out showing no turn down
footer. Slab only extends 10 inches in
the ground and not 24 inches like the
code requires


Image taken 01/23/21 @ 12:13 PM by Monica
Davis Detached Garage front left corner, shows
the slab with what the builder called a footing is
in total only 13 inches thick

Item 3 : on the NOV for the sill Plate anchor bolts on the house and garage code **R403.1.6Foundation anchorage**. Sill plates and walls supported directly on continuous foundations shall be anchored to the foundation in accordance with this section. Wood sole plates at all exterior walls on monolithic slabs, wood sole plates of *braced wall panels* at building interiors on monolithic slabs and all wood sill plates shall be anchored to the foundation with anchor bolts spaced a maximum of 6 feet (1829 mm) on center. Bolts shall be at least $^{1}/_{2}$ inch (12.7 mm) in diameter and shall extend a minimum of 7 inches (178 mm) into concrete or grouted cells of concrete masonry units. A nut and washer shall be tightened on each anchor bolt. There shall be a minimum of two bolts per plate section with one bolt located not more than 12 inches (305 mm) or less than seven bolt diameters from each end of the plate section. Interior bearing wall sole plates on monolithic slab foundation that are not part of a *braced wall panel* shall be positively anchored with *approved* fasteners. Sill plates and sole plates shall be protected against decay and termites where required by Sections R317 and R318. Cold-formed steel framing systems shall be fastened to wood sill plates or anchored directly to the foundation as required in Section R505.3.1 or R603.3.1. Interior braced wall plates shall have anchor bolts spaced at not more than 6 feet (1829 mm) on center and located within 12 inches (305 mm) of the ends of each plate section when supported on a continuous foundation. YOU WILL FIND THIS UNDER NUMBER 11 ON THE ENGINNERS REPORT FROM SCHNITZHOFER. Be informed per number 11 verbiage it states that the anchor rods are spaced as needed to satisfy the space requirements within the building code .That is inaccurate information.

The provided images will show we do not have the minimum of one anchor within 12 inches on the end of each plate as well as we have some locations with no anchors. Below you will find several images that show we have sill plates that have NO anchor bolts at all as well as plate sections that only have ONE anchor per sill plate, and locations that do not have the required anchor within 12 inches of the end of the plate and 90% of the nuts and washer do not comply because they are not tight. You can actually take them off with your hand and no needed tools. The nuts and washers are not even snug some nuts are just screwed down one or two threads making no contact at all with the washer or sill plate. The NOV for number 3 states “Need to CORRECT to section R403.1.6 OR PROVIDE an engineered design and approval in accordance with R301.3”. Number 11 in the engineer reports states they will prepare a quote for retro-fit anchor installation specifications. The verbiage clearly indicates that they have in no way, shape or form instructed the builder how to correct or provided an engineer design and approval. So we request the board require to inforce the verbiage in the NOV and require it to be CORRECT to section R403.1.6 OR PROVIDE an engineered design and approval in accordance with R301.3.

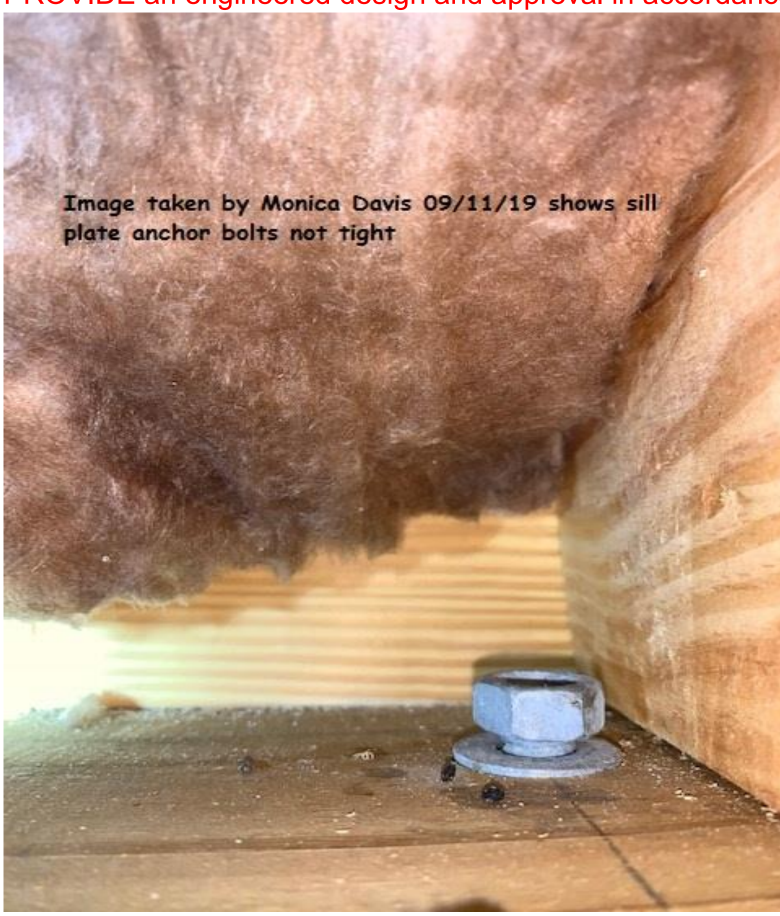



Image taken by
Monica Davis
1/26/21 @ 1:29
image shows no
anchor bolts
detached garage


Image take 08/23/19 @
7:21 AM by Monica Davis
Image shows no anchor bolt
on end of plate as code
requires

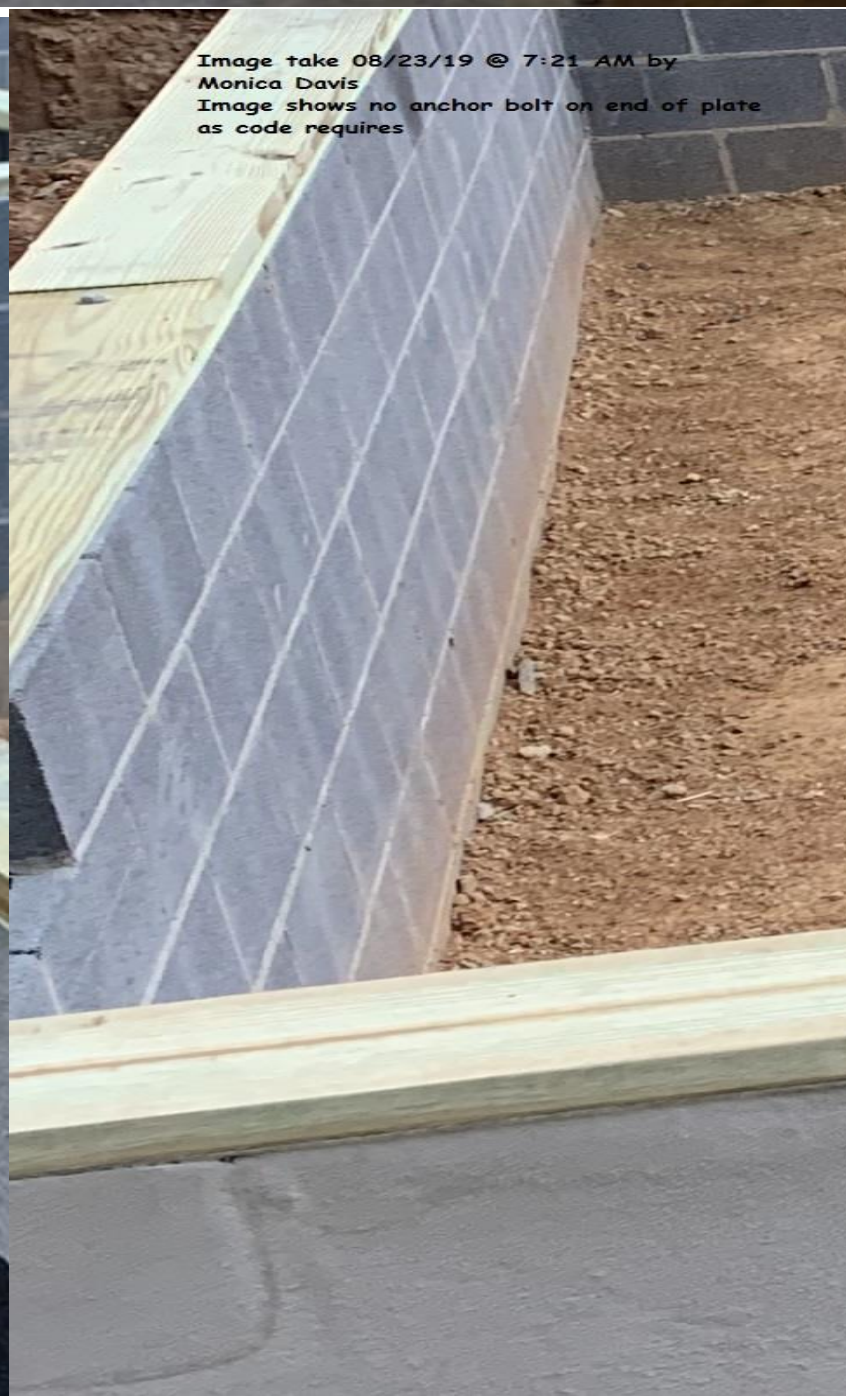


Image take 08/23/19 @ 7:21 AM by
Monica Davis
Image shows no anchor bolt on end of plate
as code requires

Item 6: on the NOV for the Roof trusses are not installed in accordance to the provided engineers truss design.

YOU WILL FIND THIS UNDER THE FOLLOWING NUMBERS 3, 4, 5, & 7 ON THE ENGINNERS REPORT FROM SCHNITZHOFER.

As it was stated to me by David Laurance the representative for UFP – Mid-Atlantic which is the company that designed the truss system and stamped them with the engineers seal for our dwelling. Mr Laurance said when a truss design is engineered an engineer has all the necessary calculations to ensure the proper design for the application. When created the design accounts for variables they anticipate the live load variable will change due to weather like snow, ice, sleet and so on. With that said the sealed stamp and approved design should never change once all calculations have been completed and the design put in to motion meaning the trusses being built and installed. He went on to say that all of the trusses are a system and damage to one part of the system affects the whole system. If one truss alone is moved, damaged or broken the system loses integrity in two planes: vertical and horizontal. Mr Laurance went on to say it would be a mistake to brush off what looks to be minor because I assure you the defect is not as localized as it appears, the entire system is compromised. Our conversation went on to discuss trusses being load bearing on interior walls that the design clearly calls out was not taken into account for. He said Mrs. Davis it's not rocket science in that aspect, if the truss are setting on the walls its bearing weigh. I went on to ask about the design calling out the 24" OC when set and he said what's to question it's a design not Legos you move where ever you want you move one truss outside of what the design calls for you compromise the entire system and its strength integrity. I ask if my truss design was in any way "overbuilt: as Schnitzhofer Enginner report called out? He said no its only built to withstand what the truss design information calls out, and if you have in any way not constructed it to that design then I can't even say that it withstand what is on the paper if you have shifted point loads and moved trusses outside of the original design. The images below will clearly show our original truss design has been compromised in not just one way but several. We have trusses that are more than 26 inches on center when the design clearly calls out for 24 inches on center. We have trusses that are resting on interior walls and the design clearly states that they are not design for that. We have a very important LVL beam that is part of the truss design that was installed in the ceiling and not in the floor. Images will show in the locating where that LVL beam was to be installed per the design we have a 2X10. To makes madders worse the floor is so messed up in that location they have all load bearing trusses setting on a 2X4 with scabs of press wood under it. To add yet another major issue the hangers that you can see have no hardware at all in them. Also in the same location we have trusses that the gap between the hanger and joining band board you can get your entire hand in the gap is so big. Last but not least the construction of the trusses clearly show in the provided images the roof sags and bulking we have going on.

The engineer report in number 3 states that "through structural analysis of the subject beam" in question for this is the LVL in the ceiling that belongs in the floor. If you go to page 6 of that same report under Limitations in the third line from the bottom. It states "we have only completed an assessment of the items in question and it goes on to say they are happy to provide a full analysis of the home, clearly calling out that no analyzes was ever even performed just visual opinions. In number 4 of the same report it calls out overbuilt trusses but was confirmed through the truss design company that we have no such thing. Number 5 of the same report speaks t the sheathing. It calls out "at this area" we are unsure what area that is. So we request the board require the trusses be corrected to the original design that was provided by UFP Mid Atlantic meaning removing the LVL that was installed in the improper location and installing it where it belongs, correcting the trusses to be the required 24 inches on center as the design required. Correcting the trusses that clearly were set higher and have the roof sheathing either sagging or raised.


image taken by
Monica Davis
08/22/20 truss
measures 26
inches on center
not the 24 inches
on center the
desin calls out for


Image taken by MOnica Davis shows how messed up and off the roof is.
How it that truss carring any load at all if the sheathing doesn even tough it.

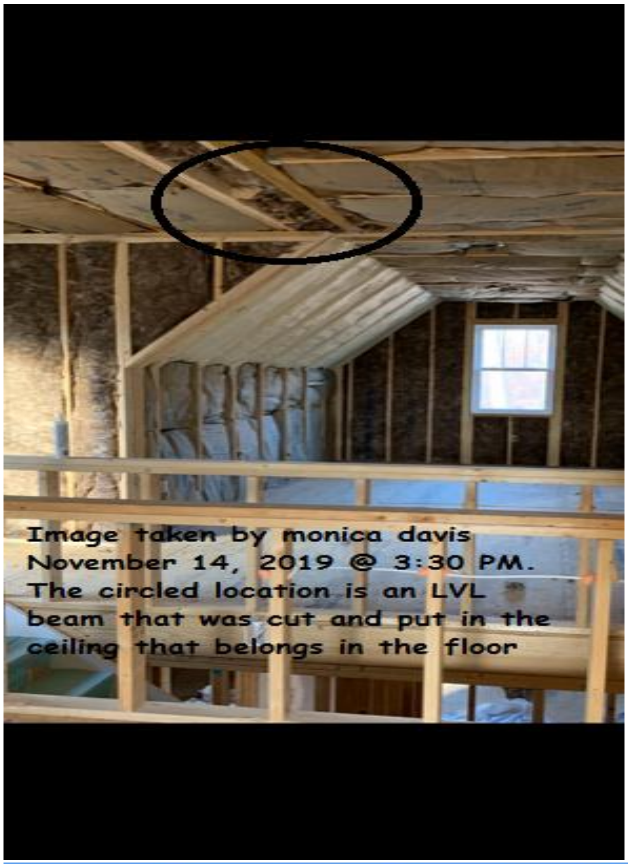


Image taken by monica davis
November 14, 2019 @ 3:30 PM.
The circled location is an LVL
beam that was cut and put in the
ceiling that belongs in the floor


image taken September 2020 by monica davis
truss set higher making roof raied


image taken 9/22/20 by monica davis show tons of sags in roof


image taken by monica davis trusses raised higher
causing sags in roof

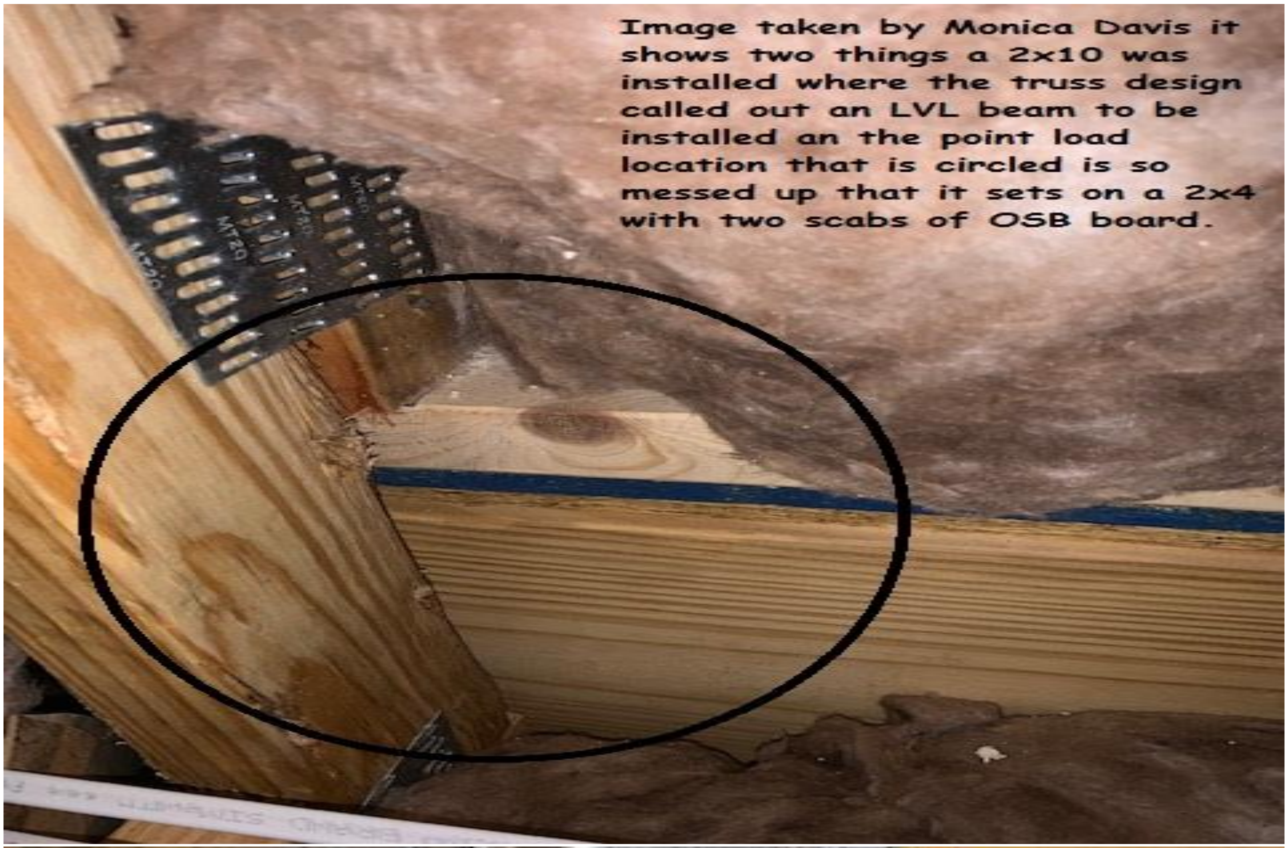


Image taken by Monica Davis it shows two things a 2x10 was installed where the truss design called out an LVL beam to be installed an the point load location that is circled is so messed up that it sets on a 2x4 with two scabs of OSB board.


Image taken 09/11/20 by monica davis shows no hardware nails in the hanger

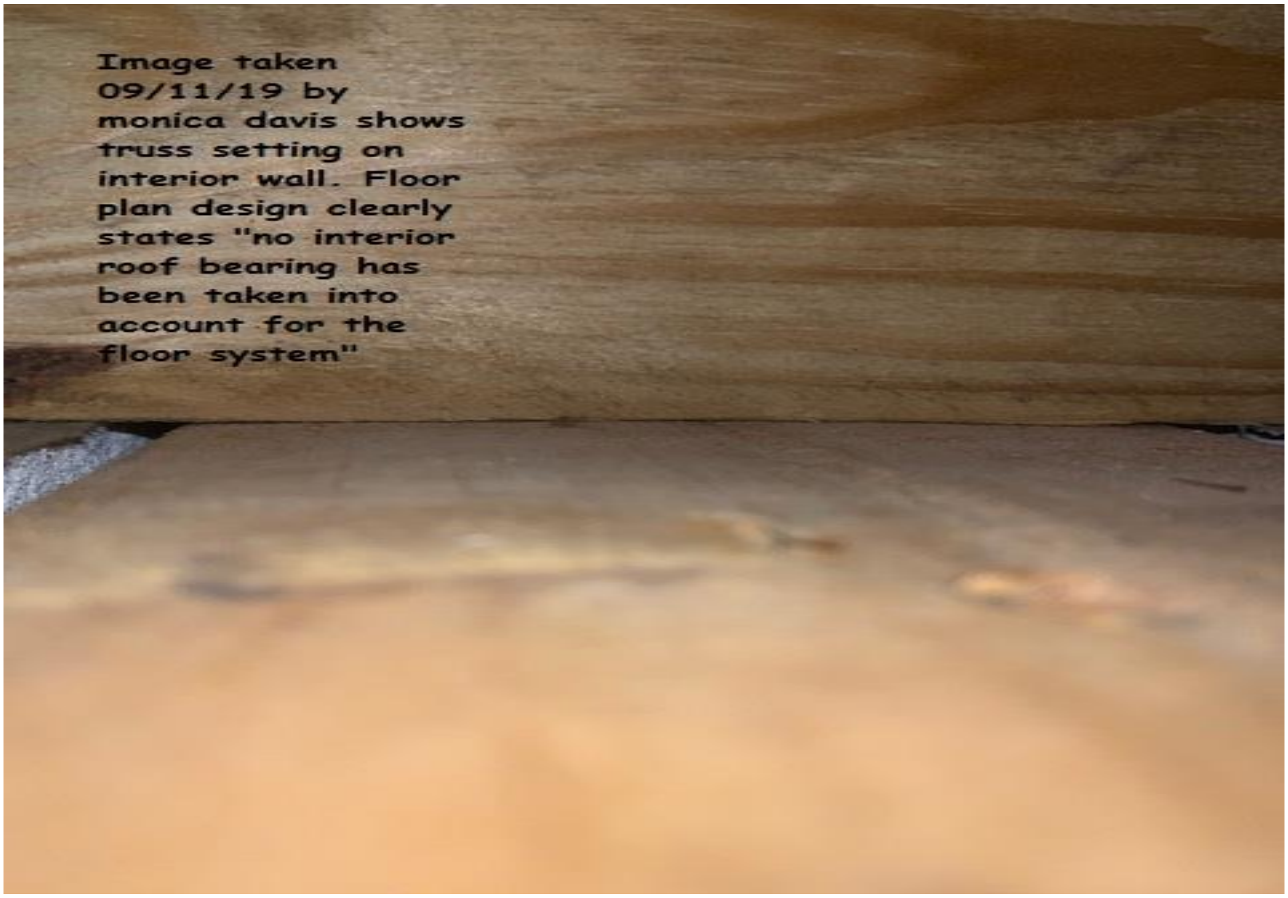


Image taken
09/11/19 by
monica davis shows
truss setting on
interior wall. Floor
plan design clearly
states "no interior
roof bearing has
been taken into
account for the
floor system"


image taken by monica davis
shows larg hanger connected to
nothing

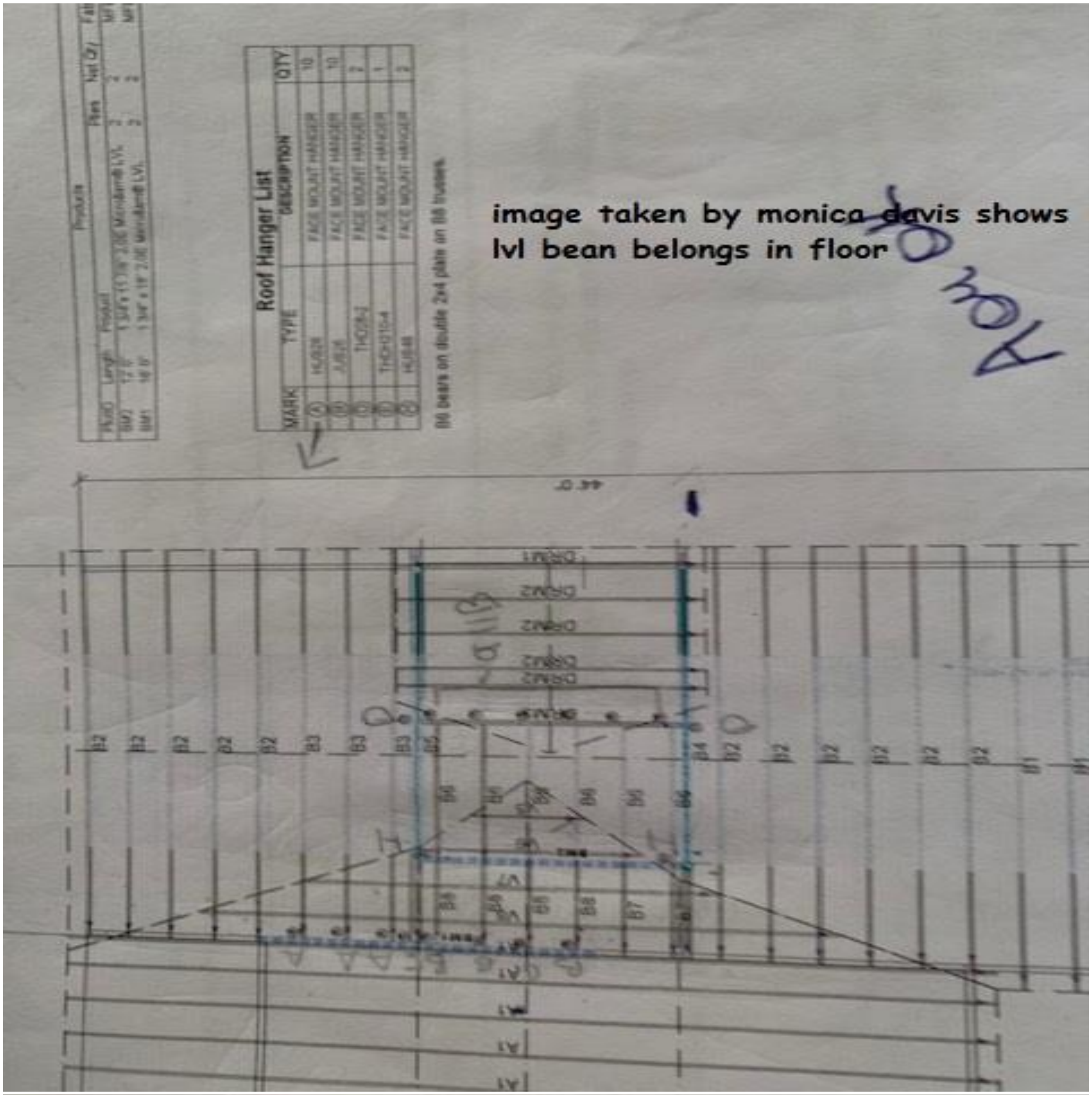


image taken by monica davis shows lvl bean belongs in floor

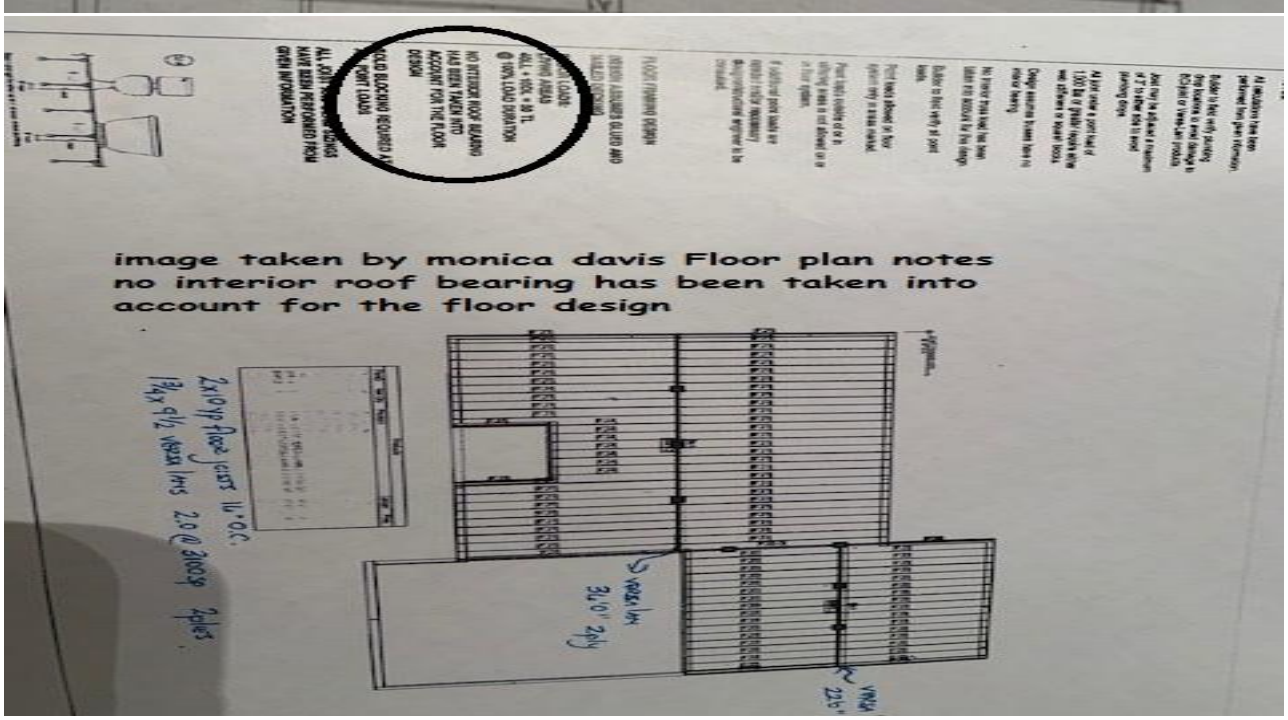


image taken by monica davis Floor plan notes no interior roof bearing has been taken into account for the floor design

Item 8: on the NOV for the Floor Joist installation in joist hanger. **R301.1.3Engineered design.** When a building of otherwise conventional construction contains structural elements exceeding the limits of Section R301.1 or otherwise not conforming to this code, these elements shall be designed in accordance with accepted engineering practice. The extent of such design need only demonstrate compliance of nonconventional elements with other applicable provisions and shall be compatible with the performance of the conventional framed system. Engineered design in accordance with the *International Building Code* is permitted for all buildings and structures, and parts thereof, included in the scope of this code. YOU WILL FIND THIS UNDER NUMBER 2 ON THE ENGINNERS REPORT FROM SCHNITZHOFER.

The provided images will show the supporting documents and emails from Greg Bundy Simpsons Strong Tie Senior Engineer. I have personally spoken with Greg on numerous occasion. I reached out to him again on January 19 to insure I did not in any way miss understand what we had discussed. I quoted the verbiage from Schnitzhofer report under number 2 that someone from that firm called the technical division and it was discussed in detail the conditions present at this location and based upon that it was the opinion that the connections is acceptable for safe and continued occupancy. The report goes on to say I should have a structural engineer explain the material behavior and stress dynamics that Simpsons Load table uses. What better person to get clarification from than an equal professional an engineer that works for the manufacture company that makes the product in question. Greg stated my issues have nothing to do with the material and stress load tables Simpsons has published in their literature. My issue falls under the allowable fastener technique that was used for hardware and allowable gaping between the fastener and the floor joist. Senior Engineer Gregory Bundy with Simpson Strong-Tie personally sent me literature that is published on the improper install of the floor joist hangers LUS210. Mr. Bundy indicated that builders performed the improper install using the 10D one and a half inch nail so much that they felt it was necessary to address and provide literature to all consumers of the appropriate repair. He informed me at that time as they have in the past personally. They always point individuals to the literature that is provided on the web page. It was stated no one at strong tie would ever tell someone that a particular install was ok when it is clearly called out on their literature that it is improper. Mr Greg Bundy went on to request that I attempt to get the individual that the engineer firm supposedly spoke with so they could in house address the allegation that such individual was providing inaccurate information. I was unable to do so. The images provided show we have large gapes for the LUS210 hanger that is clearly stated on Simpsons Literature is not allowed. Along with the documents referring to the double sheer nails and the current install not being acceptable. As I have 1 ½ inches nail that do not even penetrate the floor joist where the double sheer nail calls out to be installed that I should have a minimum length of 3 inches to achieve the publish load tables. Below is two separate emails with Greg one from November and one from January. The January was to just reassuring me that the information we had spoken on in the past is still accurate and the suggested repair avenues.

From: Greg Bundy <gbundy@strongtie.com>
Date: November 10, 2020 at 4:01:05 PM EST
To: monica.davis27@comcast.net
Subject: SST Literature

Hi Monica,

Attached is the literature you requested.

- T-C-HANGERGAP18 – Allowable Loads for Joist Hangers with Gaps
- L-C-LUSREPAIR19 – Repair of LUS Joist Hangers Installed with 10dx1½" Nails

I hope the information herein will assist you.

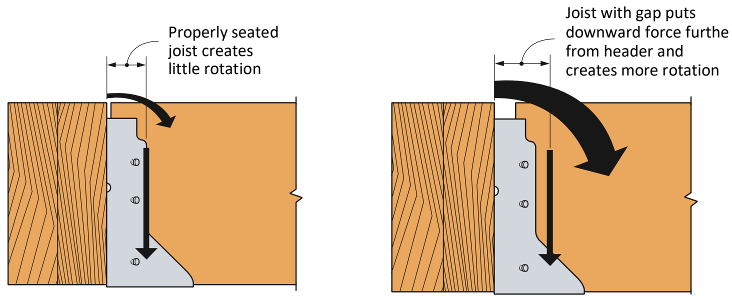
Sincerely,
Greg
Gregory D. Bundy, P.E. | Senior Engineer, Northeast USA | Simpson Strong-Tie | 614-850-4023

SIMPSON Strong-Tie®

As a requirement of the building codes, Simpson Strong-Tie® joist and truss hangers are tested in accordance with approved standards which define how to construct the test setup, how to load the assembly, and how to interpret the results. The test standards for these hangers, ASTM D7147 and ICC-ES AC13, require that they be tested with a 1⁄8" gap between the end of the carried member and the carrying member. Therefore, for hangers to achieve the full published allowable loads, the same conditions must be met in the field, i.e., that gaps between the carried member and carrying member not exceed 1⁄8".

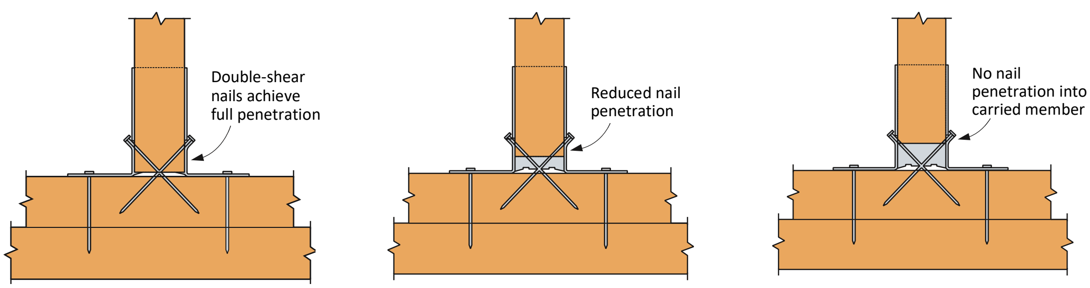
Testing performed by Simpson Strong-Tie has indicated that joist and truss hanger allowable loads are decreased when larger gaps are present. The amount of decrease in allowable load depends on the size of the gap, the type of hanger used, and the type and location of fasteners. Figures 1 and 2 below illustrate two ways in which gaps affect performance.

Figure 1 – Rotational Effects of Joist Hanger Gaps on Download Capacity (Side View)



(a) Gap up to 1⁄8" **(b) Gap Larger Than 1⁄8"**

Figure 2 – Effects of Gaps on Double Shear Nailing for Uplift Capacity (Top View)



(a) No Gap **(b) Small Gap** **(c) Large Gap**

If a gap larger than 1⁄8" exists between the end of a carried member and the girder, the reduced capacity of the connection must be evaluated. Testing was performed to establish allowable loads for common truss hangers with gaps up to 3⁄8". These allowable loads are shown in Tables 1 and 2. Testing was also performed to determine possible field remedies and repair scenarios when needed for a gap condition. Based on these additional tests, some possible repair options are provided on pages 4 and 5 for use by the Truss Designer or another design professional.

RECOMMENDED ACTION FOR HANGERS WITH GAPS LARGER THAN 1⁄8"

- In all cases involving a gap between the end of a carried truss and the girder that exceeds 1⁄8", the truss manufacturer should be notified to ensure that the truss is not adversely affected by the gap. In addition, all field remedies and repairs for gaps must be designed and approved by the Truss Designer or another design professional.

- For gaps up to 3⁄8", refer to the allowable loads in Tables 1 (DF/SP) and 2 (SPF/HF). (Note: Allowable loads for HTU hangers with gaps up to 1⁄2" are given in Table 6.) If the reduced allowable loads for a gap greater than 1⁄8" meet or exceed the design loads (download and uplift) for the hanger, the hanger is adequate and requires no repair to carry the loads. If any design load exceeds the corresponding allowable load, a repair or field modification is required to meet the design loads. See pages 4 and 5 for some possible repair options.

For gaps greater than 3⁄8" (1⁄2" for the HTU series), a repair is required unless otherwise approved. See page 5 for some possible repair options.

Attachment # 2

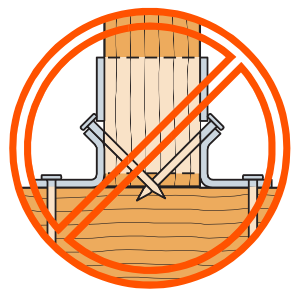
January 1, 2019

Re: Repair of LUS Joist Hangers Installed with 10dx1½" Nails

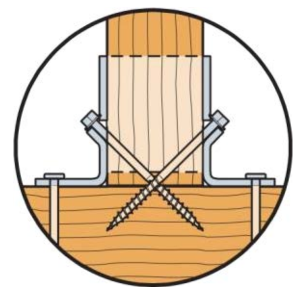
To Whom It May Concern:

Simpson Strong-Tie® LUS joist hangers require common joist nails with a minimum length of 3" to achieve the published load capacity. Simpson Strong-Tie does not support the use of 10dx1½" nails (0.148" dia. x 1½" long) into the double shear nail dome due to their lack of penetration into the header. The table below provides allowable loads for several LUS joist hangers installed and repaired with Simpson Strong-Tie Strong-Drive® SD Connector screws as follows:

1. 10dx1½" nails have been installed into the header and the joist.
2. All of the 10dx1½" joist nails have been removed without damaging the LUS joist hanger.
3. #9x2½" SD Connector screws have been installed into the joist using the dome nailing feature.
4. All other installation instructions found in the current *Wood Construction Connectors* catalog have been followed.



10dx1½” nailsmaynot be usedasdoubleshear nails



Replacedoubleshearnails withSD#9x2½” screws

Model No.	Fasteners		DF/SP Allowable Loads (lbs.)				SPF/HF Allowable Loads (lbs.)			
	Header	Joist	Uplift (160)	Floor (100)	Snow (115)	Roof (125)	Uplift (160)	Floor (100)	Snow (115)	Roof (125)
LUS24	4-10dx1½"	2-SD #9x2½"	385	540	620	675	330	465	535	580
LUS26	4-10dx1½"	4-SD #9x2½"	930	695	800	870	800	600	690	750
LUS28	6-10dx1½"	4-SD #9x2½"	1035	890	1025	1115	890	765	880	960
LUS210	8-10dx1½"	4-SD #9x2½"	980	1085	1250	1355	845	935	1075	1165

1. Uplift loads have been increased for wind or earthquake loading with no further increase allowed. Reduce where other loads govern.
2. **FASTENERS:** 10dx1½" = 0.148" dia. x 1½" long nail, SD #9x2½" *(model SD9212)* = 0.131" dia. x 2½" long structural-connector screw.

The information in this letter is valid until **12/31/20** when it will be re-evaluated by Simpson Strong-Tie. Please visit strongtie.com for additional pertinent information. If you have questions or need further assistance regarding this matter, please contact the Simpson Strong-Tie engineering department at 800.999.5099.

Sincerely,

SIMPSON STRONG-TIE COMPANY INC.

HERE IS THE SECOND EMAIL WITH MR BUNDY AND HE CONFIRMS THAT THE INFORMATION IS INDEED ACCURATE AND SHOULD BE USED AS A REFERENCE FOR REPAIRS.

From: Greg Bundy <gbundy@strongtie.com>
Date: January 26, 2021 at 9:47:24 AM EST
To: Monica Davis <monica.davis27@comcast.net>
Subject: RE: SST Literature

Hello Monica,

Attached is the current version of T-C-HANGERGAP and L-C-LUSREPAIR. This information is accurate and should be used for reference.

NOTE: The only difference between the literature I emailed you in November and this literature is the expiration date.

- T-C-HANGERGAP18 – new expiry date of 06/21
- L-C-LUSREPAIR21 – new expiry date of 12/31/22

Hope this answers your questions.

Sincerely,

Greg


Image taken 1/26/21 by Monica Davis @ 11:15 AM floor joist does not even rest in the hanger the only thing holding this hanger up is the small amount of penetratoin that 1 1/2" sheer nails display


Image taken 01/18/21 by Monica Davis Image shows double shear nails do not even penetrate the header board

We request the floor joist hangers be reviewed and both the twice the size of the up to allowable gap and improper hardware be required to be repaired to Simpsons literature.

<u>Item 9</u>: on the NOV for the Shear walls per R301.1.3 attached and detached garage walls. I will be honest when I say I do not fully know how to approach this item as I do not fully understand it. I can make you aware for the detach garage has walls that are the full 12 foot in length with no additional bracing just some inserted after the fact block that images will show are not connected to the sheathing on the outside and can actually be turned a full 360 degrees by hand which clearly add no additional support. YOU WILL FIND THIS UNDER NUMBER 12 ON THE ENGINNERS REPORT FROM SCHNITZHOFER.

Since the code violation calls out two separate location we will start with the detached garage. For clarification this detached garage has two walls that are 12 foot in height that set directly on the concrete and 2 walls that are over 1o foot tall that set on 2 run of cinderblock. One of the 12 foot walls is actually the opening side that has two 10x10 foot garage doors and a man door. Below you will see images that show we have 12 foot walls that are weight bearing that were not engineered to be that way and have no added support. You will also see we have over 10 foot walls that have the same issue. One the engineer report under number 12 it suggest removing the man door all together and down sizing the garage door. The first question that comes to mind is if you remove the man door how do you access the structure?? Second in no way does the engineer address the other 3 walls. They just go on to say in their report to contact them for design of final braced walls and foundation reinforcement. That statement confirms as the county official sited the structure for violations that it indeed is in violation and needs correcting.


Image taken by Monica
Davis 1/26/21 @ 1:32 tape
measure show wall is 12 foot
tall on this part of the
detached garage


Image taken by
Monica Davis
1/26/21 @ 1:29
tape measure show
wall is 12 foot tall
on this part of
the detached
garage

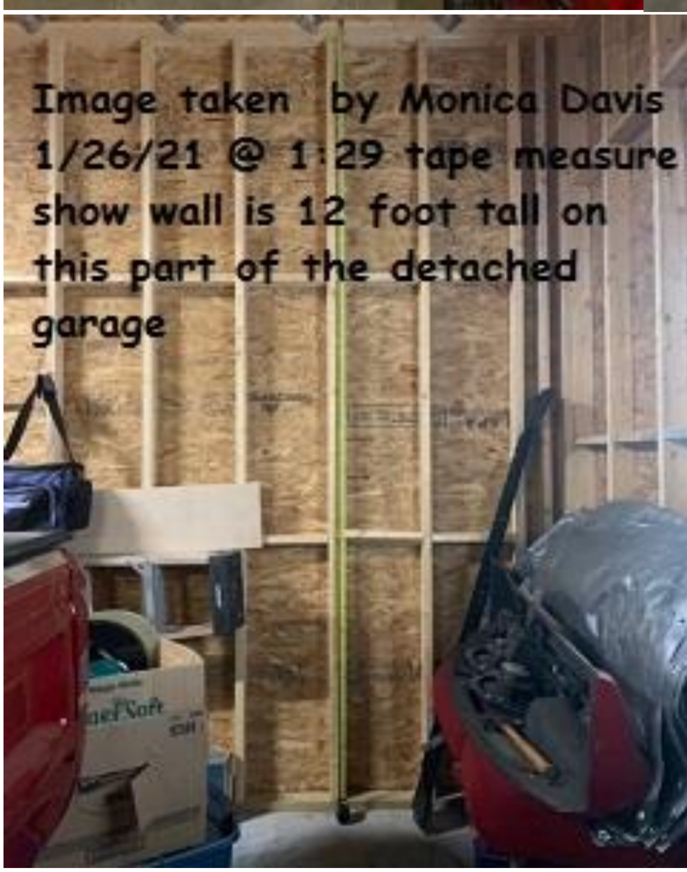


Image taken by Monica Davis
1/26/21 @ 1:29 tape measure
show wall is 12 foot tall on
this part of the detached
garage


Image taken
by Monica
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@ 1:29 tape
measure show
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garage

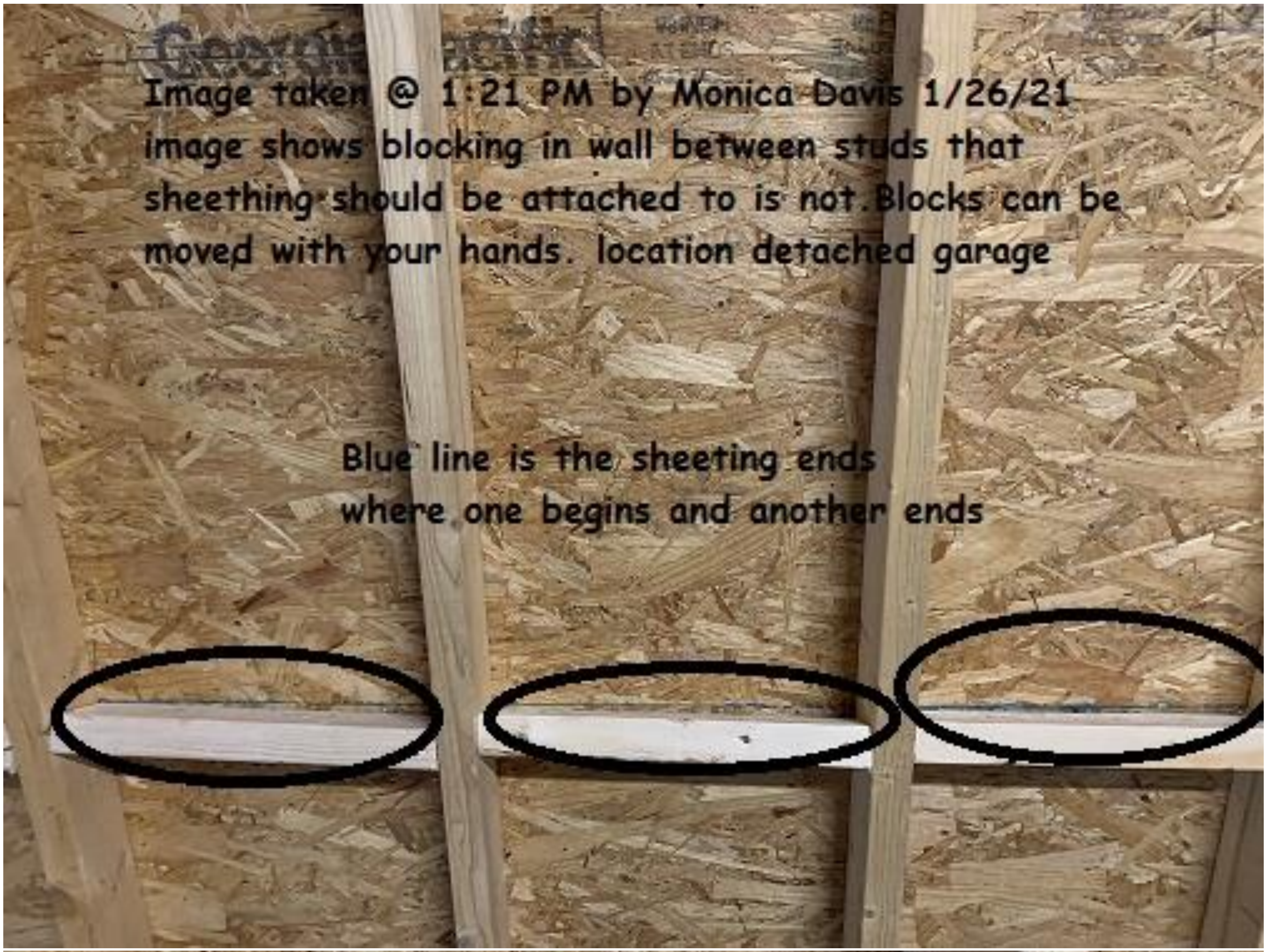
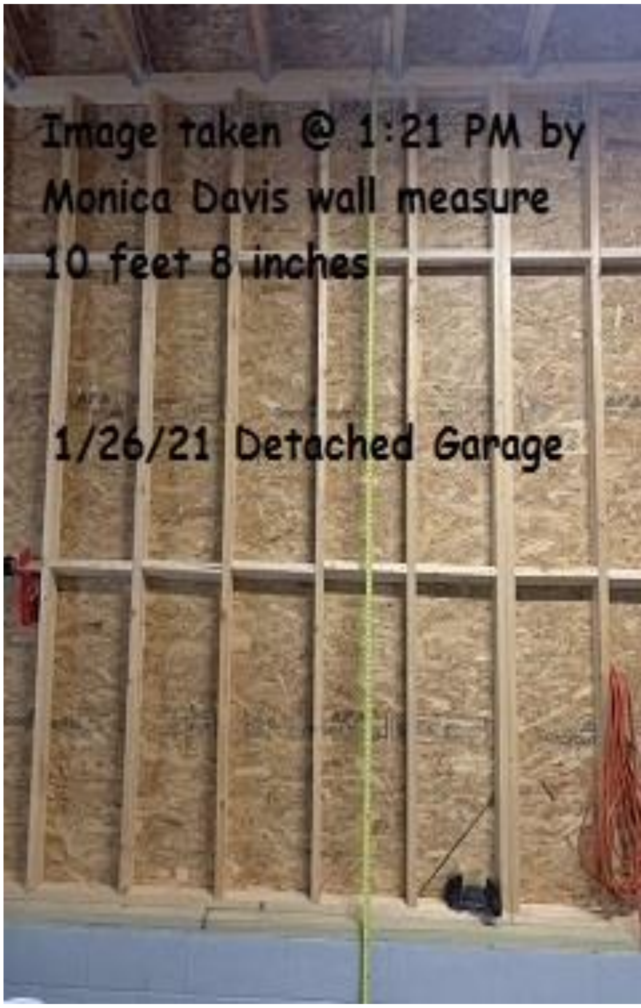


Image taken @ 1:21 PM by Monica Davis 1/26/21
image shows blocking in wall between studs that
sheething should be attached to is not.Blocks can be
moved with your hands. location detached garage
Blue line is the sheeting ends
where one begins and another ends


Image taken @ 1:21 PM by Monica Davis
1/26/21 image shows blocking in wall between
studs that sheething should be attached to is
not.Blocks can be moved with your hands.
location detached garage



Still in Item 9 but moving to the attached garage we have the same issue but to me a much bigger problem. We have 11+ foot walls in this location as well but on top of that directly above this location is a second story bonus room. All is resting on the 2x4 walls that average 11+foot in height and have no additional wall bracing and the added weight of the second story. The attached garage has 3 walls that are 11+ feet tall and has a second story above it PLUS the double garage door opening below it as well.

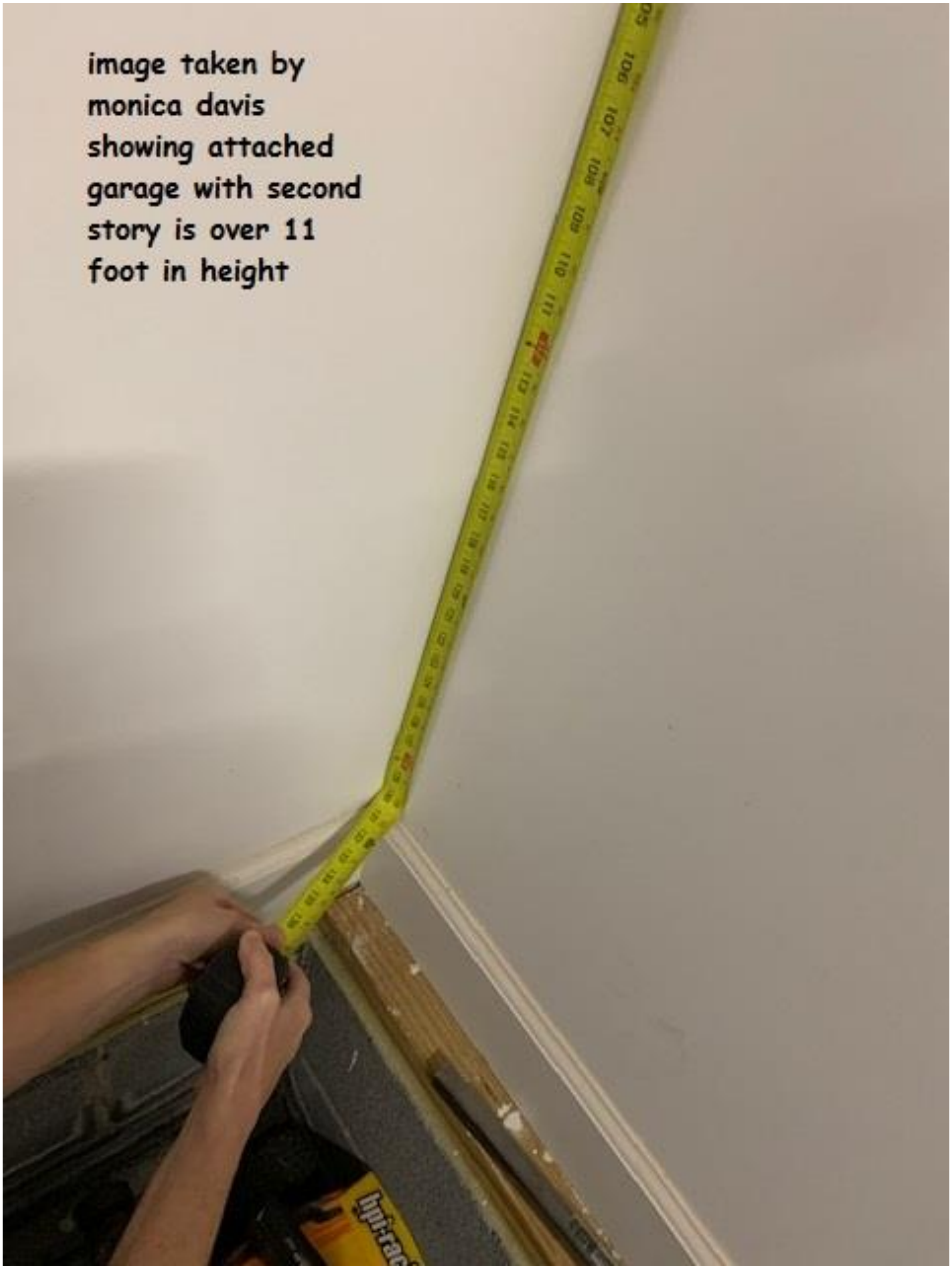


image taken by
monica davis
showing attached
garage with second
story is over 11
foot in height


image taken by
monica davis
showing attached
garage with second
story is over 11
foot in height

We request the board review the wind requirements for the exterior sheeting on both the attached and detached garage because neither structure have additional blocking. As well as address the 12 and 11 foot walls in both structures. The ridicules suggestion the engineer suggest of removing the man door (how are you to get into the structure) downsizing the door (how are we to store our vehicle in it). Again it states we the owners should contact for a design clearly calling out no analysis was taken into consideration when suggestion this silly approach.

Item 12: on the NOV for the drywall being secured in accordance with table R702.3.5

YOU WILL FIND THIS UNDER NUMBER 6 ON THE ENGINNERS REPORT FROM SCHNITZHOFER.

Below you will see images show we have nowhere near the required hardware securing our drywall to ceiling and walls. We have entire sheets that have no drywall screw or nail in the field at all. We have sheets on the ceiling that when we go back and look at pictures show only 2 and 3 nails in the field those sheet now are sagging. NONE of our images were shown to the engineer when he performed a site visit. His report only speaks to the "finish plane of the drywall and no way addresses the violation that was sighted for being secured. We request the board require the drywall to be secured to the requirement set forth in section R702.3.5

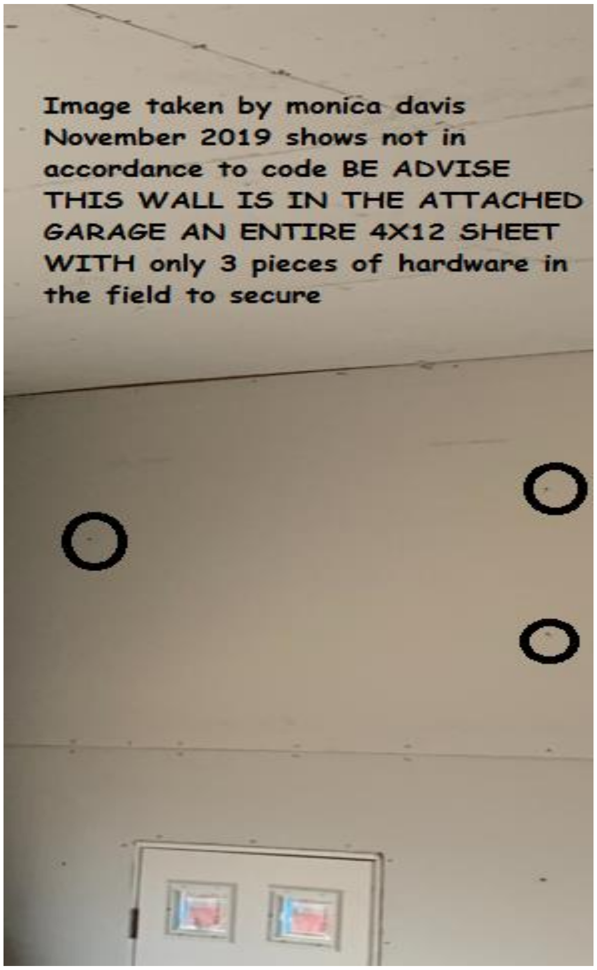


Image taken by monica davis
November 2019 shows not in
accordance to code BE ADVISE
THIS WALL IS IN THE ATTACHED
GARAGE AN ENTIRE 4X12 SHEET
WITH only 3 pieces of hardware in
the field to secure

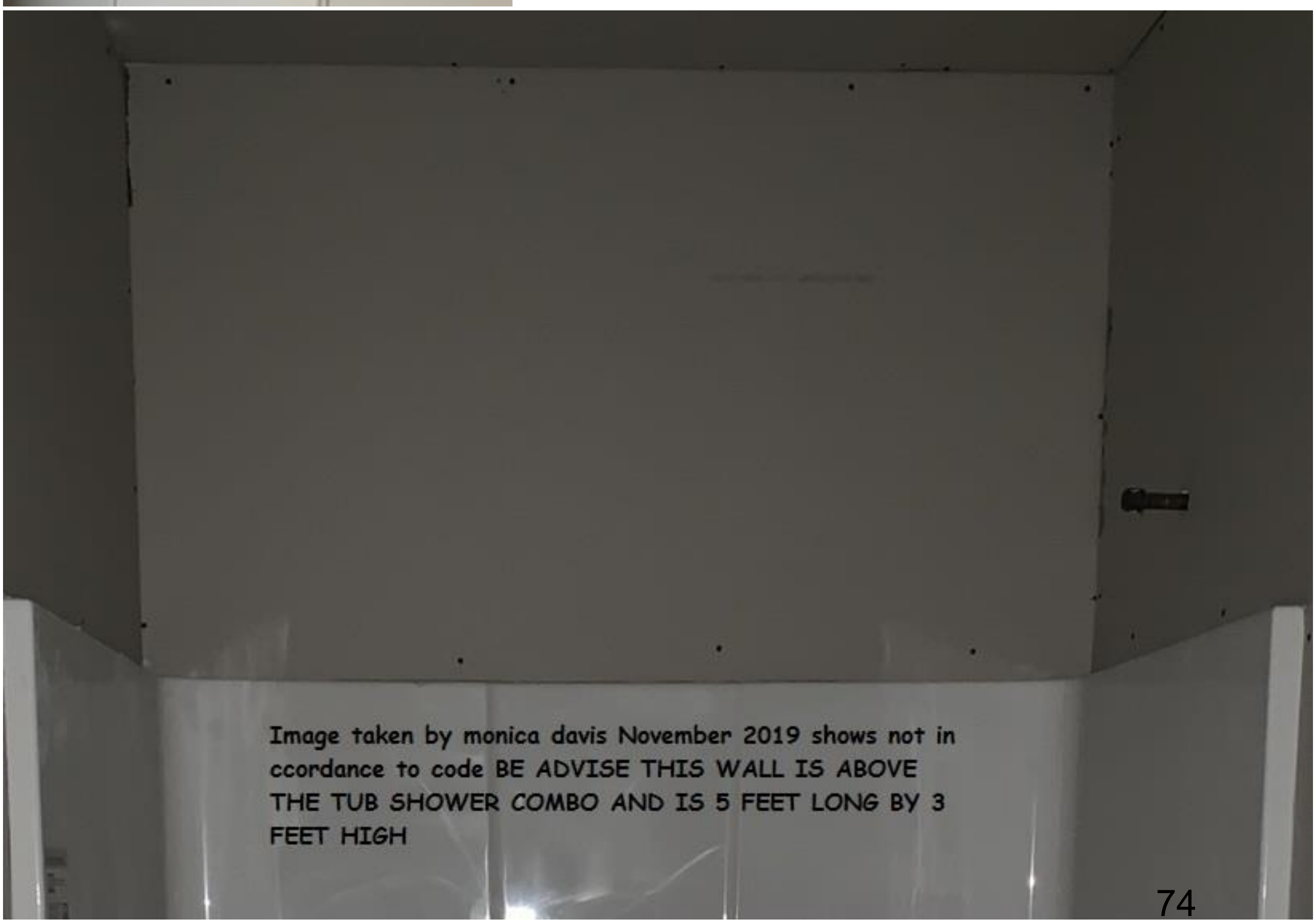


Image taken by monica davis November 2019 shows not in
ccordance to code BE ADVISE THIS WALL IS ABOVE
THE TUB SHOWER COMBO AND IS 5 FEET LONG BY 3
FEET HIGH

Item 13: on the NOV for the Header at master bath plumbing R502.10 or provide engineer design and approve in accordance with section R301.1.3 YOU WILL FIND THIS UNDER NUMBER 9 ON THE ENGINNERS REPORT FROM SCHNITZHOFER

The image clearly shows the cut floor joist for plumbing to be installed. We request a proper design be provided and approved in accordance with the code.

Documents Submitted by
Monica and Michael Davis

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ADDITIONAL DOCUMENTS SUBMITTED

Item 6: Roof Truss System. Provided are additional images showing that the truss system was set more than the 24” OC that the truss design calls out for.

Item 8: Floor Joist Hangers Since we have submitted our appeals the floor throughout the entre dwelling has moved. Images provided of interior nonweight bearing walls that have seprated from the ceiling due to the floor joist and the improper install in the hangers causing the floors to drop. We also provided images throught the dwelling in 3 different location. One in the kitchem, one on the living room and one in the bathroom. All will show that due to the improper insall of the hangers as simpsons literature said would happen the josit are putting forward force on the hanger causing the floor joist and hanger to drop. Images show now how out of level the floor throughtout the entire dwelling is. The code is very vage in reference to flatness and integrity. SO I researched and the next best thing would be the professionals at the National Wood Floring Association. The guidleines they set forth are as follow: **Part III – Subfloor Flatness and Integrity A. Wood subfloors must be flat, clean, dry, structurally sound, free of squeaks and free of protruding fasteners. 1. For installations using mechanical fasteners of 11 /2” and longer, the subfloor should be flat to within ¼” in 10 feet or 3 /16” in 6 feet. 2. For glue-down installations and installations using mechanical fasteners of less than 1 1 /2”, the subfloor should be flat to within 3 /16” in 10 feet or 1 /8” in 6 feet.** Please reference the following images to show we are way out of that standard and guidelines.

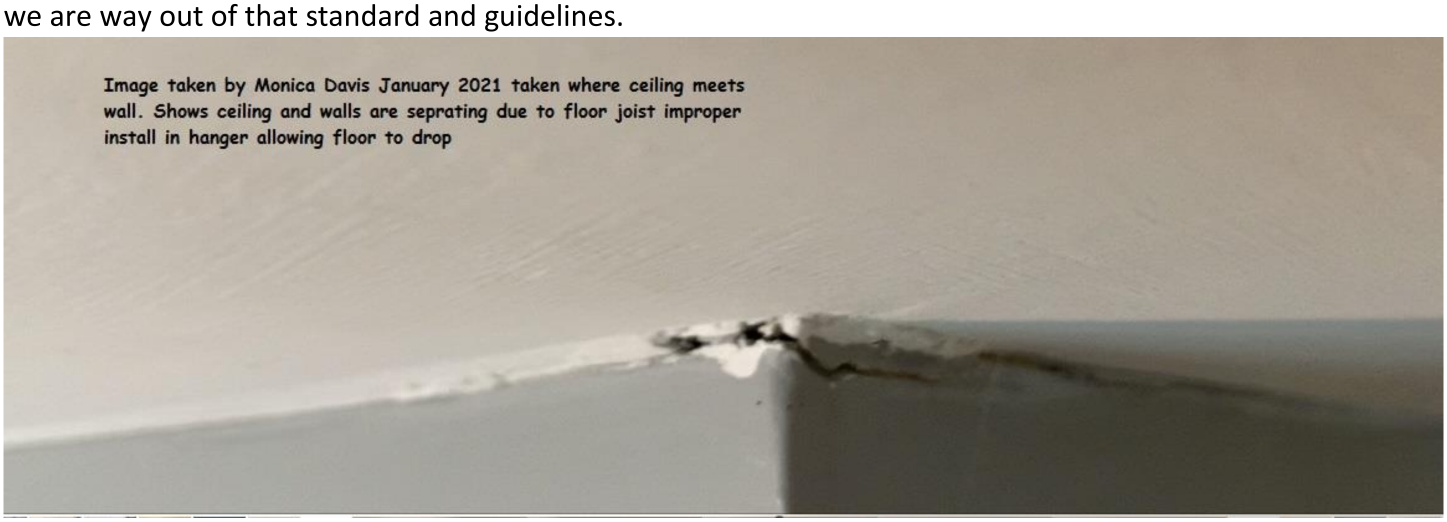


Image taken by Monica Davis January 2021 taken where ceiling meets wall. Shows ceiling and walls are seprating due to floor joist improper install in hanger allowing floor to drop

Image taken by Monica Davis January 2021 taken where ceiling meets wall. Shows ceiling and walls are seprating due to floor joist improper install in hanger allowing floor to drop

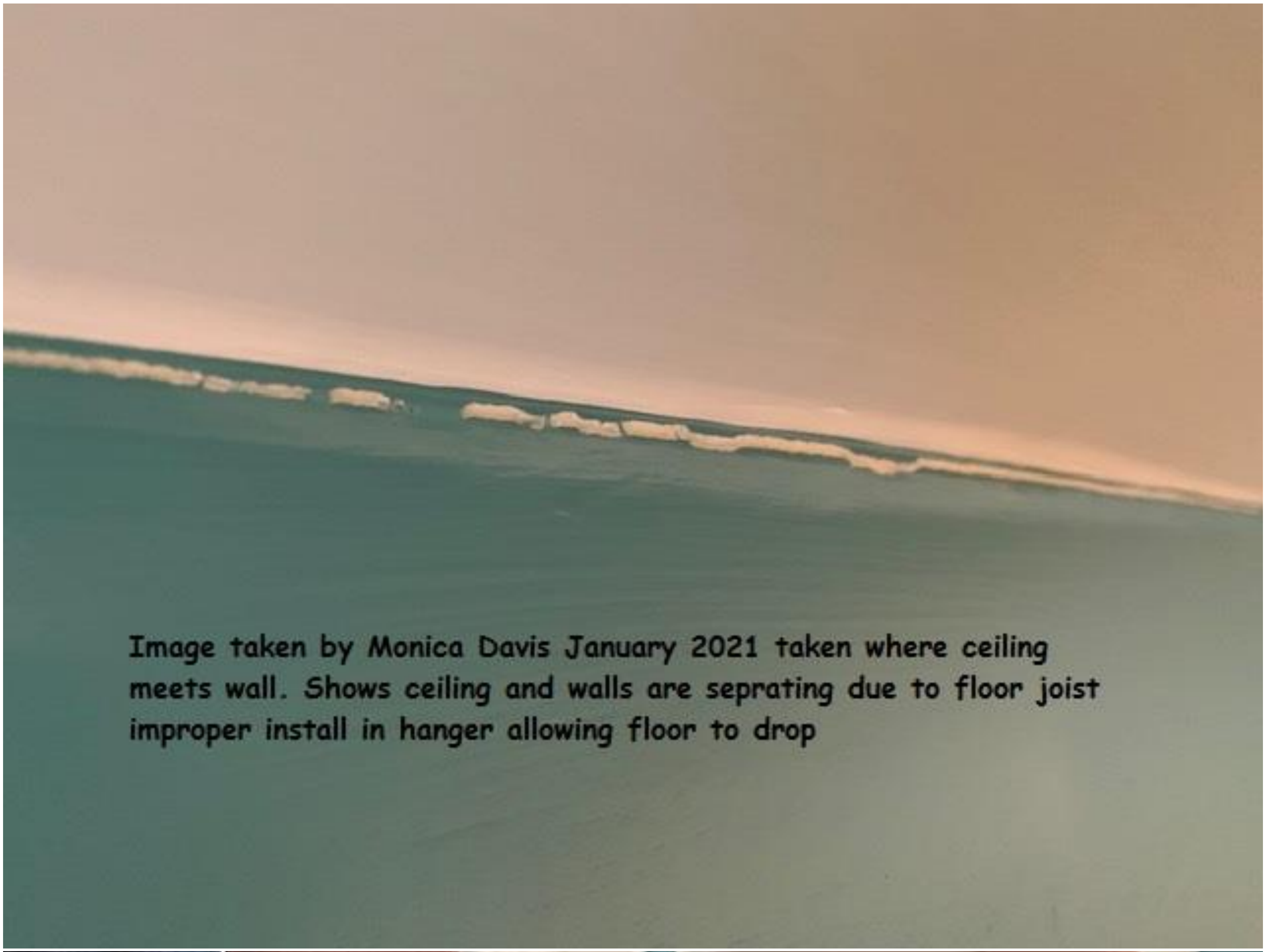


Image taken by Monica Davis January 2021 taken where ceiling meets wall. Shows ceiling and walls are seprating due to floor joist improper install in hanger allowing floor to drop

Image taken 2/16/21 by Monica Davis @ 12:00 PM. As indicated would happen by simpson literature due to the gape in the hangers and the improper hardware Joist with gap puts downward force further from header and creates more rotation. This image shows the location in the bathroom where the floor has dropped between 9/16th and 3/4th of an inch

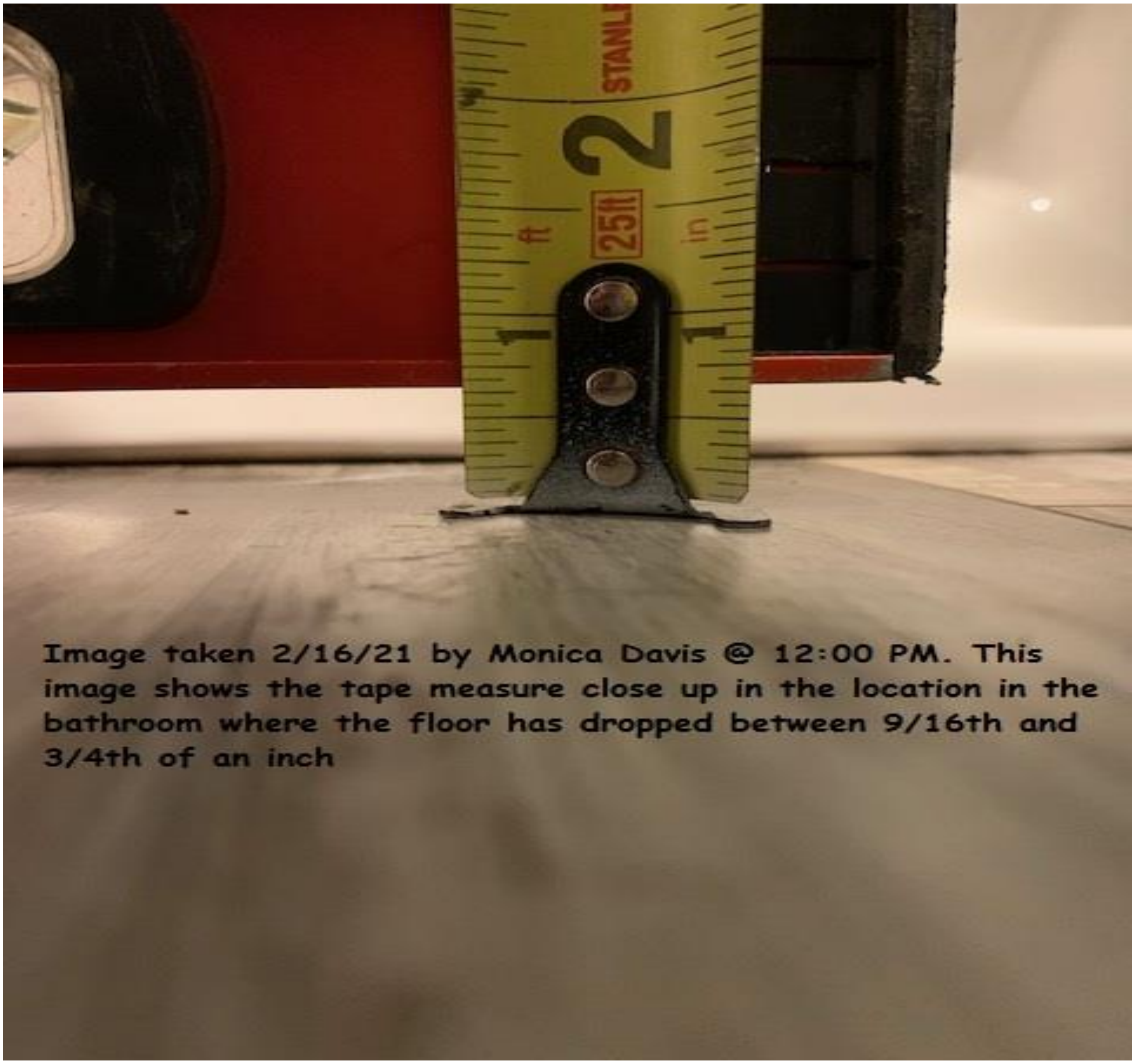


Image taken 2/16/21 by Monica Davis @ 12:00 PM. This image shows the tape measure close up in the location in the bathroom where the floor has dropped between 9/16th and 3/4th of an inch

Image taken 2/16/21 by Monica Davis @ 11:56 AM. This image shows the tape measure close up in the location in the living room where the floor has dropped 5/8th of an inch

Image taken 2/16/21 by Monica Davis @ 11:56 AM. As indicated would happen by simpson literature due to the gape in the hangers and the improper hardware Joist with gap puts downward force further from header and creates more rotation. This image shows the location in the living room where the floor has dropped 5/8th of an inch

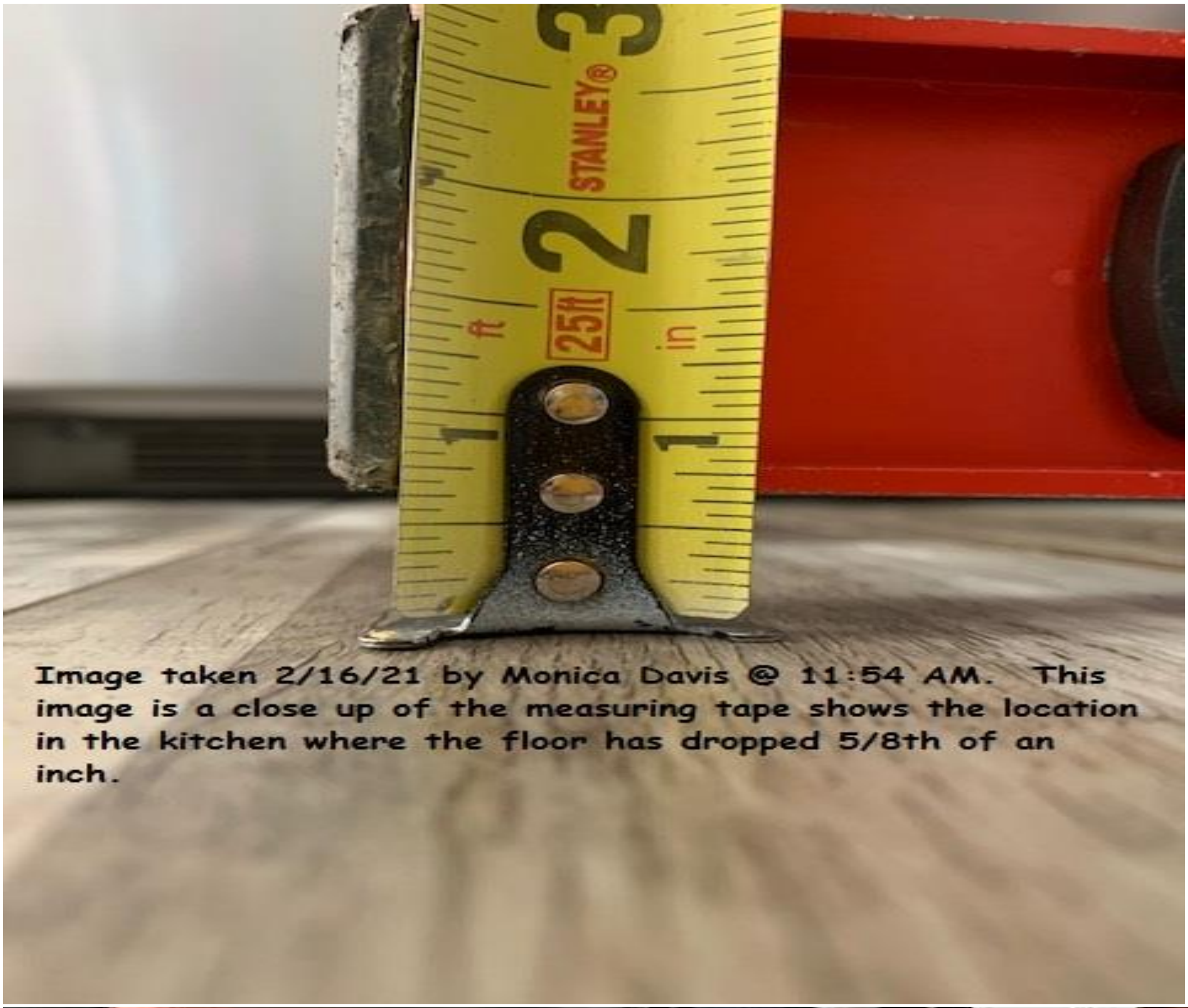


Image taken 2/16/21 by Monica Davis @ 11:54 AM. This image is a close up of the measuring tape shows the location in the kitchen where the floor has dropped 5/8th of an inch.

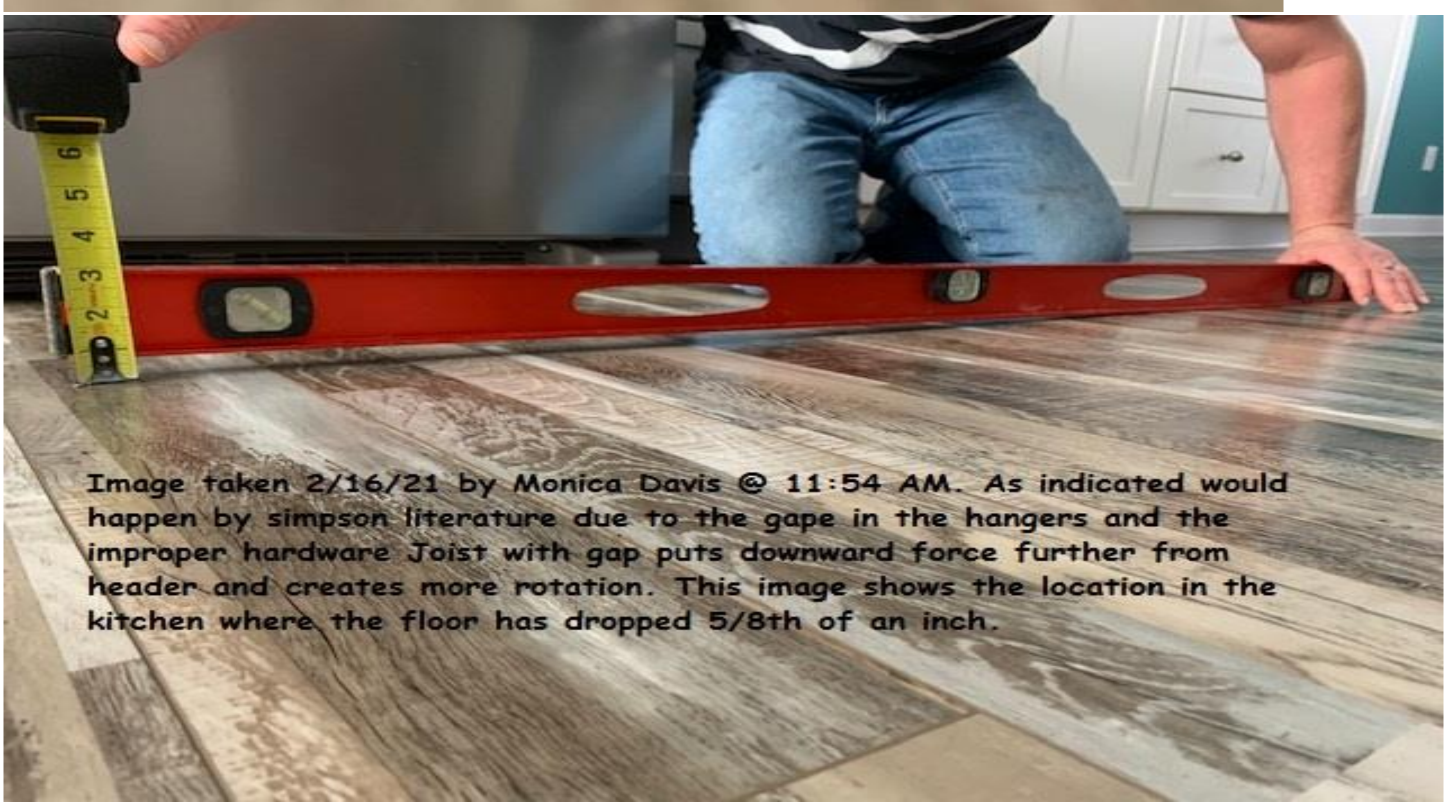
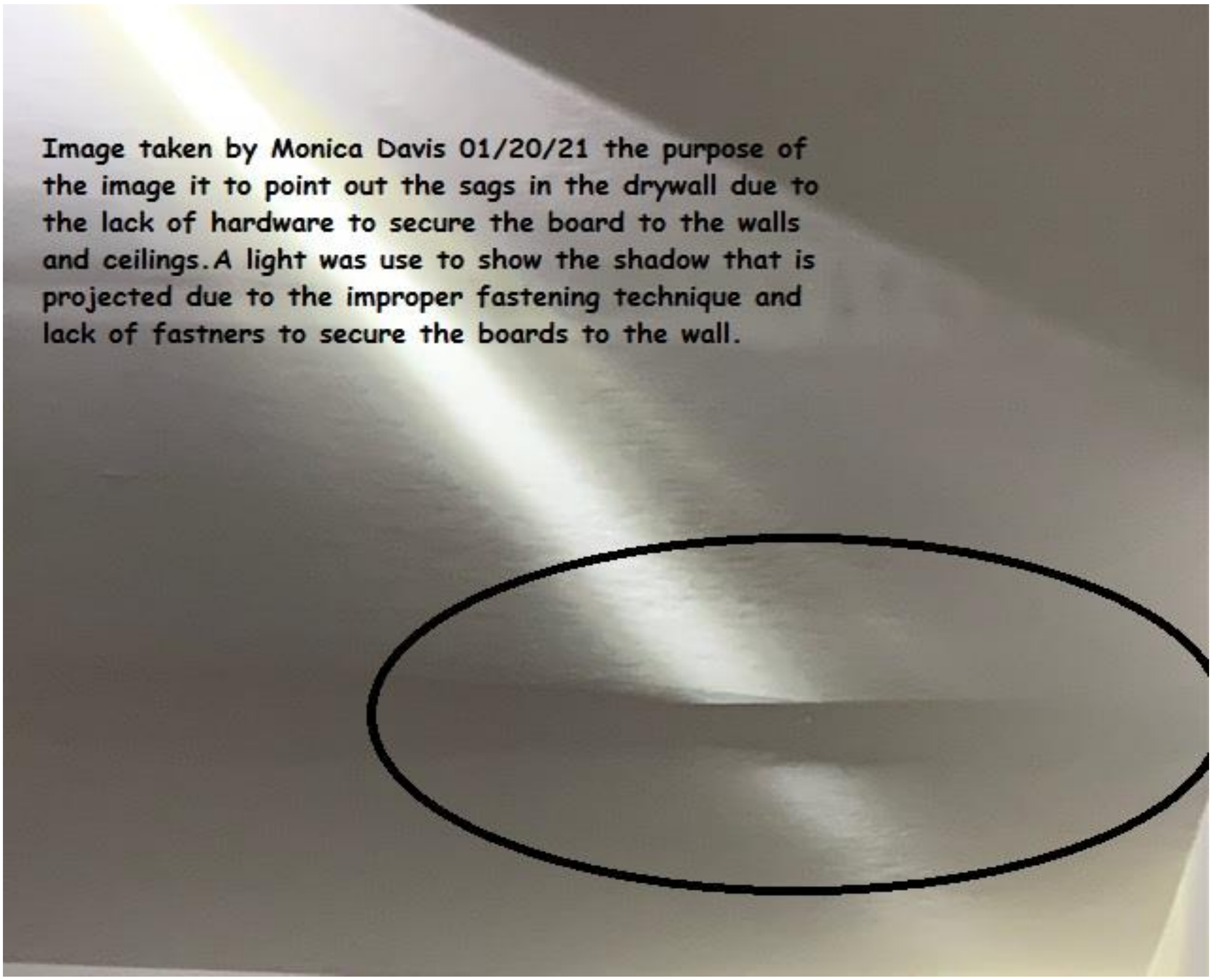


Image taken 2/16/21 by Monica Davis @ 11:54 AM. As indicated would happen by simpson literature due to the gape in the hangers and the improper hardware Joist with gap puts downward force further from header and creates more rotation. This image shows the location in the kitchen where the floor has dropped 5/8th of an inch.

Item 12: Drywall secure. Images provided below will show the sags that the drywall is experiencing due to the improper fastening procedure that was used. Images provided also show lage cracks that are entire sheets of drywall. The improper way that the drywall was secured has caused over 80% of the drywall throughout the entire structure to crack, bulg, and sag. Due to the fact that not enough fastners were used per the code the weight of the drywall is causing all the drwall to pull away from the walls which is casung the visual cracks. Sheets of drywall are also sagging do to the fact that it was not installed according to code as well as bulges are accuring where there was very few fastners on the perimeters of the sheet and none in the field causng the bulges and nail pops because the sheets just do not have proper hardware to secure the sheets in place. The images provided sole purpose are to review the cracks, bulges, and sagging pieces of drywall on the ceiling and walls and not to be viewed as poor workmanship for the finish.



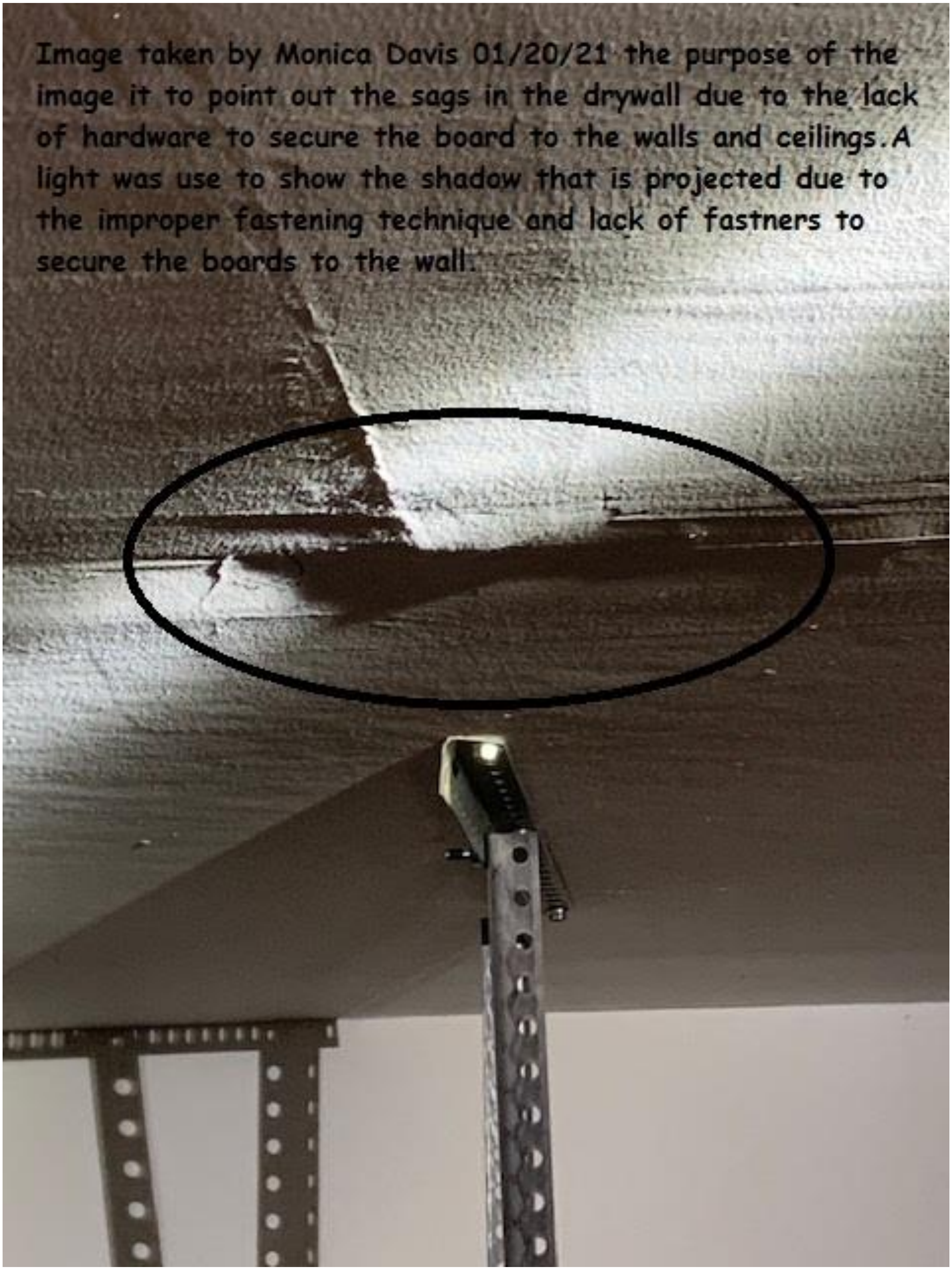
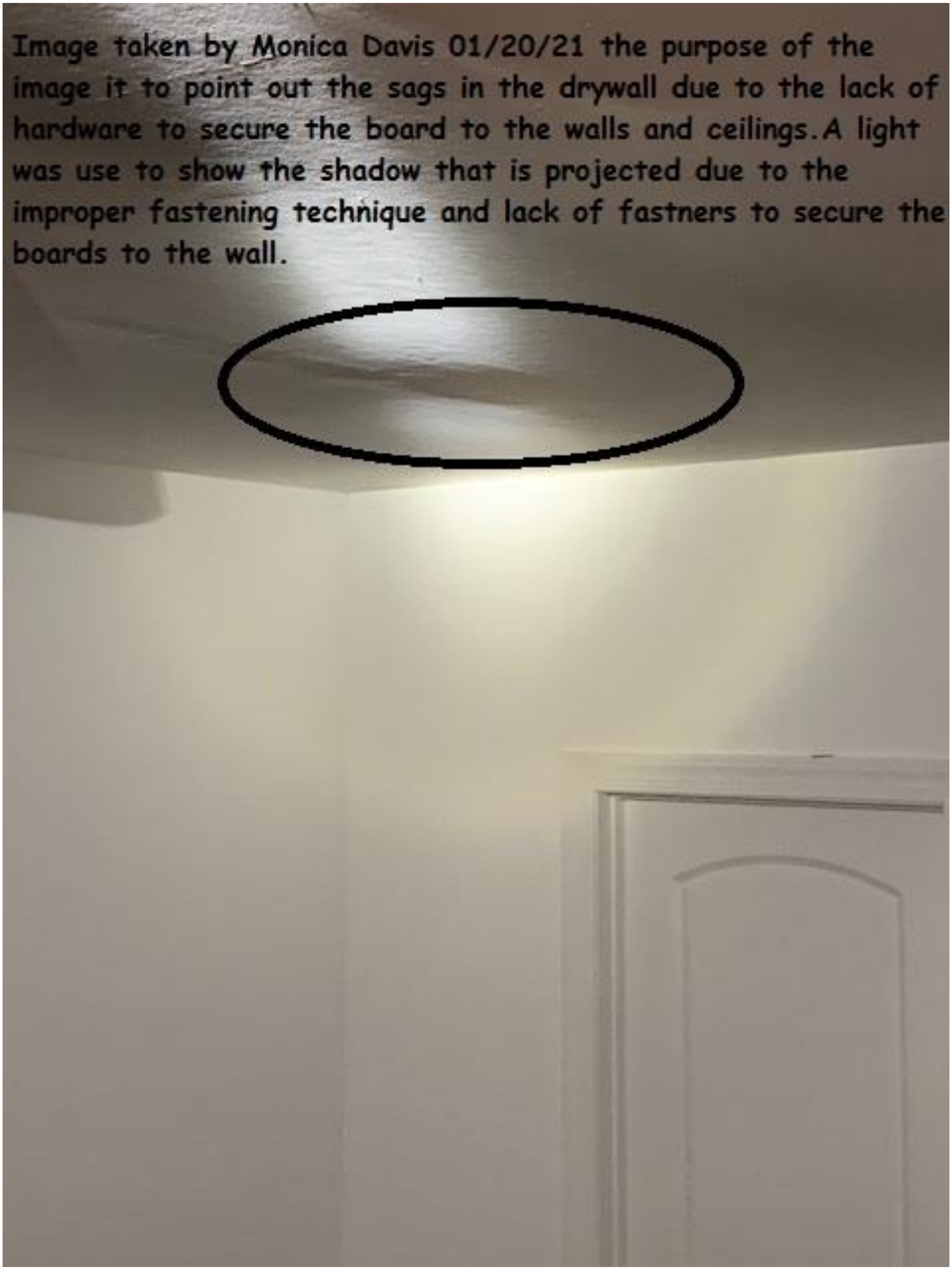


Image taken by Monica Davis 01/20/21 the purpose of the image it to point out the sags in the drywall due to the lack of hardware to secure the board to the walls and ceilings.A light was use to show the shadow that is projected due to the improper fastening technique and lack of fastners to secure the boards to the wall.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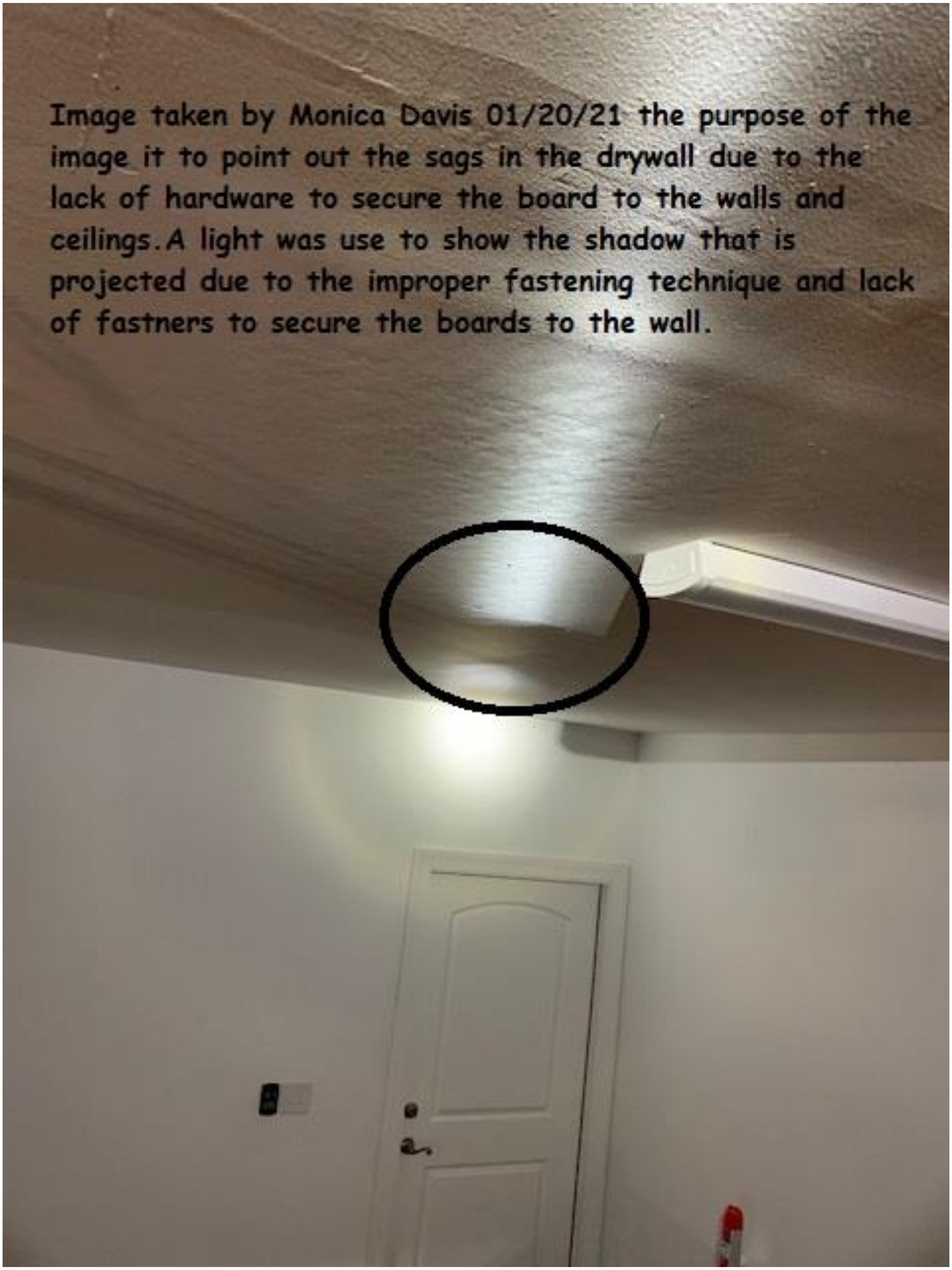
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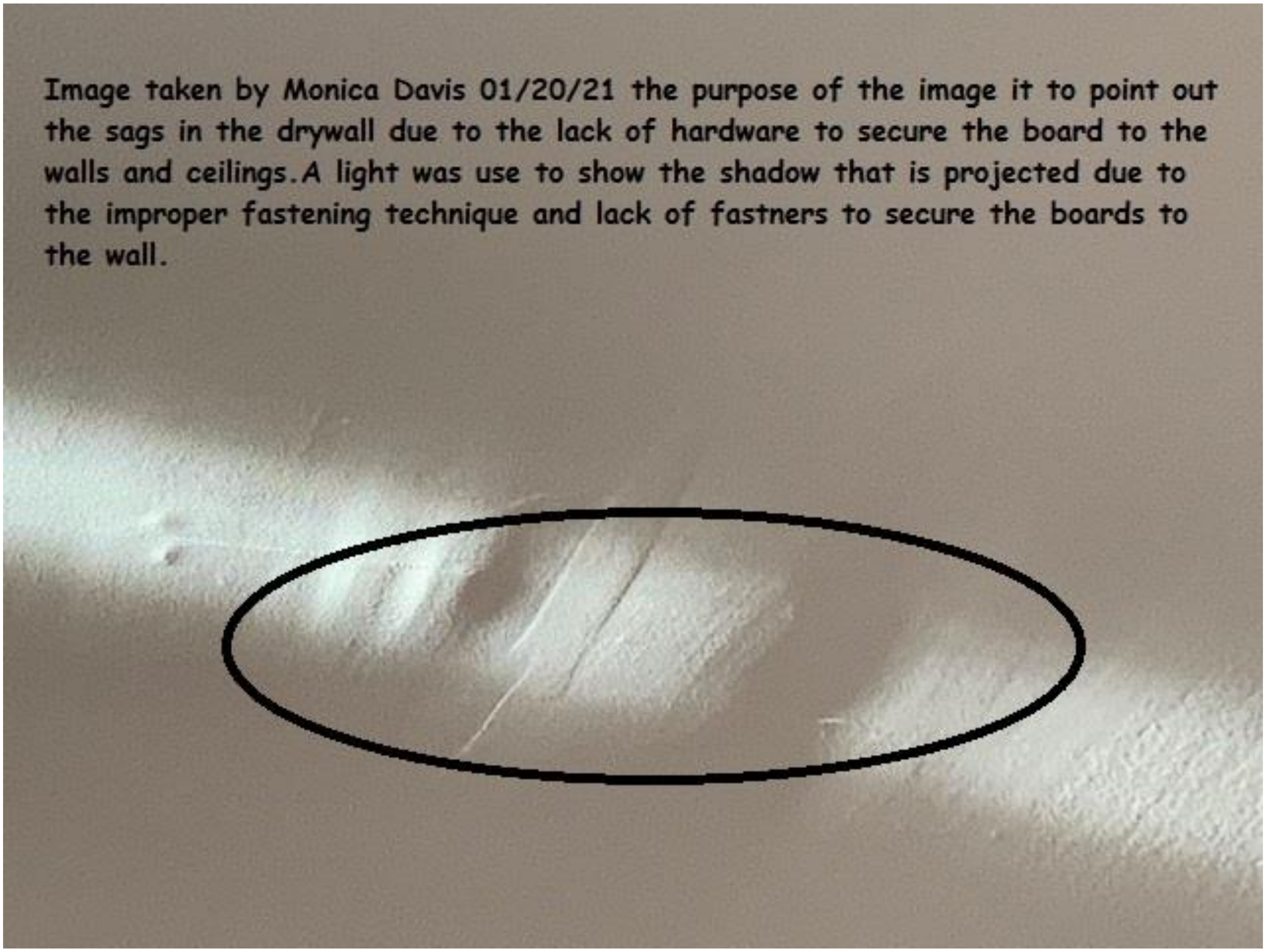
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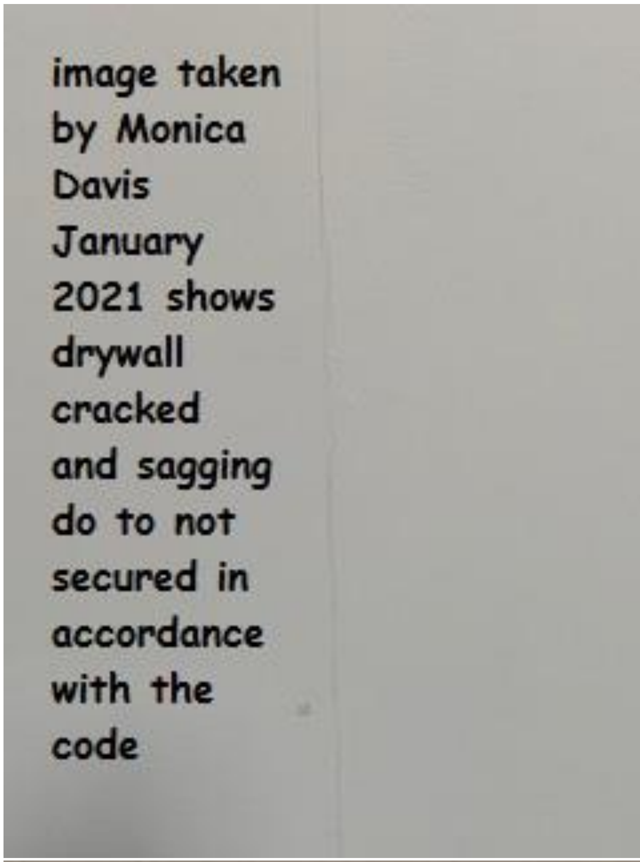
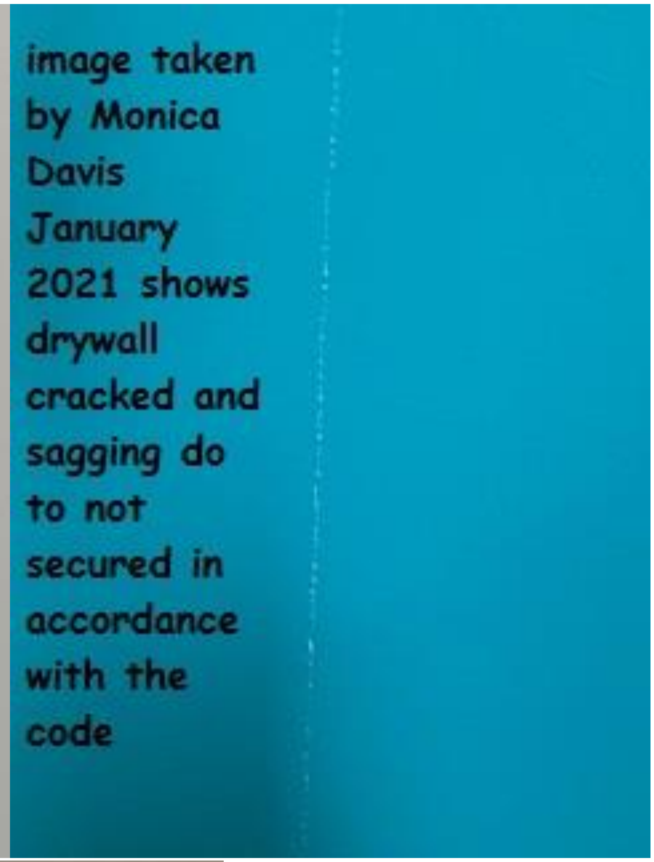


image taken by Monica Davis January 2021 shows drywall cracked and sagging do to not secured in accordance with the code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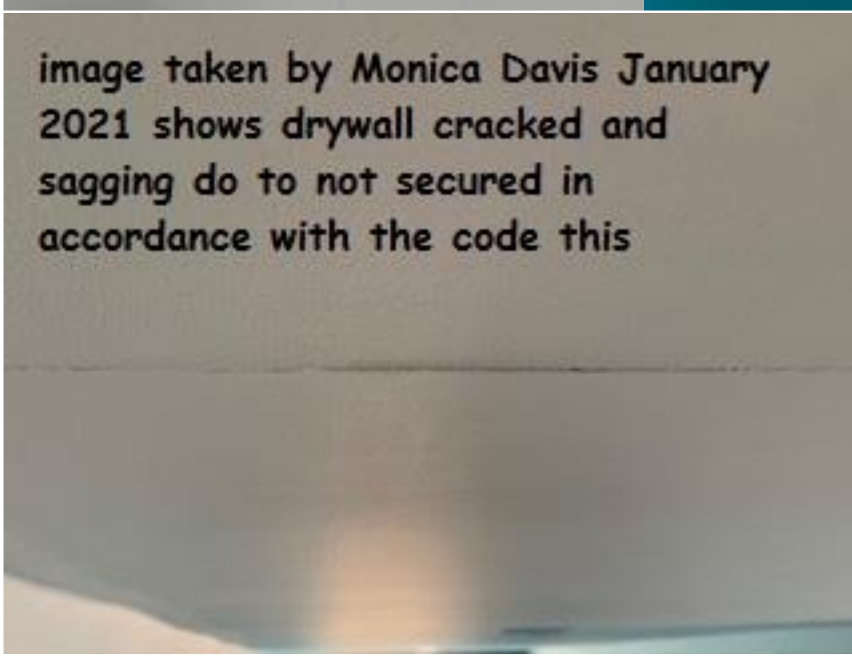
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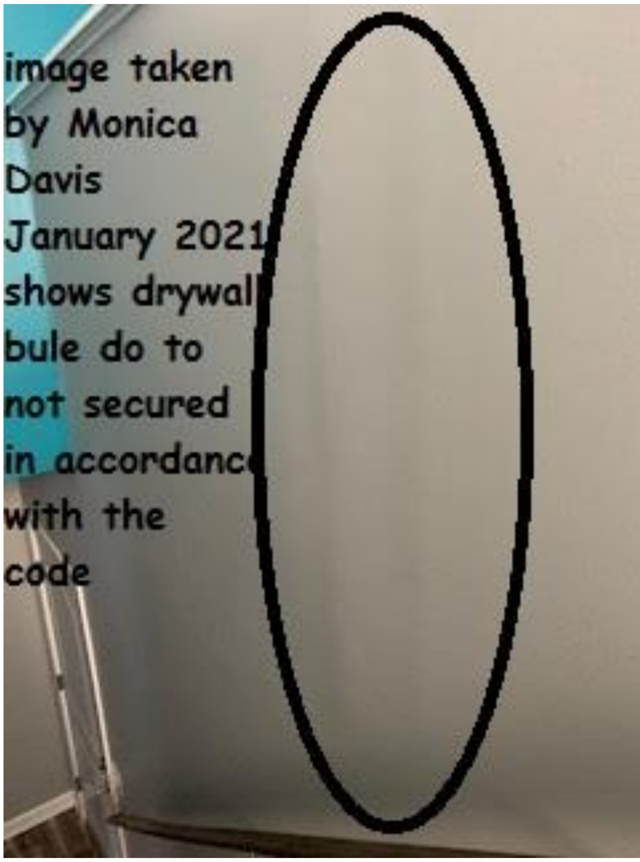
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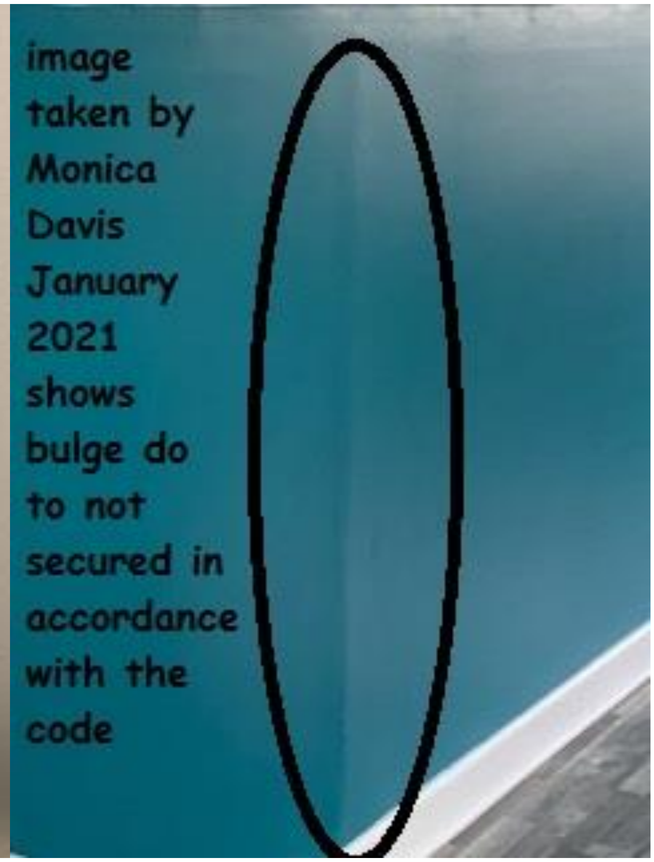
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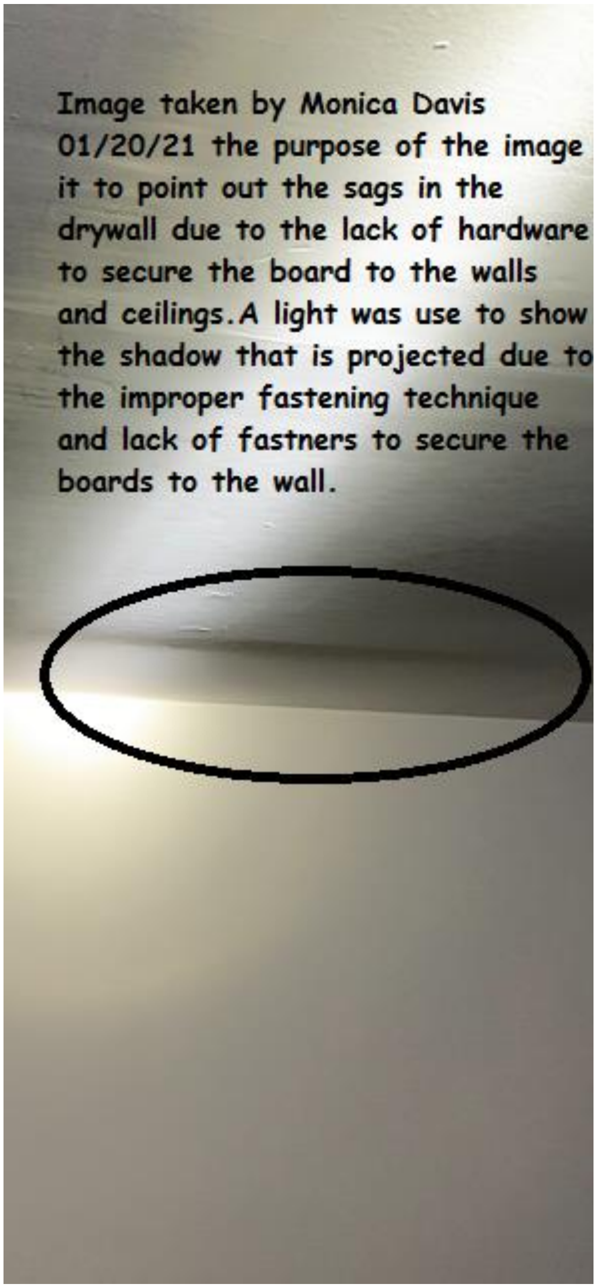
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Documents Submitted by Augusta County

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COUNTY OF AUGUSTA
COMMONWEALTH OF VIRGINIA
DEPARTMENT OF COMMUNITY DEVELOPMENT
P.O. BOX 590
COUNTY GOVERNMENT CENTER
VERONA, VA 24482-0590

February 17, 2021

Office of the State Technical Review Board
600 East Main Street, Suite 300
Richmond VA, 23219

Members of the Board:

As requested, I am providing a detailed explanation and image regarding the code items in appeal at the Michael & Monica Davis property. The appeal number is 21-02.

I believe I need to provide a little background into this appeal.

I was on vacation from November 4 – 15, 2020. The engineers report was delivered to my office on November 9, 2020. On November 17, 2020 Mrs. Davis ask me if I had received the report. I replied that I had. She then ask for my feedback. As I had only briefly read it and had not had time to see if it resolved any issues in my letter to the contractor I replied that "The report was basically as I expected. I was satisfied by his conclusions and thought his repair recommendations would work where they were proposed."

I had not made any decisions regarding any item on the report at this time. On November 24th Mrs. Davis wanted a date at which time I will have made my decisions. I replied that based on my current workload and staffing that I would have my decision by December 16th. At that time Mr. and Mrs. Davis decided to appeal the entire report to the local board. That is why the local board's decision only states that they found the report to be a valid report. I had not yet made any decision on the report.

After going thru all of that, I finally had time to get to the report and decided that the report only fully resolved 3 issues on the contractor's corrections list. The report gave some repairs for other items on the list but until those repairs can be performed they are not resolved.

I will try to address the Davis items in the same order that they did for ease of use.

Item 1: The engineer's report does not say that this is in compliance, however he does give a repair to the issue. The contractor is already going to have to show our office that he has frost line protection all around. When we originally inspected that footing on 12/13/2019, our inspector told me that the contractor had 24" frost line protection all of the way around. It looks to me that they got some dimensions wrong and made the pour wider to correct their error

Staunton (540) 245-5700
TOLL FREE NUMBERS
From Deerfield (540) 939-4111
FAX (540) 245-5066
Waynesboro (540) 942-5113

without going deeper. They already are going to have to prove to me that they have frost protection.

The Davises' comment regarding the floor slope in the detached garage is already addressed by item #2 on the letter to the contractor. The siding is address by item #5 on the corrections list. The 2X which the Davises' state is in contact with the concrete appears to be part of the garage door frame since it is outside of the wall framing. The garage door frame was addresses in their last appeal and was determined by this board that it is not required to be treated lumber. Please note that until I received the packet from the board I had never seen the photo or been contacted by the Davises about this issue. I have not been able to view it as I was on medical leave from January 27 to February 7 and then Mr. Davis went into Covid quarantine. With respect, I do not know why these issues are being brought up here as they not even mentioned in the engineer's report which is what this appeal is for.

Item 3: The engineer's report does not state that the anchor bolts are in compliance but that additional ones need to be installed within 12 of the sill ends.

Item 6: On my July 8, 2020 inspection, Mrs. Davis showed me a photo of the trusses on the 2 X beam. She stated then that it was supposed to be a LVL. Our office performed the framing inspection on 11/12/2019 and I did not believe we would have missed something like that but out of an abundance of caution, I informed the contactor that an engineer would need to evaluate and approve or design repairs if needed. The engineer's report on item #3 states that the beam is adequate to safely support the loads at this location. He also looked at some additional trusses that were questioned by the Davises' and found them in compliance.

When Mrs. Davis talks about her conversation with David Lawrence, she stated in the local appeals board hearing that she was on a phone call with him. I am not aware that Mr. Lawrence has ever been on site.

Item 8: The engineer evaluated the condition with the joist hangers and consulted with Simpson Strong Tie and determined that the connection was safe for continued occupancy. I know the Davises' are claiming that the engineer never contacted Simpson but below is a phone log was sent by the engineer verifying the call.

JAMES SCHNITZHOFER (540) 448-8321 Accessory

Download

TOTAL MINS:09:00 TOTAL COST:$0.00

ON	TO / FROM	DESTINATION	RATE	MINS	COST
Oct 20 12:53 PM	(800) 999-5099	Toll Free Call	AU	09:00	-

Showing 1-1 of 1

Total minutes used may not be the same across all invoice sections due to the presence of non-chargeable calls.

Item 9: The engineers report does not satisfy my requirements and does not resolve the shear wall problem.

Item 12: The engineer states in #6 of his report that "the drywall within the primary structure appears to have been installed in an exceptionally well manner and appears to have a very high quality "finish plane" overall." The drywall in the bonus room was apparently completed by the homeowner and so would not be the contractor's responsibility.

Item 13: The engineer's report does not resolve this issue, it only gives the contractor a repair. Since this is a common issue, the contractor could us the engineers repair or a code repair to accomplish the same thing.

As Mr. Schnitzhofer is a Virginia licensed engineer and he placed his seal on his assessment, I found nothing in his report that would cause me to doubt his conclusions. I found his conclusions reasonable and in line with other reports I have seen thru the years.

Basically, after my review of the report, I found the report only fully resolved items 6, 8, and 12 of the corrections letter to the contractor.

Sincerely,

G.W. Wiseman

G.W. Wiseman
Building Official

COUNTY OF AUGUSTA
COMMONWEALTH OF VIRGINIA
DEPARTMENT OF COMMUNITY DEVELOPMENT
P.O. BOX 590
COUNTY GOVERNMENT CENTER
VERONA, VA 24482-0590

20-735

July 16, 2020

CERTIFIED MAIL

Hendricks & Son General Contractor, LLC
604 Hilltop Drive
Staunton, VA 24401

Dear Mr. Hendricks:

On 6/10/20, 6/25/20 and 7/8/20 our office visited the Davis house, located at 1002 Round Hill School Road, to inspect concerns they have with the house you constructed under permit #718-2019. This house was constructed under the 2012 edition of the International Residential Code as amended by the Uniform Statewide Building Code. This letter is a report on our findings based on those inspections.

After review of the owner's concerns, inspections of those items, and inspections of the structures, I have concluded that the following items are not in compliance with the building code and need to be corrected:

1. The foundation on the detached garage does not comply with code sections R403.1.1 and R403.1.4.1.
2. Floor in detached garage is not sloping to the doors in accordance with section R309.1.
3. Sill plates in detached garage and house need anchor bolts within 12 inches of each sill plate splice in accordance with section R403.1.6. Need to correct to section R403.1.6 or provide an engineered design and approval in accordance with section R301.3.
4. Fascia trim on detached garage does not extend up behind the drip edge on the detached garage and the fascia is not protected per section R703.
5. Vinyl siding on detached garage and house not installed in accordance with the manufacturer's installation instructions.
6. Some of the roof trusses are not installed in accordance to the manufacturer's specifications. An engineer will need to evaluate and design the necessary repairs and approve those repairs once made.
7. Back porch floor beams not properly anchored with appropriate hangers to band board of house. Second option is to provide post with proper connector to beam to an approved foundation. Third option is to provide engineered design and approval in accordance with section R301.1.3.
8. Floor joist are not all installed in the joist hangers to manufacturer's specifications. Need to correct to manufacturer's requirements or provide engineers design and approval in accordance with section R301.1.3.

9. Need an architect or engineer to evaluate, design and approve the walls of the attached and detached garage as shears walls per section R301.1.3 as these walls cannot meet the prescriptive requirements for wall bracing in the residential code.
10. Front stairs exceed allowed slope of 2 percent per section R311.7.7.
11. Provide manufacturer's installation instructions that PVC trim boards are installed in accordance with manufacturer's specifications. They show excessive uncontrolled expansion.
12. Per numerous photos of owner's taken after drywall finishing but before paint, the drywall was not secured in accordance with table R702.3.5. Need to correct to table R702.3.5 or provide an engineered design and approval in accordance with section R301.1.3.
13. Header at master bath toilet where floor joist was cut was not installed to code. Need to correct to R502.10 or provide engineered design and approval in accordance with section R301.1.3.
14. Door in half bath in garage does not meet fire resistant requirements of R302.5.1. Need to replace with 1 3/8" solid core wood door, steel door or 20 minute fire door in accordance with section R302.5.1.
15. Grade to left of front stair needs to have proper grade in accordance with section R401.3 so that water will not pond behind sidewalk. (grade currently lower than sidewalk)
16. Dryer vent is installed in violation to section M1502.3 as it is within 3 feet of foundation vent which is a building opening. It needs to be rerouted to an approved location. Screws holding the duct together cannot protrude more than 1/8" into the duct. Duct cannot exceed 35 feet in equivalent length taking into account reductions for fittings in accordance with section M1502.4.4.1.
17. In addition we have been contacted by the owner that the attic access door is 22" X 22" instead of the 22" X 30" as required by section R807.1. You will need to check and correct if necessary.

Please contact our office within 14 days of receipt of this letter with a timetable to correct these violations.

Sincerely,

G.W. Wiseman
Building Official

NOV - 9 2020

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NOVEMBER 03, 2020

SCHNITZHOFER & ASSOCIATES, LLC.
300 E WATER STREET
CHARLOTTESVILLE, VA 22902

9 N. NEW STREET
STAUNTON, VA 24401

REPORT ISSUE DATE: 11.03.2020
PROJECT NAME: 1002 ROUNDHILL SCHOOL RD
S&A PROJECT ID: 20-081

REGARDING: **STRUCTURAL ASSESSMENT**

Dear Jay:

A licensed structural engineer (P.E.) from Schnitzhofer & Associates, LLC (S&A) visited the residence located at the above listed location on September 29, 2020. The purpose of the site visit was to document the condition of the exposed, visible, in-place structural elements related to the following:

Primary House

- **Foyer Foundation**
- **Simpson Hanger Connection**
- **Roof Beam**
- **Overbuilt Trusses**
- **Roof Sheathing Plane**
- **Drywall**
- **Roof Truss at Front Bedroom**
- **Crawlspace Pier Location**
- **Joist Blocking at Crawlspace Plumbing**
- **Crawlspace Ventilation**
- **Anchor Bolt Spacing**

Detached Garage

- **Garage Portal Frame**
- **Concrete at Corner of Foundation**

Dear Jay,

A licensed structural engineer for Schnitzhofer & Associates, LLC, further referred to as S&A, has visited the project jobsite, in the interest of addressing the potential framing issues presented to us. The purpose of our site visit and subsequent report is to provide our opinion regarding the acceptability of the visible structural foundation and framing element conditions present in the field.

Introduction

James R. Schnitzhofer, P.E. visited the home on September 29th 2020. Mr. Schnitzhofer was accompanied by Nate McConaughey, a licensed structural engineer from our Staunton branch. The owners of the property were also present. Mr. Schnitzhofer is an expert in structural consulting and has overseen 1500 structural engineering design projects throughout Virginia, and the "Valley". During his tenure at the head of Schnitzhofer & Associates, he has become intimately familiar with all aspects of local construction norms, standards of practice, standard of care, and construction craftsmanship. During the site visit completed recently, Mr. Schnitzhofer immediately noticed the high caliber construction that was in place. Generally, the quality of detail with regards to craftsmanship, and overall quality installation of the in place primary house framing and foundation systems, all appeared to be exceptional, compared to many counterpart contractors within this area.

Findings and Recommendations (Primary Residence)

1. Foyer Foundation

   S&A Response: The front foyer framing appears to bear directly onto the CMU foundation wall. It is our understanding that this condition was inspected by, and approved by, the building inspector. Given the visible framing conditions present at the site, it is the opinion that this foundation system has been installed in general conformance with standard construction practice for this region.

2. Simpson Connections/Hangers At Floor Joists

   S&A Response: The floor joists appear to adequately bear into the joist hanger seat. It is our understanding that this condition was inspected by, and approved by, the building inspector. The shear nails appear to be attached through the shear hanger fasteners holes, and potentially fall short of penetrating the supporting beam. In the interest of making a final determination regarding the adequacy of this connection, a licensed structural engineer from our firm contacted the technical/engineering division of Simpson Strong Tie. We discussed in detail the condition present at this location. Based upon the outcome of that conversation, it is our opinion that the connection is acceptable for safe and continued occupancy. For further clarification regarding this matter, we suggest that the owner contact a licensed structural engineer, in the interest of having them explain the material behavior and stress dynamics that Simpson uses for their load tables.

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3. Roof Beam

S&A Response: The roof beam in question appears to be installed in general conformance with industry standards. It is our understanding that this condition was inspected by, and approved by, the building inspector. From a structural standpoint, we have determined that though a structural analysis of the subject beam, the beam is adequate to safely support the gravity loads at this location. From a construction standpoint, it is the opinion of S&A that the beam is installed in general conformance with the standard of care of this region.

4. Overbuilt Trusses

S&A Response: The overbuilt trusses in question appear to be installed in general conformance with industry standards. It is our understanding that this condition was inspected by, and approved by, the building inspector. From a structural standpoint, it is the opinion of S&A that the overbuilt trusses are installed in conformance with standard construction practice. In fact, the method in which the overbuilt trusses have been installed, is the method our firm recommends. In light of this, it is our opinion that this is not a structural issue.

5. Roof sheathing Plane at Overbuilt Trusses

S&A Response: The sheathing over the overbuilt trusses in question appear to be installed in general conformance with industry standards. It is our understanding that this condition was inspected by, and approved by, the building inspector. From a structural standpoint, it is the opinion of S&A that the sheathing at this area is installed in conformance with standard construction practice. It is very common that minor fluctuations within the roof sheathing plane occur with a complicated roof truss system such as the one present at this home. More specifically, it is our opinion that the roof sheathing installation is within generally acceptable tolerable limits for a framing project of this type.

6. Drywall – Bonus Room

S&A Response: It is our understanding that a majority of the drywall hanging installation at this area was completed by the homeowner – not the contractor. Generally speaking, drywall installation within pre-engineered bonus room truss web members is more complicated than installation onto a standard stick framed structure. As a result of the variations in roof truss profiles and anticipated movement/expansion/contraction of the truss web and chord members, it is generally understood that the anticipated likelihood of a perfect "finish plane" is very low. In light of this, it is the opinion of S&A that the drywall at this area is in a condition that one would expect for installation at the interior of the pre-engineered wood truss web members. The drywall within the primary structure, however, appears to have been installed in an exceptionally well manner, and appears to have a very high quality "finish plane" overall.

7. Roof Truss at Front Bedroom:

S&A Response:

While at the site, the homeowner indicated to our engineer that there was a potential problem with the truss bearing over the front bedroom. It is our understanding that this condition was inspected by, and approved by, the building inspector. However, it is our pinion that the homeowner misunderstood the behavior of pre-engineered trusses, and appears to have applied a faulty understanding of this condition. It is our opinion that the truss bearing does not occur as the homeowner suggested, and that the trusses within his area appear to have been installed correctly, and in accordance with generally accepted practice. Overall, we found that the roof system framing is in very good condition, and was installed in conformance with generally accepted construction practices for this area.

8. Crawlspace Pier

S&A Response: Based upon the assessment of the piers within the crawlspace, we found that the piers have been installed in conformance with generally accepted construction practices. It is our understanding that this condition was inspected by, and approved by, the building inspector. Additionally, based upon our assessment of the adjusted loading condition as a result of the 2" offset mentioned by the owner, it is our opinion that this condition is acceptable and is not in need of structural reinforcements.

9. Joist Blocking at Crawlspace Plumbing

S&A Response: It is common that alternate framing configurations are used in construction of this type. These are commonly referred to as "field adjustments". In this case it appears that the contractor supported the plumbing supporting joists with a standard "bulkhead" framing adjustment. It is our understanding that this condition was inspected by, and approved by, the building inspector. However, this minor framing adjustment could easily be strengthened by the installation of one new joist, immediately adjacent to the compromised joist. Given the circumstances, this repair would entail about $50 in materials, and about 20 minutes to complete. A new Simpson face mount joist hanger could then support the cross member(s), 'bulkhead". Finally, this issue is extremely minor and, under no circumstances would this rise to the level of a legal dispute, or the idea that the contractor has provided work that is not in conformance with the standard of care of this area. Additionally, this does not indicate that the structure is "unsafe".

10. Crawlspace Ventilation

S&A Response: Based upon our calculations, Schnitzhofer and Associates, LLC found that the crawl space ventilation area provided does exceed the required area. We recommend review by the building official, in the interest of approving the removal of the vent adjacent to the dryer vent. Specifically, the building official will need to approve the removal of a vent within 3 feet of a building corner.

11. Anchor Rods

S&A Response: Based upon our assessment, Schnitzhofer and Associates, LLC found that the anchor rods are spaced as needed to satisfy the spacing requirements within the building code. However, there may be the need for additional anchors to be installed at the locations where the sill terminates. This operation is relatively easy and cost effective to accomplish. It is our understanding that this condition was inspected and approved by the building department. However, if you are in need of this reinforcement design, please contact S&A and we will prepare a quote for the retro-fit anchor installation specifications.

Findings and Recommendations (Detached Garage)

12. Braced Frame/Portal Frame at Garage Doors

S&A Response: It is the understanding of S&A that the garage portal frames have been installed as directed by the building inspector, have been inspected, and ultimately approved by the County. However, we understand that the inspector now believes the framing is inadequate. In light of this, we believe that, by the introduction of additional shear wall length (Approximately 4 feet), new hold down anchors, and minor foundation reinforcement, the portal wall can be reinforced to adequately support the anticipated lateral loads. Specifically, we suggest the removal of the 10 ft x 10 ft doors, installation of two new, 2 foot braced walls in each bay, removing and infilling the man door, then replace the existing garage doors with new doors to fit the adjusted openings. This work would be completed in conjunction with foundation reinforcements as needed to provide adequate anchorage for load path to foundation continuity, in the interest of resisting overturning forces present in the shear walls. Contact S&A for a design of the final braced wall and foundation reinforcement specifications, if needed.

13. Concrete at Corner of Foundation

S&A Response: It is the understanding of S&A that the corner of the garage foundation has been exposed to reveal the slab edge. During the time of the site visit, approximately 2-3 feet of the turn down slab foundation was exposed. If the frost depth needs to be met at this location, we suggest pouring additional concrete at this area, to comply with the local building department frost depth requirements. This is a very easy solution to this condition. We have not reviewed or commented on any foundations that were not exposed during the time of the site visit.

Executive Summary

- A licensed structural engineer from Schnitzhofer & Associates, LLC visited the home and completed a visual assessment of the in-place framing within the interior of the primary home, including the bonus room and the attic framing area. Based upon our many years of review of residential construction in this area, other than the minor recommendations for framing adjustments listed above, we have found that the overall framing we were asked to review within the primary home is in conformance with generally accepted construction practices for this area. Additionally, we believe that workmanship represents an appreciation for the standard of care one would expect under the conditions present of this home.

LIMITATIONS

While Schnitzhofer & Associates, LLC has completed a visual assessment of the above listed items, we were not provided the photographs shown to our staff during the site visit. A review of these photographs would be beneficial to resolving the framing questions posed by the owner. If you would like us to comment on the framing that is covered up, we suggest providing our engineers with the photographs showing the areas in question. Otherwise, it may be useful for the home occupants to demo the interior finishes where they believe a structural framing issue exists, and have their engineer review these framing elements. If their engineer then believes that there is a framing deficiency, then they could forward those findings to you for additional review. Overall, it is our understanding that neither the building official, our engineer, nor any other engineer, has found a framing issue within the roof framing viewed by our staff while inspecting the attic framing during the site visit, and, as such, it is logical to assume that demolishing the drywall is not warranted at this time. Generally, there would need to be significantly more damage to the interior finishes, for an engineer to believe there is a structural defect in the overall framing system. Currently, the evidence of a framing deficiency is not visible. We have only completed an assessment of the items in question listed above. We are happy to provide a full structural analysis of the home. However, based upon our assessment while at the site, we don't feel this is necessary. Should you be in need in of a full analysis of the home, please contact us and we will prepare a proposal for services.

Schnitzhofer & Associates, LLC are happy to provide this structural assessment report with regards to the project located in Crimora, VA. Please feel free to contact us at 540-448-8321 at any time to discuss this structural report.

COMMONWEALTH OF VIRGINIA
11.03.2020
JAMES R. SCHNITZHOFER
Lic. No. 43910
PROFESSIONAL ENGINEER

Sincerely,

James Ray Schnitzhofer P.E.
President

Cc: file

300 EAST WATER STREET CHARLOTTESVILLE, VA 22902
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434.220.1035 SCHNITZHOFERANDASSOC.COM

DECEMBER 15, 2020

Michael and Monica Davis
1002 Round Hill School Road
Crimora, VA 24431

RE: DEFAMATION

CERIFIED US MAIL

Hello Michael and Monica,

Please allow this letter to convey our serious concerns with regards to your statements regarding our firm.

It has been brought to the attention of Schnitzhofer & Associates, LLC, the following:

1. Michael and Monica have stated that "Schnitzhofer And Associates, LLC is not licensed".

2. Michael and Monica have stated that, "Schnitzhofer And Associates, LLC is not insured".

Be advised that your statements are untrue now, and were untrue at the time they were uttered.

In addition to potentially defaming Schnitzhofer & Associates, LLC, you unnecessarily and improperly communicated these statements to multiple third parties. Schnitzhofer & Associates, LLC has a good working relationship with these third parties and, as such, your statement could potentially damage the long-standing positive reputation within the community in which we operate. We have obtained the names of those third parties and plan to notify them of your false statements.

If you continue to make such statements, we will consider legal actions and remedies that are available to Schnitzhofer & Associates, LLC, due to your knowingly defaming comments.

Sincerely,

James Ray Schnitzhofer P.E.
President

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Building Board of Appeals
Appeals Hearing, Michael & Monica Davis
December 15, 2020, 8:30 a.m.
Clean Transcript

Members Present:
Bill Dudley, *Acting Chairman*
John Earhart
Pat Katz
David Kirby

Attendees:
Jay Hendricks
Zuzanna Loar

Staff Present:
G.W. Wiseman
Renee Southers

G.W. Wiseman:
Mr. Seaman has to be tested for COVID, so I'll call the meeting to order. The first order on the agenda since Mr. Seaman is not here and he's the Chairman, is for you all to vote on the Acting Chairman for this meeting.
David Kirby:
I nominate Mr. Dudley.
Pat Katz:
Second.
The motion carried and passed unanimously.
Bill Dudley:
Okay, with that being said, bear with me. I guess you're here to appeal the engineer's decision on this, is that where we're at?
Michael Davis:
Yes sir.
Bill Dudley:
Ok, go ahead.
Monica Davis:
So, basically the letter that G.W. initially did stated that analysis would need to be run and a new direction and design in reference to the structure's current state, and the beams being in the wrong location, the trusses being 26 inches on center and even some missing. The report that Mr. Schnitzhofer did, when he came, one of the first things he stated when he got on site was he is being paid for one hour and that is it, so we need to hit the high stuff. There is no high stuff. It's all important to us, regardless if it was to him or not. If you note, every item that he inspected he only did a visual inspection and everything says that it was approved by the building inspector, which is not true because that's why they were cited, that's why the items were being addressed because--
Bill Dudley:
I did notice that in each statement--
Monica Davis:
Every statement says it in the second line, it just reiterates itself. Everything was only visually inspected. There was no analysis run. All he did was do the same thing Mr. Wiseman did. He looked at it. That

wasn't the whole purpose. We were not under the impression that was the purpose of the engineer to come. It says, per GW's certified letter, that you need to come out and analyze the current status of the structure and determine if what's there is capable of staying in place and being adequate for the weight that the walls are bearing and that the whole change of the design. That never took place. No drywall was ever penetrated. All he did was look at what is there and you can't see. You can't see that the LVL beam is in the ceiling, that belongs in the floor. You can't see that. When we went up to the attic, he did measure the 26 inches on center and noted that but he never reached out I mean, he had to truss design but there was no analysis run to determine that it is okay. It is not okay and it clearly says it on the truss design, that is 26 inches on center. If that house was designed for that, that needed to be stuck to and if it wasn't then you needed to show how you got to the determination that it is okay. One individual of a professional can't look at it and say that it's good and another one look at it and say it's not okay, one good one bad, that's not how it works. You have to say, okay, I looked at it, I've deemed it to be okay because of this. Otherwise you just have two professional individuals, one says it's right, one says it's wrong.

Michael Davis:

One guy saying it's wrong by the code, we've got another guy saying well in my opinion is right.

Bill Dudley:

Well the inspection is basically visual anyway. Now your calculations would be up to the--

Monica Davis:

Up to the engineer, right.

Bill Dudley:

--to the engineer.

Monica Dudley:

Right, which is what we determined was going to happen because it says analysis and new design would need to be put in place with the current structure, change of design that was done. I mean, you can't tell me that a 2x10 that's in the location that a LVL beam is supposed to be a double ply that's 16 feet long, you can put a 2x10 and it's right. You can't do that. Those beams are designed to hold the weight. That's why they are put in the locations they are supposed to be and we have one that's in the ceiling that belongs in the floor. I did a conference call with Dave from Mid Atlantic which is the company that did our truss design and put their stamp of approval on it for the way it's supposed to be constructed. I did a conference call sitting in my attic. He said put your hand on the one on the left, and I did, put your hand on the one on the right, it doesn't exist. There's a 2x10 in there. He said you have a problem. So we're looking for someone to do exactly what we thought was supposed to take place, which was run analysis and determine the structure's current state and what needs to take place to repair it because anybody in the building industry knows if a LVL beam belongs there it's bearing weight, it has a purpose and a 2x10 is not going to do what that beam is designed to do.

Bill Dudley:

So, you're contesting the whole engineering report?

Monica Davis:

That's correct because every item clearly says that it was an opinion, and that all of the items were passed by the County, and they were not.

Michael Davis:

A prime example, let's just go down to the detached garage where it was dug up on the corner to show that there is no turn down on the slab. Mr. Wiseman noted that himself and said that is a problem and the engineer just said pour some concrete in the hole. That's not how we fix it. The floor is busted 10 ways from Sunday, it's shifting, it's moving. It's almost becoming a trip hazard. So something's not right.

Monica Davis:

And pouring concrete in the hole that's exposed is not the answer.

Michael Davis:

For the floor joists you've got one-inch nails in the Simpson hangers, inch and a half nails where it's supposed to be three-inch nails. These are all things that Mr. Wiseman noted and said they were a problem and this guy comes in and just looks around and says well it all looks good to me.

Monica Davis:

So, I provided the documentation that was sent to me from Simpson because I have been in contact with them several times. One of the very first things, and the attachments that you see were sent directly from their senior engineer along with the email that says, look, it's wrong, your nails that are in place right now don't even penetrate your header, and they don't. You can get under my house, and all of the hangers, there's two problems. Number one the gap is twice the allowable, which states on the paper you can't have that. On top of the gap being too big, it has a one-and-a-half-inch nail that doesn't even penetrate the board so when you shine a light up in there because you can because the gap is so big, my nails don't even penetrate the headboard. My floor joist is literally sitting in these hangers that the gaps too big. And we had a company come out and look at the floor joist, JES, and said the floor is already sagging because the joists, that the hangers are wrong, eventually that's going to happen because the weight is not in the hanger like it's supposed to be. It's going to continue to drop. And there's no support for the nails so it's just sitting there.

John Earhart:

Where are you talking about those nails going into the Simpson hangers? What type of beam is that going in to?

Monica Davis:

It's going into an LVL beam but it doesn't even go in. Like it doesn't even penetrate the board. When you shine your light--

John Earhart:

Don't we always use inch and a half nails on Simpson hangers?

G.W. Wiseman:

You have two sets of nails on these hangers. You've got face nails to the LVL--

[cross talk] (8:07)

--you've got face nails to the floor joist and then there's a pair of cross nails in the back. One pair of cross nails in the back.

Monica Davis:

They're called double--

John Earhart:

I'm talking to him right now.

Monica Davis:

Sorry.

John Earhart:

Give me just a minute. But are the inch and a half nails the ones that are going in on the face of the joist hangers?

G.W. Wiseman:

The face nails are an inch and a half. The others are three.
John Earhart:
Is that not sufficient?
Bill Dudley:
I think we're talking about the cross nails.
G.W. Wiseman:
The cross nails are the ones that they are questioning.
[cross talk] (8:43)
John Earhart:
But the inch and a half are the ones we've used for 30 years?
G.W. Wiseman:
Correct. And they are still used.
John Earhart:
So, the only question we've got is the cross nails?
G.W. Wiseman:
Correct.
David Kirby:
Were the joists nailed in by hand or nail gun?
G.W. Wiseman:
I do not recall. Simpson actually allows both.
John Earhart:
Yes. Doesn't make any difference.
G.W. Wiseman:
Simpson will allow it to be done with a nail gun or by hand. It used to be nail gun.
[cross talk] (9:14)
David Kirby:
Were they nailed in or were they just resting in the hanger?
G.W. Wiseman:
No, they have nails on them. The whole issue is the cross nails.
John Earhart:
Can you get back in there to do cross nails or not?
G.W. Wiseman:
You could pull the nails that's in there out and put the others in but in his report, it says "the floor joists appear to adequately bear on the joist hanger seat. It is our understanding that this condition was inspected by and approved by the building inspector. The shear nails," which are those two nails, "appear to be attached to the shear hanger bracket holes and potentially fall short of penetrating the support beam." He states that. "In the interest of making final determination regarding the adequacy of this connection, a licensed structural engineer from our firm contacted the technical engineering division of Simpson Strong Tie. We discussed in detail the condition present at this location. Based upon the outcome of that conversation, it is our opinion that the connection is acceptable for safe and continued occupancy."
John Earhart:
They are acceptable?
G.W. Wiseman:

It says “it is our opinion that the connection is acceptable for safe and continued occupancy.”
John Earhart:
And that came from Simpson?
G.W. Wiseman:
No, that came from the engineer after he talked to the Simpson technical engineering division.
John Earhart:
Right.
Bill Dudley:
Who hired the engineer?
Michael Davis:
Mr. Hendricks did, but in regard to what he just said, you can contact Simpson and they keep email documentation of everybody they talk to. Nobody from Simpson has talked to Mr. Schnitzhofer.
Monica Davis:
I talked to Mr. Bundy, who is the senior engineer for the northeast. There's an email in there. I spoke with him and he said you know, we always direct people to go to the literature because the literature clearly indicates what's acceptable and what's not. As my husband stated, when an individual from an engineer firm calls they log it, and they email because they want to make sure that the direction that they're giving is not debatable. It's not like we're doing right now where an individual says they called and give direction and then you have a report saying that they spoke to them. That's not the case. Even if the individual called from Mr. Schnitzhofer’s engineer firm and did not indicate that he was from an engineer firm and that he was looking for guidance and direction. If you look at the literature, which the email came from Mr. Bundy himself. Here's the literature saying look, it's not acceptable, it clearly states it. The double shear nails are not acceptable. On top of that, you have twice the allowable gap so you have two problems going on in one location.
John Earhart:
Okay, so what are you trying to do? Get the contractor to come back and pull those nails?
Monica Davis:
No.
Michael Davis:
The joists aren’t long enough.
Monica Davis:
The joists aren’t long enough.
John Earhart:
The what?
Monica Davis:
For the hangers.
John Earhart:
Are they the wrong hangers?
Monica Davis:
No, the hangers are correct for the application but now that the gaps are twice the allowable, they're not. The whole hanger needs to be changed. If you look at the documentation from Simpson it says it can't be any bigger than an eighth, and I have twice that. So there's two problems going on in that location. You have a gap that's too big and it can be fixed with a different hanger. So the hanger that's there for all the ones that the gap is twice the allowable, those hangers have to come out and new

hangers have to be put in so that the leg that comes off the bottom is longer. But either way, the pictures clearly show on the documentation that Mr. Bundy, the senior engineer sent me, I mean I've attached the email--

John Earhart:

Has that spread since your inspection?

G.W. Wiseman:

I don't know, I haven't been back out there since the initial inspection. In my letter, if you pull the second attachment sheet from the back, in your packet--

John Earhart:

Second sheet from the back?

G.W. Wiseman:

--the second attachment from the back. Take a clip off the top. The last thing in your packet is Mr. Schnitzhofer's engineering. The thing before that is the correction letter to Mr. Hendricks. Item Number Eight says floor joists are not installed in the joist hangers to manufacturer's specifications. Need to correct to manufacturer's requirement or provide engineer's design and approval in accordance with section R301.1.3. R301.1.3 Engineers Design. That is building code. When a building or otherwise conventional construction contains structural elements exceeding the limits set forth in R301, or otherwise not conforming to these codes these elements shall be designed in accordance with acceptable engineering practice. The extent of this design need only demonstrate compliance of non-conventional elements with other applicable provisions, and should be compatible with performance of a conventional framing system. Engineered design in accordance with International Building Code is permitted for all buildings and structures and parts thereof, including the scope of this code. My interpretation of Mr. Schnitzhofer's letter was he was not saying that it met Simpson's standards. He was saying that based on his analysis, it is acceptable. Which, as Ms. Katz knows, she's an architect, an architect or an engineer can often design something that is not to the manufacturer's specs, but it's designed according to acceptable engineering.

Pat Katz:

Right.

John Earhart:

Right.

G.W. Wiseman:

Which is why I think it is in compliance. Mr. Schnitzhofer is a licensed engineer and he sealed the drawing in the back.

Monica Davis:

How can you say that something that's supposed to be a nail, that's supposed to be holding something in place that doesn't even penetrate the board, like it's supposed to, how can you say that is okay? Otherwise it's just sitting there.

David Kirby:

At this point this engineer has pretty much just wrote you an insurance policy. He says it's okay and he kind of overrules us so if he says it's ok.

Monica Davis:

Right…

Michael Davis:

So it's all on him now?

David Kirby:
It’s on him now.
John Earhart:
That’s the way I see it.
Michael Davis:
Alright.
Monica Davis:
Yeah, but it says it's his visual.
Michael Davis:
I’m not going to argue about it.
David Kirby:
He’s got his stamp--
John Earhart:
He’s got a stamp.
Monica Davis:
Well if you look and you run his license, actually he is not a licensed engineer because you cannot validate his license.
John Earhart:
He’s got a stamp, that’s good enough for me.
G.W. Wiseman:
He’s got a stamp and his license does show on DPOR but it says that they are not updating licenses right now because of COVID.
John Earhart:
Because of what now?
G.W. Wiseman:
DPOR is not updating licenses right now because of COVID.
John Earhart:
Oh okay.
Michael Davis:
They're updating building licenses.
John Earhart:
Well, he’s got a stamp what can I say, I can’t overrule him.
Monica Davis:
Okay.
Michael Davis:
Alright.
Bill Dudley:
What do you have to say about this G.W.?
G.W. Wiseman:
I read Mr. Schnitzhofer’s entire report. He does not sign off on everything in this house. There are things such as anchor bolts where he says anchor bolts may need to be added and that those anchor bolts need to be added. Mr. Hendricks is to get with him regarding the design for adding those anchor bolts. The foundation on the garage where the foundation was missing. He says that they need to dig it down the frost line and then pour from the frost line up to the bottom of the slab. Again, that's not an

uncommon occurrence, it's done all the time, and he sealed the design. So, my issue with it was Mr. Schnitzhofer is a licensed engineer, I thought the report said, what is typically said in a lot of engineering that I look at. I didn't see anything that stuck out that said this is wrong. If the Davis's wish to hire another engineer, they are certainly welcome to do that. No one is stopping them from doing that. But at that point if they then want to determine who's engineering we're going to go by is a civil matter. They need to let a judge decide that.

John Earhart:
That's the way I see it. I don't see nothing else we can do. We can't override an engineer.

Bill Dudley:
That is exactly what I think, we're not engineers.

John Earhart:
We can't do that. We don't have the authority to do that.

Bill Dudley:
We're building professionals, but we're not engineers.

David Kirby:
Mrs. Davis mentioned trusses 26 inch on center, couple of trusses missing, LVL beam in the wrong place, I haven't seen that in the engineer's report or anywhere else.

G.W. Wiseman:
He evaluated the beam, he evaluated the trusses--

Michael Davis:
How did he evaluate the beam when he didn't even see it?

G.W. Wiseman:
He said "the roof beam in question appears to be installed in general performance with industry standards. It is our understanding that it was inspected and approved by the building inspector. From a structural standpoint, we have determined that through a structural analysis of a subject beam, the beam is adequate to safely support the gravity loads of this location."

Michael Davis:
The beam is not there.

G.W. Wiseman:
He's saying it's adequate, so what do you want me to do?

Monica Davis:
He didn't see it. He didn't penetrate the wall, when he come into our home he seen the same thing…

John Earhart:
If he were to penetrate the wall and found it to be okay then who pays for that penetration to put it back?

Monica Davis:
I didn't put the beam in the wrong place.

Michael Davis:
I don't have a beam.

Monica Davis:
I don't have a beam, it doesn't exist.

Michael Davis:
I have 2x10's where a beam is supposed to be. That's supposed to support the floor load of an upstairs floor over top the rest of my house.

Bill Dudley:
Did the engineer see that?
Monica Davis:
No sir, he could not see it.
Michael Davis:
There's drywall, you can't see it.
Monica Davis:
So how can you tell me it's ok if you can't see it?
Michael Davis:
So this beam here--
Bill Dudley:
So how do you know that is what's in there if you can't--
Monica Davis:
Pictures.
Michael Davis:
Because I have pictures.
Bill Dudley:
Did you show the engineer those?
Michael Davis:
I showed him the picture of the 2x10 up there.
Bill Dudley:
What was his comment on that?
Michael Davis:
That's not right. That's exactly what he told me standing in my garage.
John Earhart:
Then why isn't it in his report?
Michael Davis:
I have no idea. He wanted to know about, if we could give him pictures and due to the legal battle, I can't hand him anything--
Monica Davis:
I would have loved to.
Michael Davis:
--without my lawyer and Jay's lawyers' permission.
Monica Davis:
We have walls that are 12-foot-tall with a second story--
John Earhart:
Well the only thing I can tell you is we can't override an engineer.
Michael Davis:
Okay.
Monica Davis:
Okay.
David Kirby:
I don't think we have that authority.
John Earhart:

I know we don't, do we?
Monica Davis:
You do.
Bill Dudley:
I don't believe we do.
Pat Katz:
Well technically--
Bill Dudley:
Would you like to have it re-engineered? Have a different engineer come in?
Monica Davis:
We started that process with Engineer Solutions--
Michael Davis:
There's a proposal in here.
Monica Davis:
--there's a proposal in there with what needs to take place to determine if the structure is sound or not and how to repair the problems that currently--
John Earhart:
Are you going to hire an engineer to--
Monica Davis:
I'm not hiring him. I paid $362,000 for this home to be put in place and done proper, I shouldn't have to spend another $10,000 to determine if what I've got is okay.
Pat Katz:
But this report is basically saying--
Monica Davis:
No, ma'am, it's not saying that. It's saying from his visual inspection and his opinion. I didn't ask for his opinion, I asked for his analysis.
Pat Katz:
His stamp says that.
Monica Davis:
Okay.
John Earhart:
His stamp stays that. Aren't there four things in there he wanted corrected?
G.W. Wiseman:
There are four things he wanted corrected.
[cross talk] (20:44)
John Earhart:
If they're done, then I'm done.
Michael Davis:
May I ask a question? So, in this man's report for my garage it says to remove my 10-foot doors and downsize and remove my man door, how are you going to get into the garage?
G.W. Wiseman:
If you do not wish to have that done--
Michael Davis:
How are you going to get in that garage if you take that man door out?

G.W. Wiseman:
If you do not wish to have it done that way that is absolutely your right.
John Earhart:
That's right.
[cross talk] (21:10)
G.W. Wiseman:
That is an issue between you and the general contractor.
Michael Davis:
Okay, fair enough. We can we expect all this stuff for--
G.W. Wiseman:
It's going to be at least a month.
Michael Davis:
Okay.
Bill Dudley:
So, what all have we agreed that we're going to repair?
G.W. Wiseman:
He still has to repair the anchor bolts. He's got to repair the foundation. He's got to deal with the wall bracing. He's got to deal with the floor joist, he's got to add a floor joist--
Bill Dudley:
Does he have to pull those nails where they are too short?
G.W. Wiseman:
Schnitzhofer said that it was--
John Earhart:
That's not what the engineer said.
[cross talk] (21:47)
Bill Dudley:
He said it was fine?
G.W. Wiseman:
He said it was adequate the way it was for safe and continued use.
David Kirby:
If the engineer said it's ok, that's good enough for me.
G.W. Wiseman:
He said it was adequate for safe and continued use.
David Kirby:
If you're really concerned about the beam, you may have to yourself, cut out a little bit of drywall so some engineer or someone could see it.
Monica Davis:
Right, which is part of the proposal in there from Engineer Solutions that says this is what needs to take place to determine what the proper analysis and repairs that need to take place. Which was what our request was, to say look, we started this process with an engineer. We've done the legwork. This is what needs to take place to determine how the repairs need to take place for the current structure.
Michael Davis:
When a man gets out of his car and the first words out of his mouth is I've only been paid for an hour, then I know he's not there for my help. He's not there to truly do what he's there to do. He's looking at

the hour he's been paid for and he's got to go. That's what he said when he got out of the car. So, all he did was walk around and look, he didn't do nothing.
John Earhart:
The contractor hired the engineer?
Michael Davis:
Yes sir.
G.W. Wiseman:
The contractor hired the engineer based on--
John Earhart:
If I've got a problem with whatever, my truck or whatever it is, I'm the one that's got to prove it's wrong. Not Ford Motor Company.
G.W. Wiseman:
Correct.
John Earhart:
So I'm going to hire whoever I have to hire, lawyers, engineers to prove that this is wrong. And then it becomes a civil between me and Ford. Or between me and my contractor.
G.W. Wiseman:
Correct.
John Earhart:
So, for what we got to go on, we cannot override this engineer.
Bill Dudley:
Right.
Pat Katz:
Right.
John Earhart:
As long as the contractor agrees to do the things that the contractor's engineer said to do.
Bill Dudley:
It would be up to you all to hire someone else to say--
John Earhart:
Exactly, you're the one that has to prove it.
Bill Dudley:
--that's wrong.
Monica Davis:
So, when I hire an engineer and he says that this is wrong and I come back in here and you say, this is what we said. Well it's that guys word against yours.
John Earhart:
It's a civil matter.
G.W. Wiseman:
It's a civil matter.
[cross talk] (24:10)
John Earhart:
It's a civil suit between you and the contractor or whoever.
G.W. Wiseman:
It's a civil suit to be settled by a judge at that point.

Monica Davis:
Sure, let’s just finish.
Michael Davis:
So, who takes care of the end that the County didn't withhold as far as letting all this stuff go and not catching it through the building process. So if my County guy comes out to inspect my house, and he's got my truss design right here in his hand and literally all he's got to do is walk through and look at the numbers and say yeah, they're all there, who holds that man responsible for the fact that there's a whole truss missing on one end of my house and on the other end of my house that's holding the second story there's a LVL beam completely gone. Who holds them responsible?
G.W. Wiseman:
Where's the paperwork that says it's missing?
Michael Davis:
You can get in there and see. You saw it yourself.
Monica Davis:
We showed you.
Michael Davis:
You were upstairs.
G.W. Wiseman:
You showed me a truss that appeared to be a 2x10 instead of an LVL.
Michael Davis:
I showed you a truss design. I’m not going to argue. You got the same truss design I got. You know what's there and what's not.
G.W. Wiseman:
And I saw no missing trusses.
Michael Davis:
Yeah. Okay, sure. Fine.
Monica Davis:
What about the beam? What about the LVL beam that was clearly missing?
G.W. Wiseman:
The beam, there was a 2x that was sitting on top of the LVL, which is what I questioned. He has answered that question.
Monica Davis:
Okay.
Michael Davis:
There's no LVL in that second location.
Monica Davis:
There’s no beam there.
G.W. Wiseman:
He's telling me the beam that's there is adequate for the loads imposed.
[cross talk] (25:34)
Monica Davis:
Let’s just get it over with. Our care is at the state level which is really sad that the County, you have no--
Michael Davis:
I’m sorry I built in this County.

John Earhart:
I'm sorry you're having trouble, I really, truly am. Your home is most people's largest expense. They spend their whole life--
Michael Davis:
It is. This is my forever home that I built on the hill and now it’s a disaster.
John Earhart:
And I understand that.
Michael Davis:
I'm looking at anywhere between $100 to $150,000 to correct the issues.
John Earhart:
I still think that it's going to end up being a civil suit, if that's what you want to do, if you think it's going to fall down or whatever. I don't see where we can override, in any shape or form an engineer, I don't think we have that authority to do that.
G.W. Wiseman:
I certainly don't.
John Earhart:
And I think probably what needs to be corrected, is what the contractor’s engineers stated, I think those four things I believe.
Bill Dudley:
I would offer that you may, if you are not liking the decisions you're getting from us go to the Board of Contractors.
Michael Davis:
I'm going to the state level.
Bill Dudley:
That’s what I’m speaking of. The Board of Contractors in Richmond. Because we pay a fee for people that default on property. That fee goes to pay the people back for the problem that they have and then the contractor loses his license until he pays that money back.
Michael Davis:
Yes sir.
Bill Dudley:
Contractor’s recovery fund. That's through the Board of Contractors. To me, that would be my next step I would go to and then it becomes between you all and the Board and the contractor, that it takes us out of it at the local level and takes you to the state level.
John Earhart:
But you are still, even when you go there, going to have to prove your case.
Michael Davis:
I understand that.
Monica Davis:
Right.
John Earhart:
It’s not going to be your word at all. It's going to be, you're going to have to--
Monica Davis:
The facts.
John Earhart:

--have that stamp.
Michael Davis:
I'll get that stamp taken care of.
John Earhart:
And then it's going to become a civil suit.
Monica Davis:
Mr. Jeff Brown is at the state level and Travis Looter, which have been phenomenal, they have been very good guidance and direction and pointing me in the direction to go but this is a part of the process that you have to do first. We were just hoping that you would consider the information that was provided from two different engineers saying how did he determine this was good when this is what actually had to take place. That was all we were looking at.
John Earhart:
We looked at, but we can't do anything.
G.W. Wiseman:
Basically, you submitted a proposal you didn't submit engineering.
Monica Davis:
Right, a proposal that needs to take place to determine if the structure was good or not. That's it, let's just move on.
John Earhart:
Our hands are tied.
G.W. Wiseman:
Even if we had the other engineering, it's a dispute between one engineer and another and it's still going be a civil matter. I can't make that decision.
John Earhart:
No.
Bill Dudley:
I guess you could get a third engineer and they could split it.
John Earhart:
And that happens.
Bill Dudley:
If two agree, you know, maybe.
John Earhart:
What usually happens is you would get an engineer, the contractor gets an engineer, and those two engineers pick a third engineer between the two, they'll pick a third. I mean it may go that far.
Michael Davis:
Well I'm going to pay for mine, I'm not going to pay for another.
John Earhart:
But you know what I'm saying? Those two will pick another one then whoever wins, wins at that point.
Bill Dudley:
And then at that point, if you could arrange such a meeting I'd recommend that GW be a part of it to so that he can defend himself on the spot.
Monica Davis:
We'll just deal with it from the state level, we appreciate your time.
John Earhart:

I don’t know what else we can do.
David Kirby:
Once you get an engineer to say something, it overrules us. And if you had an engineer and he came in and said something else, you know, we couldn't argue with him either.
John Earhart:
Yeah, I mean even if you would have brought your engineering here today we couldn't have--
David Kirby:
If he said it wasn't and this guy said it was, that’s beyond us, we can’t make that decision really.
G. W. Wiseman:
And we don't have the authority to tell a contractor, I can't tell Mr. Earhart if he's got a problem then he has to hire Ms. Katz to fix it. I don’t have that authority.
Bill Dudley:
Well do I have a motion that we adjourn this meeting.
G.W. Wiseman:
You need to vote on whether you’re going to uphold my decision to accept the engineer report or not.
David Kirby:
I move that we uphold the Building Official’s decision to accept the engineer’s report.
Bill Dudley:
I second.
The board voted to unanimously to accept the engineer’s report and the meeting was adjourned.

Additional Documents
Submitted by
Monica and Michael Davis

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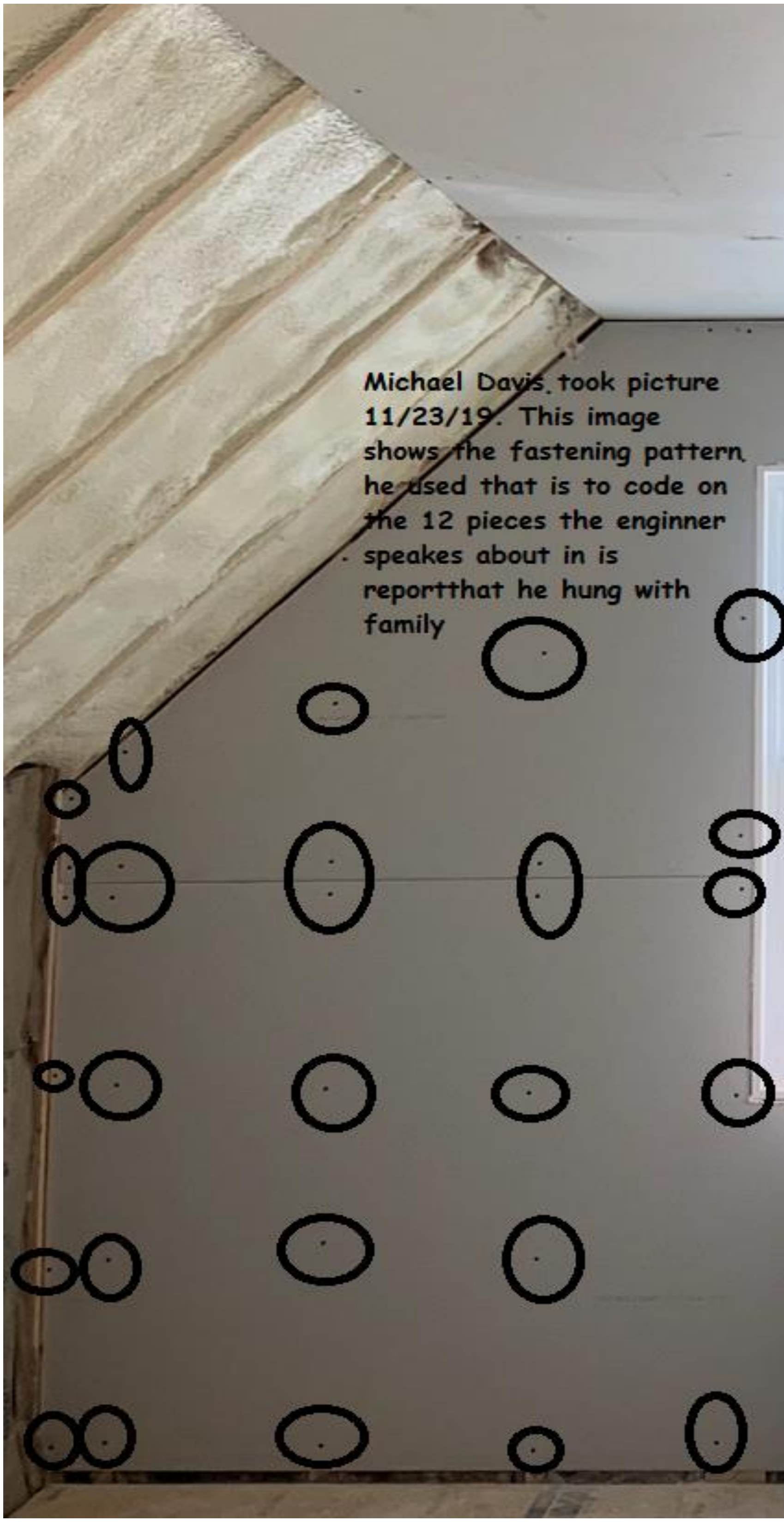
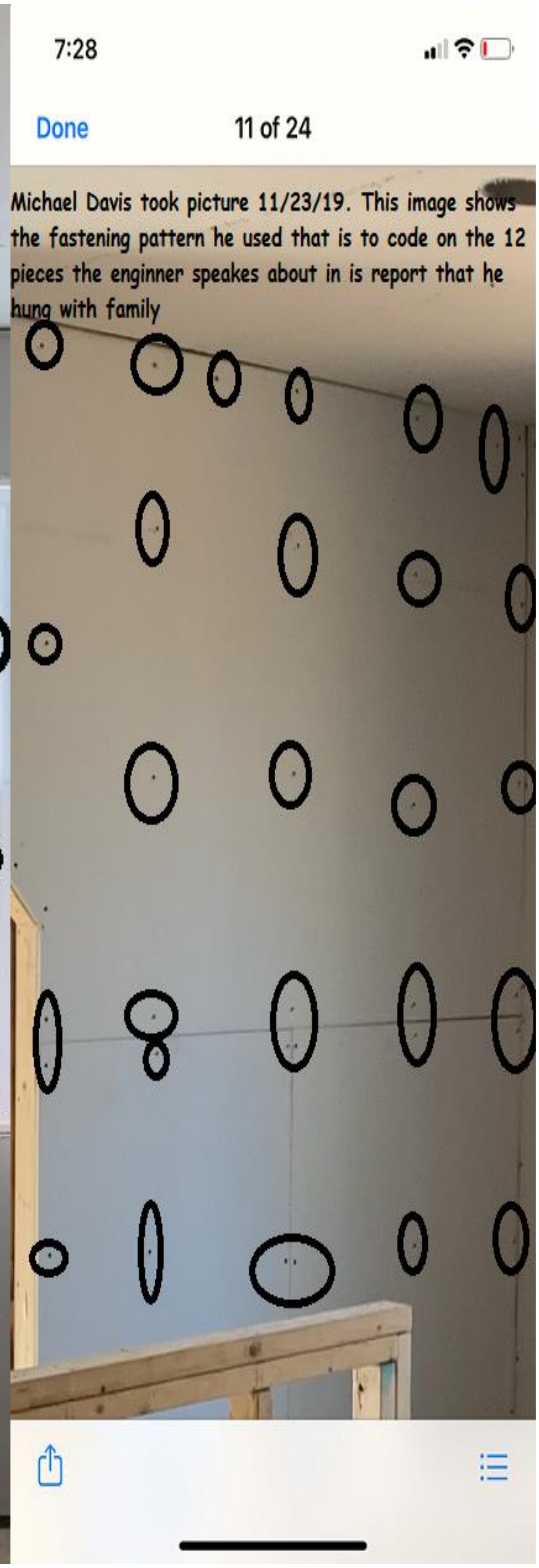
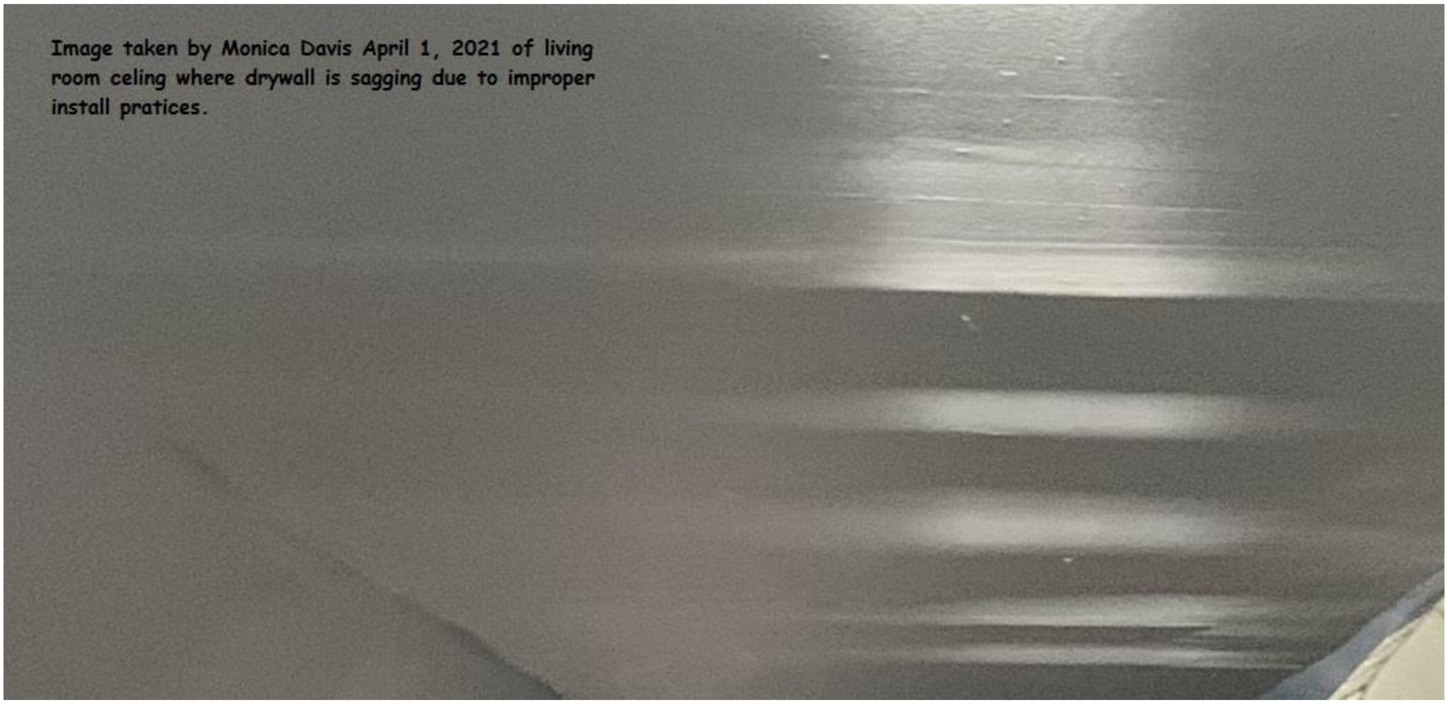
Third Submittal

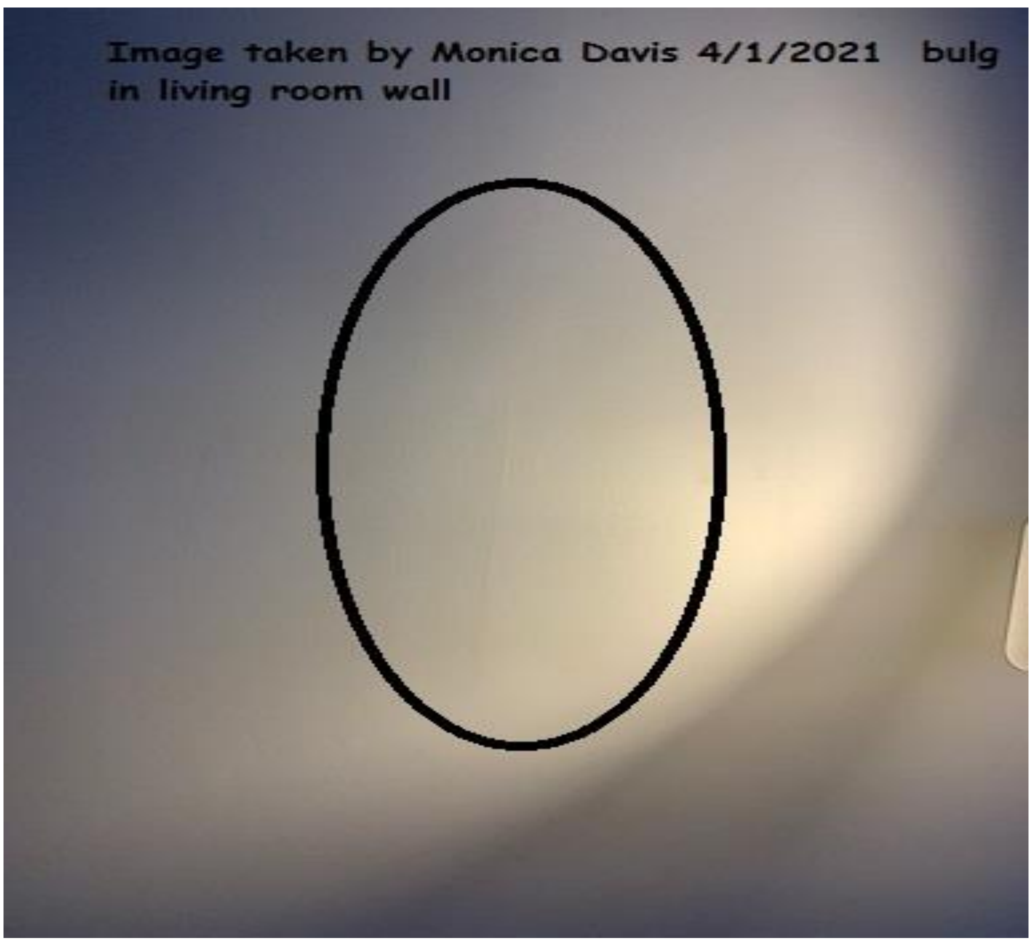
Below you will find clarification in reference to number 6 on the engineers report from Schnitzhofer. It was stated the majority of the bonus room was hung by the homeowner. Just to clarify my husband hung 12 sheets in that room out of almost 4 sheets total. Below are images that will show that the sheets he hung were hung to code verses the sheets the contractor hung.





Here is more sage in the ceiling do to the improper install





You will also find in the attachment an engineer's report from Brian Koerner with Engineer Solutions. We were told at the county appeals we would have to prove that what we were saying in reference to the truss design not being installed proper because the report from Schnitzhofer under numbers 3, 4, 5 and 7 that the truss system is adequate to support, installed in conformation with standard construction practices, and that what the homeowner actually misunderstood the behavior of the trusses and goes as far to say what the homeowner actually see is not occurring. I am attaching additional images that go along with what our engineer calls out in his report. Below are images of the improper gap for hanger installs, as well as hangers with no hardware, hangers with the wrong hardware, LVL beam in the celling, 2x10 in the place of the LVL Beam, and trusses setting on interior walls. PLEASE BE AWARE EVERY HANGER THAT WAS EXPOSED WAS WRONG RATHER IT WAS HARDWARE, NO HARDWARE, GAP TO LARGE, OR NO HANGER AT ALL


Image taken by Monica Davis
4/1/2021 far out image of truss
on wall see circle spot close up
in next picture


Image taken by Monica Davis 4/1/2021 truss setting
on an interior wall clear on the design floor plan this
is not allowed
Close up of spot circled in image in other image


Image taken by Monica Davis 4/1/2021 show after dtwall removed LVL beamin the ceiling that belongs in the floor


Image taken by Monica Davis 4/1/2021 gap in hanger over half of an inch
USP
THD28-2 Connectors
Ref# HHUS28-2, HTU28-2
ESR-2685, FL17232.17, RR25843
24142624
INCH
1
2
1
2
3
4
5

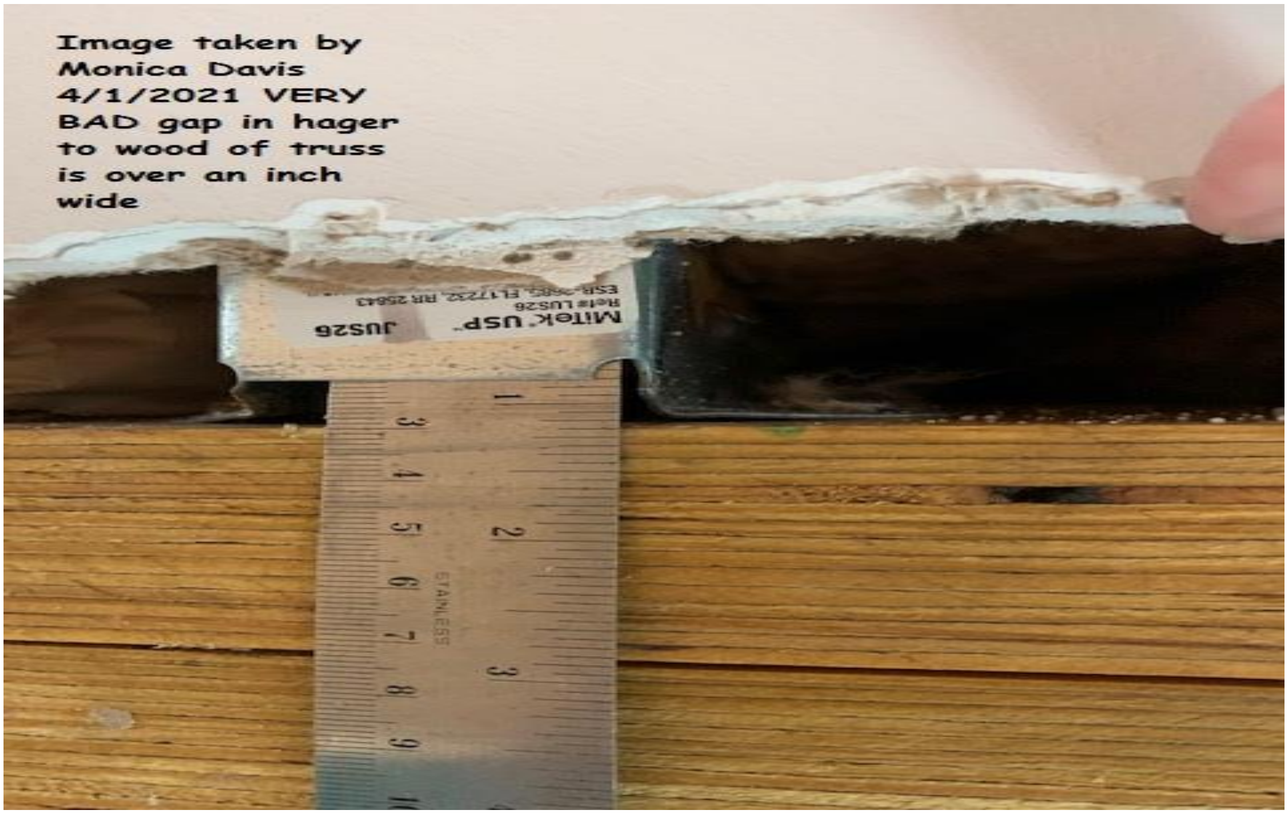


Image taken by
Monica Davis
4/1/2021 VERY
BAD gap in hager
to wood of truss
is over an inch
wide

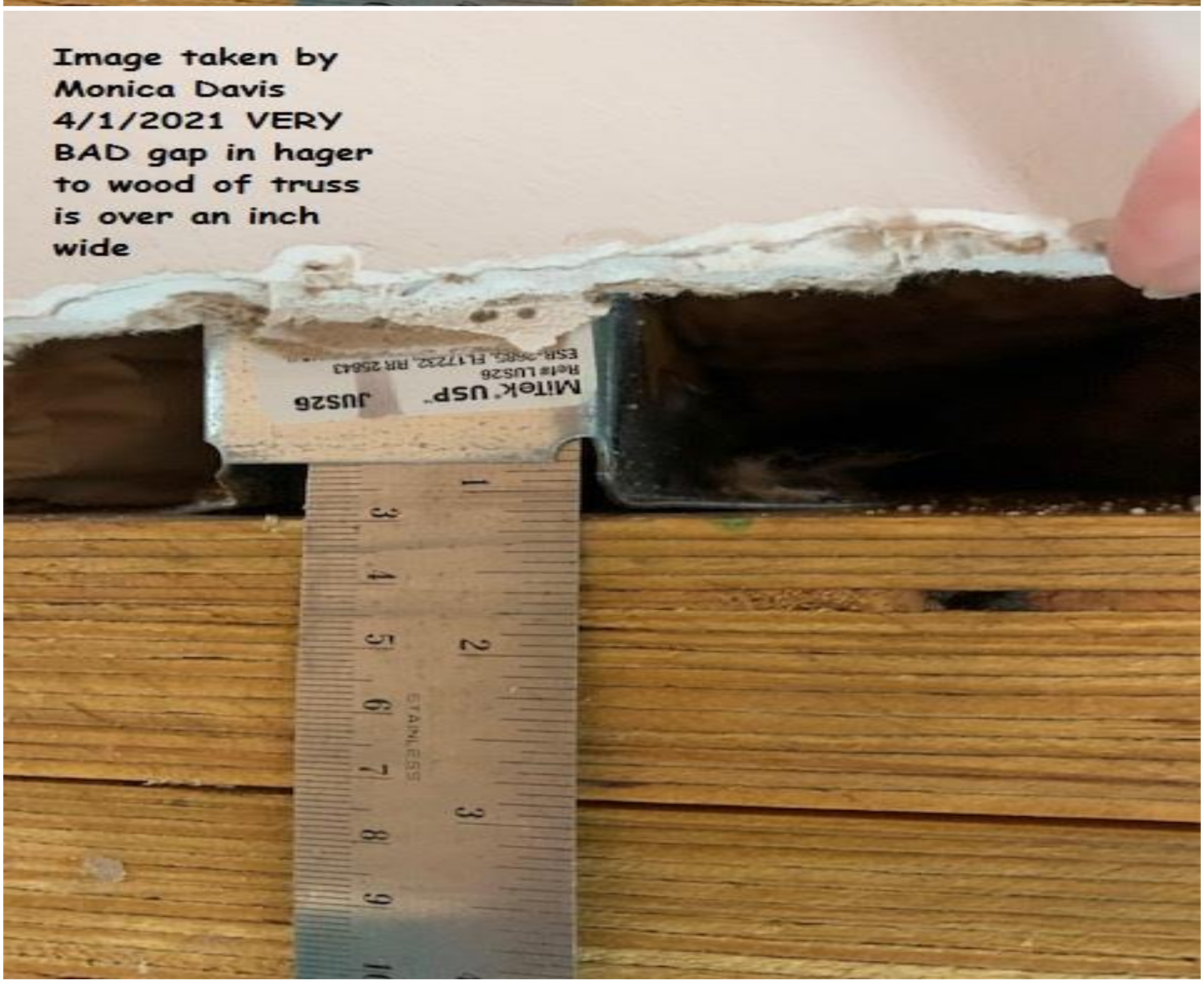


Image taken by
Monica Davis
4/1/2021 VERY
BAD gap in hager
to wood of truss
is over an inch
wide


Image taken by Monica Davis 4/1/2021 hanger hardware penetrates compromised web on truss plate


Image taken by Monica Davis 4/1/2021 image shows truss in hanger with 1 1/2 nails here 3 inch screws belong and gap in hanger is a quarter of an inc

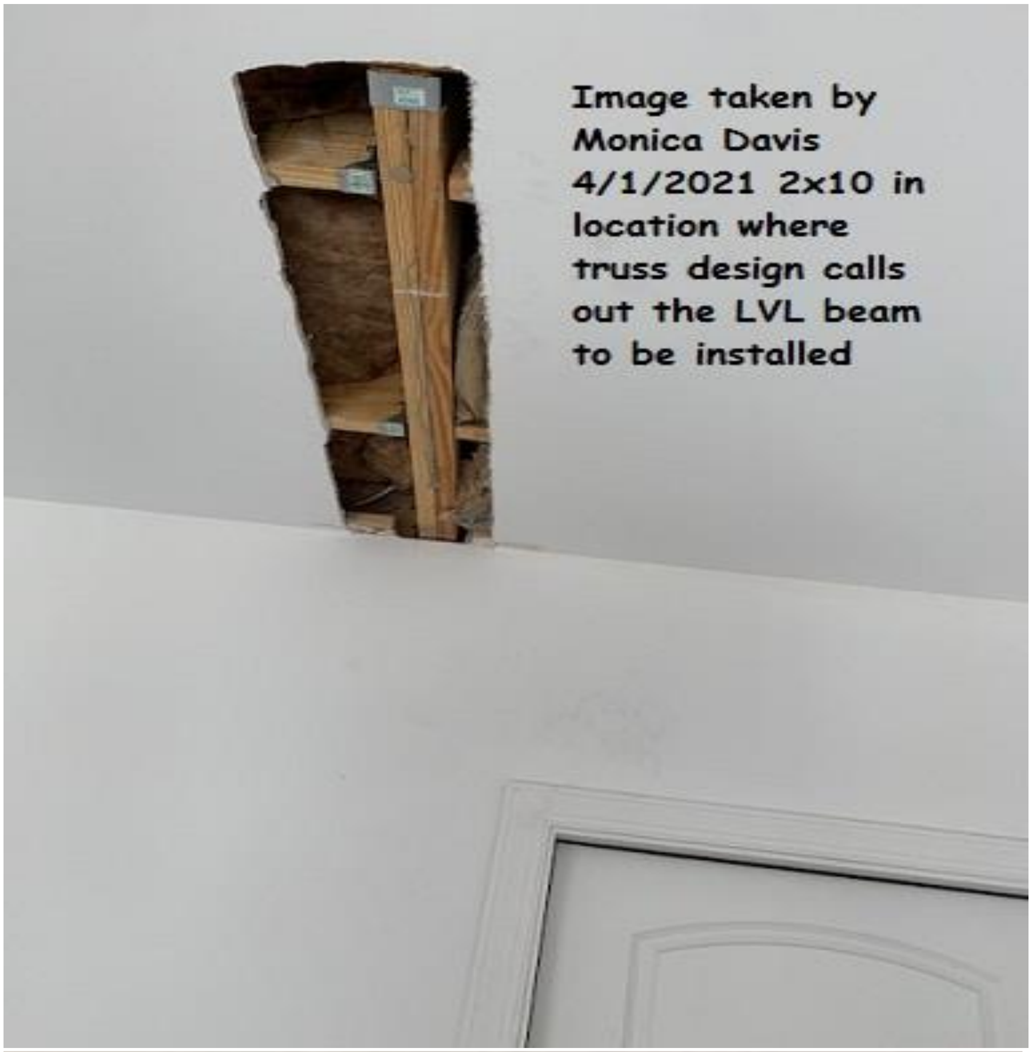


Image taken by Monica Davis 4/1/2021 2x10 in location where truss design calls out the LVL beam to be installed

Image taken by Monica Davis 4/1/2021 another hanger with wrong hardware and gap to large


Image taken by
Monica Davis
4/1/2021
no hardware in
some locations and
wrong hardware in
others along with
incorrect gap


Image taken by
Monica Davis
4/1/2021 another
hanger with no
hardware


Image taken by
Monica Davis
4/1/2021 half of
an inch gap in
hanger
INCH
1
2
3


Image taken by
Monica Davis
4/1/2021 wrong
hardware again
and into web plate
of truss


Image taken by Monica Davis 4/1/2021 gap in hanger over half of an inch
USP
THD28-2
Connectors
24142624

Charlottesville
434-202-8527

Harrisonburg
540-442-8787

Richmond
571-477-9328

www.engsoln.com

March 8, 2021 ES. 1120-677

Ms. Monica Davis
1002 Roundhill School Road
Crimora, Virginia

Subject: Site Visit Summary – February 25, 2021

Ms. Davis,

This is a summary of the site visit provided on February 25, 2021 in regards to several ongoing issues at your recently constructed house. There are several items that do not meet the building code and need to be fixed immediately to avoid future, long term issues.

The Detached Garage
The building code is really clear on all footings need to be below frost depth. The garage footings do not meet frost depth at any of the four corners and likely all the points in between the corners along the walls. Before any work is to be done, we would appreciate the opportunity to review the proposed repair by any contractor. The proposed repair should be presented in a drawing, sealed by a Professional Engineer licensed in the Commonwealth of Virginia.

The Bonus Room

Upstairs in the Bonus Room, the framing does not appear to be consistent with the framing plan provided by the truss manufacturer. A section of drywall was removed in order for Engineering Solutions to evaluate the roof framing. An LVL beam, as shown in the picture to the right, was discovered in the roof framing that is not in the framing plan that was approved by the Augusta County Building Department. The Builder will need to provide an updated drawing sealed by a licensed Professional Engineer showing this field revision.

For the USP THD hanger that supports this LVL, the wrong nails were used. As indicated by the ESR3445 attached, the only nails approved by the ESR is 16d Common for the header nails as shown in Table 8 of the ESR on page 13. It is very clear in the picture that the nails into the header are not 16d nails. A picture of the installed nails is shown in the picture to the right.

As stated in ESR-3445's Section 3.0 Conditions of Use on page 24, the "supported end of joist of beam must be within ¼-inch from the supporting member." Based on our field measurements, the end is over the ¼" maximum measurement. A repair provided by USP and sealed by a professional engineer must be provided. Using a hanger outside of the ESR testing is not advised. This is not the only scenario where the end gap is over ¼". It is EXTREMELY important that all hangers are installed properly. In our professional opinion, all hangers will need to be reviewed by a representative of USP and a proposed repair be developed by the hanger manufacturer. Once the repair plan has been developed, the field repairs should be evaluated by a licensed Professional Engineer.

The Attached Garage

There are several areas where the gap appears to be non-conforming with the joist hanger manufacturer's specifications. The gap is over a half inch in some locations. As previously mentioned in this report on Page 2, the maximum end gap is ¼". Two such examples are shown on this page.

The tall 2x4 framed garage walls supporting a second floor should be checked for load capacity in combined axial and bending. With a wind load applied and 40 pounds per square foot live load in the bonus room above and snow load, it does not appear that the 2x4 framed walls are adequate, which could lead to a catastrophic wall failure.

Additional areas of the wall may need to be opened up if fire blocking is greater than 10' from the sill. Based on the picture provided by the homeowner, it appears that the fire blocking may not meet code.

A section of drywall in the attached garage was removed. After opening up the area, the framing is not consistent with the approved building plans. 2x10 lumber was observed where an LVL beam was supposed to be.

The Foundation Walls
The foundation walls continue to crack. In some spots, you can see daylight through the mortar joints. In other locations, there are mortar joints that do not meet the ACI Code specifications.

Intersecting foundation walls are not tied into each other. Differential settlement has occurred and a gap has opened up between the two non-connected walls.

Hangers
The nails used for the LUS210 hanger are to be 10d nails. Based on the Simpson Strong-Tie website, the shorter Simpson nails may not be used as double shear nails. This website page print is attached to this report. Simpson should be contacted to provide a recommended repair sealed by a Professional Engineer.

As noted earlier, some connections have too large of a gap between the face of the main member and the end of the wood member supported by the wood hanger.

In other scenarios, there are gaps between the bottom of the floor joist and the hanger. There are multiple examples of this. The floor joists will continue to move and make noises as they are not supported properly. The joist hanger manufacturer should provide a repair sealed by a Professional Engineer licensed in the Commonwealth of Virginia. The picture to the side shows one of the many hangers where this occurs.

House Foundation

The front corners of the house foundation were exposed. This footing does not extend down 24" below grade to provide frost protection and does not meet code. Other areas of the house should be exposed to ensure that frost protection is met all the way around the building.

Conclusion

This work presented is subject to Engineering Solutions & Construction Management, PLC standard Terms and Conditions. It is based upon visual observations performed during the site visit. There may be hidden conditions that are not able to be evaluated. Should you have any questions, please do not hesitate to contact our office. We appreciate the opportunity to work with you on this project.

Sincerely,
ENGINEERING SOLUTIONS AND CONSTRUCTION MANAGEMENT, PLC

COMMONWEALTH OF VIRGINIA
BRIAN D. KOERNER
11march21
No. 036384
PROFESSIONAL ENGINEER

Brian Koerner, PE
Partner

ICC EVALUATION SERVICE

ICC-ES Evaluation Report

ESR-2523

Issued October 2007
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Index Report

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 05 23—Wood, Plastic and Composite Fastenings

REPORT HOLDER:

SIMPSON STRONG-TIE COMPANY INC.

EVALUATION SUBJECT:

INDEX OF SIMPSON STRONG-TIE STAMPED AND WELDED COLD-FORMED STEEL PRODUCTS FOR WOOD OR COLD-FORMED STEEL CONSTRUCTION

1.0 EVALUATION SCOPE

This evaluation report provides a cross-reference index for Simpson Strong-Tie stamped and welded cold-formed steel products for wood and cold-formed steel construction that are labeled with evaluation report number ESR-2523. The products are cross-referenced to the evaluation reports that provide product descriptions, installation requirements, the codes under which the specific products are recognized, allowable loads, names of the inspection agencies (for welded products), and limitations on use of the specific products.

2.0 IDENTIFICATION

2.1 The products noted in this evaluation report are labeled with evaluation report number ESR-2523 and with information as specified in the applicable evaluation report for the product. Welded products must be labeled with the name of the inspection agency, when required by the evaluation report on the product.

2.2 The report holder's contact information is the following:

SIMPSON STRONG-TIE COMPANY INC.
5956 WEST LAS POSITAS BOULEVARD
PLEASANTON, CALIFORNIA 94588
(800) 999-5099
www.strongtie.com

SIMPSON STRONG-TIE PRODUCT CROSS-REFERENCE INDEX FOR STAMPED AND WELDED COLD-FORMED STEEL PRODUCTS FOR WOOD OR COLD-FORMED STEEL CONSTRUCTION						
SERIES	**REPORT NUMBER**	**MODEL**				
A series	ESR-3096	A21 A23	A33	A34	A35	A44
ABA series	ESR-1622 ESR-3096	ABA44 ABA44R	ABA46	ABA46R	ABA66	ABA66R
ABU series	ESR-1622 ESR-3096	ABU44	ABU46	ABU66	ABU88	
ABWZ series	ESR-1622	ABW44Z ABW44RZ	ABW46Z	ABW46RZ	ABW66Z	ABW66RZ
AC series	ESR-2604 ESR-3096	AC4	AC4R	AC6	AC6R	
ACE series	ESR-2604	ACE4	ACE6			
AHEP series	ESR-2605	AHEP				
BA series	ESR-2615	BA1.81/11.88 BA2.56/11.88 BA2.1/11.88 BA1.56/11.88 BA1.81/7.25 BA2.1/9.5 BA2.56/20 BA2.56/30 BA3.56/22 BA3.56/7.25 BA4.12/14 BA4.28/16 BA4.75/18 BA5.12/16 BA5.12/26 BA7.12/16 BA7.12/26 BA314 BA610	BA2.56/14 BA2.56/16 BA2.37/11.88 BA1.56/14 BA1.81/9.25 BA2.37/18 BA2.56/22 BA2.56/9.5 BA3.56/24 BA3.56/9.25 BA4.12/16 BA4.28/9.5 BA4.75/20 BA5.12/18 BA5.12/28 BA7.12/18 BA7.12/28 BA316 BA612	BA3.56/11.88 BA3.56/14 BA2.37/14 BA1.56/9.5 BA1.81/9.5 BA2..37/20 BA2.56/24 BA3.25 BA3.56/26 BA3.56/9.5 BA4.12/9.5 BA4.75/11.88 BA4.75/9.5 BA5.12/20 BA5.12/9.5 BA7.12/20 BA7.12/9.5 BA38 BA614	BA3.56/16 BA410 BA2.37/16 BA1.81/11.25 BA2.1/14 BA2.37/9.5 BA2.56/26 BA3.56/11.25 BA3.56/28 BA3.56 BA4.28/11.88 BA4.75/14 BA5.12/11.88 BA5.12/22 BA7.12/11.88 BA7.12/22 BA310 BA414 BA616	BA412 BA48 BA3.56/18 BA1.81/14 BA2.1/16 BA2.56/18 BA2.56/28 BA3.56/20 BA3.56/30 BA4.12/11.88 BA4.28/14 BA4.75/16 BA5.12/14 BA5.12//24 BA7.12/14 BA7.12/24 BA312 BA416 BA68
BC/S series	ESR-2604 ESR-3096	BC4 BC46	BC4R BC40	BC6 BC6R	BC8 BC60	BCS2-2/4 BCS2-3/6
BT series	ESR-2608	BT	BTB	BTH		
CB series	ESR-3050	CB44	CB46	CB48	CB66	CB68
CBSQ series	ESR-3050	CBSQ44	CBSQ46	CBSQ66	CBSQ86	CBSQ88
CC/ECC series	ESR-2604	CC31/4-4 CC31/4-6 CC44 CC46	CC51/4-4 CC51/4-6 CC51/4-8 CC64	CC66 CC68 CC76 CC77	CC78 CC86 CC88 CC96	CC98 CC106
CCQ/ECCQ series	ESR-2604	CCQ3-4-SDS2.5 CCQ3-6-SDS2.5 CCQ44-SDS2.5	CCQ46-SDS2.5 CCQ48-SDS2.5 CCQ5-4SDS2.5	CCQ5-6SDS2.5 CCQ5-8SDS2.5 CCQ64-SDS2.5	CCQ66-SDS2.5 CCQ68-SDS2.5 CCQ74SDS2.5	CCQ76SDS2.5 CCQ77SDS2.5 CCQ78SDS2.5
CMST series	ESR-2105	CMST12	CMST14			
CMSTC series	ESR-2105	CMSTC16				
CPTZ series	ESR-1622	CPT44Z	CPT66Z	CPT88Z		
CS series	ESR-2105	CS14	CS16	CS18	CS20	CS22
CSHP series	ESR-2105	CSHP18	CSHP20			
CTS series	ESR-2105	CTS218				
DGF series	ESR-2553	DGF1.81/11.88 DGF1.81/14 DGF1.81/16 DGF1.81/9.5 DFG2.1/11.88 DFG2.1/14 DGF2.1/16 DGF2.1/9.5	DGF2.37/11.88 DGF2.37/14 DGF2.37/16 DGF2.37/18 DGF2.37/20 DGF2.37/9.5 DGF2.56/11.25 DGF2.56/11.88	DGF2.56/14 DGF2.56/16 DGF2.56/18 DGF2.56/20 DGF2.56/22 DGF2.56/24 DGF2.56/9.25 DGF2.56/9.5	DGF210 DGF212 DGF28 DGF3.62/11.25 DGF3.62/11.88 DGF3.62/14 DGF3.62/16 DGF3.62/18	DGF3.62/20 DGF3.62/22 DGF3.62/24 DGF3.62/9.25 DGF3.62/9.5
DGBF series	ESR-2553	DGBF3.62/11.25 DGBF3.62/11.88 DGBF3.62/14 DGBF3.62/16 DGBF3.62/18 DGBF3.62/20	DGBF3.62/22 DGBF3.62/24 DGBF3.62/9.25 DGBF3.62/9.5 DGBF5.25 DGBF5.37/11.88	DGBF5.37/14 DGBF5.37/16 DGBF5.37/18 DGBF5.37/20 DGBF5.37/22 DGBF5.37/24	DGBF5.56 DGBF6.88 DGBF7.12/11.88 DGBF7.12/14 DGBF7.12/16 DGBF7.12/18	DGBF7.12/20 DGBF7.12/22 DGBF7.12/24

SIMPSON STRONG-TIE PRODUCT CROSS-REFERENCE INDEX FOR STAMPED AND WELDED COLD-FORMED STEEL PRODUCTS FOR WOOD OR COLD-FORMED STEEL CONSTRUCTION						
SERIES	**REPORT NUMBER**	**MODEL**				
DGHF series	ESR-2553	DGHF1.81/11.88 DGHF1.81/14 DGHF1.81/16 DGHF1.81/9.5 DGHF2.1/11.88 DGHF2.1/14 DGHF2.1/16	DGHF2.1/9.5 DGHF2.37/11.88 DGHF2.37/14 DGHF2.37/16 DGHF2.37/18 DGHF2.37/20 DGHF2.37/9.5	DGHF2.56/11.25 DGHF2.56/11.88 DGHF2.56/14 DGHF2.56/16 DGHF2.56/18 DGHF2.56/20 DGHF2.56/22	DGHF2.56/24 DGHF2.56/9.25 DGHF2.56/9.5 DGHF3.62/11.25 DGHF3.62/11.88 DGHF3.62/14 DGHF3.62/16	DGHF3.62/18 DGHF3.62/20 DGHF3.62/22 DGHF3.62/24 DGHF3.62/9.25 DGHF3.62/9.5
DHU series	ESR-2552	DHU1.81/11.88 DHU1.81/14 DHU1.81/16 DHU1.81/9.5 DHU2.1/11.88 DHU2.1/14 DHU2.1/16 DHU2.1/9.5 DHU2.37/11.88	DHU2.37/14 DHU2.37/16 DHU2.37/18 DHU2.37/20 DHU2.37/9.5 DHU2.56/11.88 DHU2.56/14 DHU2.56/16	DHU2.56/18 DHU2.56/20 DHU2.56/9.5 DHU3.56/11.88 DHU3.56/14 DHU3.56/16 DHU3.56/18 DHU3.56/20	DHU3.56/22 DHU3.56/24 DHU3.56/9.5	
DHUTF series	ESR-2552	DHU1.81/11.88TF DHU1.81/14TF DHU1.81/16TF DHU1.81/9.5TF DHU2.1/11.88TF DHU2.1/14TF DHU2.1/16TF	DHU2.1/9.5TF DHU2.37/11.88TF DHU2.37/14TF DHU2.37/16TF DHU2.37/18TF DHU2.37/20TF DHU2.37/9.5TF	DHU2.56/11.88TF DHU3.56/11.88TF DHU2.56/14TF DHU2.56/16TF DHU2.56/18TF DHU2.56/20TF DHU2.56/9.5TF	DHU3.56/14TF DHU3.56/16TF DHU3.56/18TF DHU3.56/20TF DHU3.56/22TF DHU3.56/24TF DHU3.56/9.5TF	
DJT series	ESR-3096		DJT14Z			
DSC series	ESR-2605	DSC2R-SDS3	DSC2L-SDS3	DSC5RSDS3	DSC5L-SDS3	
DSP series	ESR-2613	DSP				
DTT series	ESR-2330	DTT2				
DU series	ESR-2552	DU1.81/11.88 DU1.81/14 DU1.81/16 DU1.81/9.5	DU2.1/11.88 DU2.1/14 DU2.1/16 DU2.1/9.5	DU2.37/11.88 DU2.37/14 DU2.37/9.5		
EG series	ESR-2615	EG5	EG7	EG9		
EGQ series	ESR-2615	EGQ3.62 – SDS3	EGQ5.50 – SDS3	EGQ7.25 – SDS3		
EPB series	ESR-3050	EPB44A	EPB46	EPB66	EPB44	
EPC series	ESR-3096 ESR-2604	EPC44-16 EPC46-16 EPC8Z	EPC44 EPC48-16 EPC8RZ	EPC4Z EPC64-16	EPC4RZ EPC66-16	EPC6Z EPC6RZ
EPS series	ESR-3050	EPS4Z				
F series	ESR-2607			F26-2	F44	F46
FJA series	ESR-2616	FJA				
FRFP series	ESR-2616	FRFP				
FSA series	ESR-2616	FSA				
GA series	ESR-3096	GA1	GA2			
GBC series	ESR-2605	GBC				
GH series	ESR-2616	GH46-6 GH410-8 GH68-6	GH46-8 GH610-6 GH68-8	GH48-6 GH610-8	GH48-8 GH66-6	GH410-6 GH66-8
GLB series	ESR-2616 ESR-2877	GLB5A GLB5B	GLB5C GLB5D	GLB7A GLB7B	GLB7C GLB7D	
GLBT series	ESR-2616	GLBT512 GLBT612	GLBT516	GLBT616	GLBT520	GLBT620
GLS series	ESR-2615	GLS3-5 GLS3-7	GLS3-9 GLS5-5	GLS5-7 GLS5-9	GLS7-7 GLS7-9	

SIMPSON STRONG-TIE PRODUCT CROSS-REFERENCE INDEX FOR STAMPED AND WELDED COLD-FORMED STEEL PRODUCTS FOR WOOD OR COLD-FORMED STEEL CONSTRUCTION

SERIES	REPORT NUMBER	MODEL				
GLTV series	ESR-2615	GLTV3 GLTV3.59 GLTV3.511 GLTV3.512 GLTV3.514 GLTV3.516 GLTV3.518 GLTV3.520 GLTV3.56/9.25 GLTV3.56/11.25 GLTV3.56/11.5 GLTV3.56/12.5	GLTV3.56/15.25 GLTV3.56/18.75 GLTV3.62 GLTV4 GLTV4.50 GLTV5 GLTV5.37 GLTV5.50/9.25 GLTV5.50/11.25	GLTV5.50/13.25 GLTV5.50/15.25 GLTV5.50/18.75 GLTV5.50/19 GLTV5.59 GLTV5.511 GLTV5.512 GLTV5.514 GLTV5.516 GLTV5.518 GLTV5.520	GLTV6 GLTV7 GLTV7.12 GLTV7.12/19 GLTV49.25-2 GLTV49.5-2 GLTV411.25-2 GLTV411.88-2 GLTV412-2 GLTV418.75-2 GLTV414-2	GLTV416-2 GLTV418-2 GLTV420-2 GLTV422-2 GLTV424-2 GLTV426-2 GLTV428-2 GLTV430-2 GLTV3520-2
H series	ESR-2613 ESR-3096	H1 H10-2	H8 H2.5A	H3 H5	H6 H7Z H10A	
HB series	ESR-2615	HB2.56/22 HB2.56/24 HB2.56/28 HB2.56/30 HB3.56/11.25 HB3.56/11.88 HB3.56/12	HB3.56/14 HB3.56/16 HB3.56/18 HB3.56/20 HB3.56/22 HB3.56/24 HB3.56/26 HB3.56/28 HB3.56/30 HB3.56/9.25 HB3.56/9.5	HB4.75/14 HB4.75/16 HB4.75/18 HB4.75/20 HB412 HB414 HB416 HB5.12/11.88 HB5.12/14 HB5.12/16 HB5.12/18 HB5.12/20 HB5.12/22 HB5.12/24	HB5.12/26 HB5.12/28 HB5.12/30 HB5.50/11.25 HB5.50/11.88 HB5.50/12 HB5.50/14 HB5.50/16 HB5.50/18 HB5.50/20 HB5.50/9.25 HB5.50/9.5 HB7.12/11.25 HB7.12/11.88	HB7.12/14 HB7.12/16 HB7.12/18 HB7.12/20 HB7.12/22 HB7.12/24 HB7.12/26 HB7.12/28 HB7.12/9.25 HB7.12/9.5
HCA series	ESR-2607	HCA3.62-5 HCA3.62-9 HCA5-5 HCA5-7 HCA5-9	HCA5.62-5 HCA5.62-7 HCA7-5 HCA7-7 HCA7-9	HCA7.12-5 HCA7.12-9 HCA9-5 HCA9-7 HCA9-9	HCA11-5 HCA11-7 HCA11-9 HCA5.37-5 HCA5.37-9	
HCP series	ESR-2551	HCP2	HCP1.81	HCP4		
HDC series	ESR-2330	HDC10/22	HDC10/4			
HDQ series	ESR-2330	HDQ8				
HDU series	ESR-2330	HDU2 HDU4	HDU5	HDU8	HDU11	HDU14
HFN series	ESR-2607	HF24N	HF26N	HF34N	HF36N	
HGLB series	ESR-2616 ESR-2877	HGLBA	HGLBB	HGLBC	HGLBD	
HGLS series	ESR-2615	HGLS5	HGLS7	HGLS9		
HGLT series	ESR-2615	HGLT3 HGLT4	HGLT5 HGLT6	HGLT7	HGLT8	HGLT9
HGLTV series	ESR-2615	HGLTV3 HGLTV3.514 HGLTV3.516 HGLTV3.518 HGLTV3.520 HGLTV3.56/18.75 HGLTV3.56/19	HGLTV3.62 HGLTV4 HGLTV5 HGLTV5.37 HGLTV5.50/18.75 HGLTV5.50/19	HGLTV5.514 HGLTV5.516 HGLTV5.518 HGLTV5.520 HGLTV6 HGLTV7 HGLTV7.12 HGLTV7.12/18.75 HGLTV7.12/19 HGLTV7.12/22 HGLTV7.12/24	HGLTV414-2 HGLTV416-2 HGLTV418-2 HGLTV420-2	HGLTV426-2
HGT series	ESR-2613 ESR-2877 ESR-2616	HGT-2	HGT-3	HGT-4		
HGU series	ESR-2552	HGU3.63-SDS HGU5.25-SDS	HGU5.50-SDS HGU5.62-SDS	HGU7.00-SDS HGU7.25-SDS	HGU9.00-SDS	

SIMPSON STRONG-TIE PRODUCT CROSS-REFERENCE INDEX FOR STAMPED AND WELDED COLD-FORMED STEEL PRODUCTS FOR WOOD OR COLD-FORMED STEEL CONSTRUCTION						
SERIES	**REPORT NUMBER**	**MODEL**				
HGUS series	ESR-2549 ESR-2552	HGUS26-2 HGUS28-2 HGUS210-2 HGUS46 HGUS2.75/10 HGUS2.75/12 HGUS2.75/14 HGUS3.25/10	HGUS3.25/12 HGUS48 HGUS410 HGUS412 HGUS414 HGUS26-3 HGUS28-3 HGUS210-3	HGUS212-3 HGUS5.25/10 HGUS5.25/12 HGUS5.5/8 HGUS214-3 HGUS26-4 HGUS28-4 HGUS210-4	HGUS5.62/10 HGUS5.62/12 HGUS5.62/14 HGUS6.88/10 HGUS5.5/10 HGUS5.5/12 HGUS5.5/14 HGUS6.88/12	HGUS6.88/14 HGUS212-4 HGUS214-4 HGUS7.25/8 HGUS7.25/10 HGUS7.25/12 HGUS7.25/14 HGUS26 HGUS28 HGUS210
HHDQ series	ESR-2330	HHDQ11	HHDQ14			
HHGU series	ESR-2552	HHGU5.50-SDS	HHGU5.62-SDS	HHGU7.00-SDS	HHGU7.25-SDS	HHGU9.00-SDS
HHRC series	ESR-2551	HHRC2-2 HHRC4/1.81	HHRC42 HHRC42-2	HHRC44 HHRC66	HHRC5.25/3.25 HHCRC5.37/3.12	
HHUS series	ESR-2549 ESR-2552	HHUS26-2 HHUS28-2	HHUS210-2 HHUS46	HHUS48 HHUS410	HHUS5.50/10 HHUS7.25/10	
HIT series	ESR-2615	HIT318 HIT320 HIT322	HIT324 HIT326 HIT3518	HIT3520 HIT418 HIT420	HIT422 HIT424 HIT426	HIT3522 HIT3524 HIT3526
HPA series	ESR-2920	HPA28	HPA35			
HRC series	ESR-2551	HRC22	HRC1.81			
HRS series	ESR-3096	HRS6	HRS8	HRS12		
HS series	ESR-2613	HS24				
HSS series	ESR-2608	HSS2-SDS1.5	HSS2-2-SDS3	HSS2-3-SDS3	HSS4-SDS3	
HST series	ESR-2105	HST2	HST3	HST5	HST6	
HSUR/L series	ESR-2549 ESR-2552	HSUR/L210-2 HSUR/L214-2 HSUR/L46 HSUR/L410	HSUR/L414 HSUR/L26-2 HSUR/L4.12/9 HSUR/L4.12/11	HSUR/L4.12/14 HSUR/L4.12/16 HSUR/L4.28/9 HSUR/L4.28/11	HSUR/L4.75/9 HSUR/L4.75/11 HSUR/L4.75/14 HSUR/L4.75/16	HSUR/L5.12/9 HSUR/L5.12/11 HSUR/L5.12/14 HSUR/L5.12/16
HTP series	ESR-3096	HTP37Z				
HTS series	ESR-2613	HTS16 HTS20	HTS24	HTS28	HTS30	HTS30C
HTU series	ESR-2549	HTU26 HTU28	HTU210	HTU26-2	HTU28-2	HTU210-2
HU series	ESR-2549 ESR-2552	HU26 HU26-3 HU28 HU210 HU212 HU214 HU216 HU34 HU36 HU38 HU310 HU312 HU314 HU1.81/5 HU7 HU9 HU11	HU14 HU2.1/9 HU2.1/11 HU359 HU3511 HU3514 HU3516/22 HU3524/30 HU316 HU44 HU46 HU48 HU410 HU412 HU414 HU416 HU66	HU68 HU610 HU2.75/10 HU2.75/12 HU2.75/14 HU2.75/16 HU3.25/10.5 HU3.25/12 HU612 HU614 HU616 HU24-2 HU26-2 HU28-2 HU210-2 HU212-2	HU214-2 HU216-2 HU310-2 HU4.12/9 HU4.12/11 HU312-2 HU314-2 HU210-3 HU210-4 HU212-3 HU214-3 HU216-3 HU4.28/9 HU4.28/11 HU4.75/9 HU4.75/11 HU3514-2	HU3516-2 HU5.125/12 HU5.125/13.5 HU5.125/16 HU410-2 HU412-2 HU414-2 HU88 HU810 HU812 HU814 HU816 HU3520-2
HUCQ series	ESR-2552	HUCQ1.81/9-SDS HUCQ1.81/11-SDS	HUCQ410-SDS HUCQ412-SDS	HUCQ5.25/9-SDS HUCQ5.25/11-SDS	HUCQ610-SDS HUCQ612-SDS	
HUS series	ESR-2549 ESR-3096 ESR-2552	HUS26 HUS28 HUS210	HUS46 HUS48 HUS410	HUS412 HUS26-2	HUS28-2 HUS1.81/10	HUS210-2 HUS212-2
HUSTF series	ESR-2553	HUS26-2TF HUS28-2TF	HUS210-2TF HUS212-2TF	HUS214-2TF HUS46TF	HUS48TF HUS410TF	HUS412TF HUS414TF

SIMPSON STRONG-TIE PRODUCT CROSS-REFERENCE INDEX FOR STAMPED AND WELDED COLD-FORMED STEEL PRODUCTS FOR WOOD OR COLD-FORMED STEEL CONSTRUCTION

SERIES	REPORT NUMBER	MODEL				
HUTF series	ESR-2553	HU24TF HU26TF HU28TF HU210TF HU212TF HU214TF HU216TF HU34TF	HU36TF HU38TF HU310TF HU312TF HU314TF HU316TF HU24-2TF HU26-2TF	HU28-2TF HU210-2TF HU212-2TF HU214-2TF HU216-2TF HU44TF HU46TF HU48TF	HU410TF HU412TF HU414TF HU416TF HU210-3TF HU212-3TF HU214-3TF HU216-3TF	HU66TF HU68TF HU610TF HU612TF HU614TF HU616TF
HWP/HWPH series	ESR-2615	HWP1.56 HWP1.81 HWP2.56 HWP3.12	HWP3.56 HWP3.62 HWP5.12 HWP5.37	HWP5.62 HWP66 HWPH2.56 HWHP2.75	HWPH3.56 HWPH3.62 HWPH5.12 HWPH5.25	HWPH5.37 HWPH5.62 HWPH7.12
ITS series	ESR-2615	ITS1.56/9.5 ITS1.56/11.88 ITS1.81/9.5 ITS1.81/11.88 ITS1.81/14	ITS1.81/16 ITS2.06/9.5 ITS2.06/11.88 ITS2.06/14 ITS2.06/16 ITS2.37/9.5 ITS2.37/11.88	ITS2.37/14 ITS2.37/16 ITS2.56/9.37 ITS2.56/9.5 ITS2.56/11.25 ITS2.56/11.88 ITS2.56/13	ITS2.56/14 ITS2.56/16 ITS3.56/9.25 ITS3.56/9.5 ITS3.56/9.37 ITS3.56/11.25 ITS3.56/11.88	ITS3.56/14 ITS3.56/16
IUS series	ESR-2552	IUS1.81/9.5 IUS1.81/11.88 IUS1.81/14	IUS1.81/16 IUS2.06/9.5 IUS2.06/11.88 IUS2.06/14 IUS2.06/16	IUS2.37/9.5 IUS2.37/11.88 IUS2.37/14 IUS2.37/16 IUS2.56/9.25	IUS2.56/9.5 IUS2.56/11.88 IUS2.56/14 IUS2.56/16	IUS3.56/9.5 IUS3.56/11.88 IUS3.56/14 IUS3.56/16
JB series	ESR-2553	JB26	JB28			
JBA	ESR-2553	JB210A	JB212A	JB214A		
L series	ESR-3096	L30	L50	L70	L90	
LB series	ESR-2553	LB26 LB28				LB216
LBAZ	ESR-2553	LB210AZ	LB212AZ	LB214AZ		
LCB series	ESR-3050	LCB44	LCB66			
LCE series	ESR-3096	LCE4				
LEG series	ESR-2615	LEG3	LEG5	LEG7		
LFTA series	ESR-2613	LFTA				
LGU series	ESR-2552	LGU3.25.SDS	LGU3.63-SDS	LGU5.25-SDS		
LPCZ series	ESR-2604 ESR-3096	LPC4Z		LPC6Z		
LRU series	ESR-2551	LRU26	LRU28	LRU210	LRU212	
LSSU series	ESR-2551	LSSU28	LSSU210			
LSTA	ESR-2105 ESR-3096	LSTA9 LSTA15	LSTA12 LSTA18	LSTA21 LSTA24	LSTA30 LSTA36	
LSTHD series	ESR-2920	LSTHD8	LSTHD8RJ			
LSTI	ESR-2105 ESR-3096	LSTI49	LSTI73			
LSU series	ESR-2551	LSU26				
LTB series	ESR-2608	LTB20	LTB40			
LTHJA series	ESR-2605	LTHJA26				
LTHMA	ESR-2605	LTHMA				
LTP series	ESR-3096	LTP4				
LTS series	ESR-2613	LTS12	LTS16	LTS18	LTS20	
LU series	ESR-2549 ESR-3096	LU24	LU26	LU28	LU210	
LUCZ series	ESR-2549 ESR-3096	LUC26Z	LUC210Z			
LUS series	ESR-2549 ESR-3096	LUS24 LUS24-2 LUS26 LUS26-2	LUS26-3 LUS28 LUS28-2 LUS28-3	LUS36 LUS44 LUS46 LUS48	LUS210 LUS210-2 LUS210-3	LUS214-2 LUS410 LUS414
MASA series	ESR-2555	MASA				
MASAP series	ESR-2555	MASAP				

SIMPSON STRONG-TIE PRODUCT CROSS-REFERENCE INDEX FOR STAMPED AND WELDED COLD-FORMED STEEL PRODUCTS FOR WOOD OR COLD-FORMED STEEL CONSTRUCTION						
SERIES	**REPORT NUMBER**	**MODEL**				
MEG series	ESR-2615	MEG5	MEG7			
MGU series	ESR-2552	MGU3.63-SDS	MGU5.25-SDS	MGU5.50-SDS	MGU5.62-SDS	MGU7.00-SDS
MIT series	ESR-2615	MIT1.81/14 MIT1.81/16 MIT11.88 MIT211.88 MIT211.88-2 MIT29.5-2 MIT311.88 MIT311.88-2	MIT314 MIT314-2 MIT316 MIT318 MIT320 MIT359.25-2 MIT3511.88 MIT3511.88-2 MIT3514	MIT3514-2 MIT3516 MIT3518 MIT3520 MIT359.5-2 MIT39.5-2 MIT4.12/11.88 MIT4.12/14	MIT4.12/9.5 MIT4.28/11.88 MIT4.28/14 MIT4.28/9.5 MIT4.75/16 MIT411.88 MIT414 MIT416 MIT418 MIT420 MIT49.5	MIT5.12/16 MIT9.5
MIU series	ESR-2552	MIU1.56/7 MIU1.56/9 MIU1.56/11 MIU1.56/14 MIU1.81/7 MIU1.81/9 MIU1.81/11 MIU1.81/14 MIU1.81/16 MIU1.81/18 MIU2.1/11 MIU2.37/7	MIU2.37/9 MIU2.37/11 MIU2.37/14 MIU2.37/16 MIU2.37/18 MIU2.37/20 MIU2.56/9 MIU2.56/11 MIU2.56/14 MIU2.56/16 MIU2.56/18	MIU2.56/20 MIU3.12/9 MIU3.12/11 MIU3.56/9 MIU3.56/11 MIU3.56/14 MIU3.56/16 MIU3.56/18 MIU3.56/20 MIU4.12/9 MIU4.12/11 MIU4.12/14	MIU4.12/16 MIU4.28/9 MIU4.28/11 MIU4.28/14 MIU4.28/16 MIU4.75/9 MIU4.75/11 MIU4.75/14 MIU4.75/16 MIU4.75/18 MIU4.75/20 MIU5.12/7	MIU5.12/9 MIU5.12/11 MIU5.12/14 MIU5.12/16 MIU5.12/18 MIU5.12/20
MPAI	ESR-2920	MPAI32	MPAI44			
MPBZ	ESR-3050	MPB44Z	MPB66Z	MPB88Z		
MSC series	ESR-2615	MSC2	MSC1.18	MSC4	MSC5	
MST series	ESR-2105 ESR-3096	MST27	MST37	MST48	MST60	MST72
MSTA series	ESR-2105 ESR-3096	MSTA9 MSTA12	MSTA15 MST18	MSTA21 MSTA24	MSTA49 MSTA30	MSTA36
MSTC series	ESR-2105 ESR-3096	MSTC28	MSTC40	MSTC52	MSTC66	MSTC78
MSTCB3 series	ESR-2105	MSTC48B3	MSTC66B3			
MSTI series	ESR-2105 ESR-3096	MSTI26	MST136	MSTI48	MSTI60	MSTI72
MTS series	ESR-2613 ESR-3096	MTS12	MTS16	MTS18	MTS20	MTS30
MUS series	ESR-2549	MUS26	MUS28			
NC series	ESR-2608	NC2x10-16				
NCA series	ESR-2608	NCA2x10-12	NCA2x12-12 NCA2x8-16	NCA2x10-16	NCA2x12-16	
PA series	ESR-2920	PA18	PA23	PA28	PA35	PA51 PA68
PAI series	ESR-2920	PAI18	PAI23	PAI28	PAI35	
PB series	ESR-3050	PB44	PB46	PB66	PB44R	PB66R
PBS series	ESR-3050	PBS44A	PBS46	PBS66		
PBV series	ESR-1622	PBV6	PBV10			
PC series	ESR-2604 ESR-3096	PC44-16 PC44 PC46-16 PC46	PC48-16 PC48 PC64-16 PC64	PC66-16 PC66 PC68 PC84	PC86 PC88 PC4Z PC4RZ	PC6Z PC6RZ PC8Z PC8RZ
PF series	ESR-2553	PF24 PFD24B PFDS28B	PF26 PFD26B	PF24B PFD28B	PF26B PFDS24B	PF28B PFDS26B
PHD series	ESR-2330	PHD2	PHD5	PHD6		
PPB series	ESR-3050	PPB44-4Z	PPB44-6Z			
RCWB series	ESR-2608		RCWB12	RCWB14		
RPBZ series	ESR-1622	RPBZ				
RPS series	ESR-2608	RPS18	RPS22	RPS28		

SIMPSON STRONG-TIE PRODUCT CROSS-REFERENCE INDEX FOR STAMPED AND WELDED COLD-FORMED STEEL PRODUCTS FOR WOOD OR COLD-FORMED STEEL CONSTRUCTION

SERIES	REPORT NUMBER	MODEL				
RR series	ESR-2553 ESR-3096	RR				
RSP series	ESR-2613 ESR-3096	RSP4				
SA series	ESR-2607	SA36				
SP series	ESR-2613	SP1	SP2	SP4	SP6	SP8
SPH series	ESR-2613	SPH4	SPH6	SPH8		
SS series	ESR-2608	SS1.5	SS2.5	SS3	SS4.5	
SSP series	ESR-2613	SSP				
ST series	ESR-2105 ESR-3096	ST292 ST2122 ST2115	ST2215 ST6215	ST6224 ST6236	ST9 ST12	ST18 ST22
STHD series	ESR-2920	STHD10	STHD14		STHD10RJ	STHD14RJ
SUR/L series	ESR-2549 ESR-2552	SUR/L24 SUR/L26 SUR/L26-2 SUR/L210 SUR/L214	SUR/L1.81/9 SUR/L1.81/11 SUR/L1.81/14 SUR/L2.06/9 SUR/L2.06/11	SUR/L2.06/14 SUR/L2.1/9 SUR/L2.1/11 SUR/L2.1/14 SUR/L2.37/9	SUR/L2.37/11 SUR/L2.37/14 SUR/L2.56/9 SUR/L2.56/11 SUR/L2.56/14	SUR/L210-2 SUR/L214-2 SUR/L46 SUR/L410 SUR/L414
TB series	ESR-2608	TB20 TB27	TB30 TB36	TB42 TB48	TB54 TB56	TB60
TBE series	ESR-2605	TBE4	TBE6			
TC series	ESR-2605	TC24	TC26	TC28		
THA series	ESR-2551	THA29 THA213 THA422-2	THA218 THA218-2 THA426-2	THA222-2 THA413	THA418 THAC418	THA422 THA426
THAI series	ESR-2551	THAI222 THAI1.81/22	THAI2.06/22 THAI2.1/22	THAI3522	THAI322	THAI422
THAL series	ESR-2551	THAL422				
THAR series	ESR-2551	THAR422				
THJA series	ESR-2605	THJA26				
THJM2 series	ESR-2605	THJM2-4-SDS3	THJM2-5-SDS3			
THJU series	ESR-2605	THJU26	THJU26-W			
TSBR series	ESR-2605	TSBR2-24				
TWB series	ESR-2608	TWB10	TWB10	TWB14		
U series	ESR-2549 ESR-2552	U24 U26 U26-3 U210 U214 U34 U36	U14 U310 U314 U44 U46 U410 U3510/14	U414 U24-2 U26-2 U210-2 U66 U3516/20 U610	U210-3 U24R U26R U210R U3510-2 U44R U46R	U410R U66R U610R U3512-2
UFP series	ESR-2616	UFP10-SDS3				
URFP series	ESR-2616	URFP				
VB series	ESR-2607	VB-5	VB-7	VB-8	VB-10	VB-12
VPA series	ESR-2551	VPA2	VPA25	VPA3	VPA35	VPA4
VTCR series	ESR-2605	VTCR				
WB series	ESR-2608	WB106	WB126	WB106C	WB126C	WB143C
WP series	ESR-2615	WP211.25-2 WP211.88-2 WP29.25-2 WP29.5-2 WP2.75 WP3.12 WP212-2 WP3.25	WP3.56 WP412 WP414 WP416 WP3.62	WP4.12 WP4.28 WP4.75 WP5.12 WP5.37	WP5.56 WP612 WP614 WP6.06 WP7.12	WP1.81 WP2.1 WP2.37 WP2.56 WP312 WP314

Fastener Types and Sizes Specified for Simpson Strong-Tie Connectors

Many Simpson Strong-Tie connectors have been designed and tested for use with specific types and sizes of fasteners. The specified quantity, type and size of fastener must be installed in the correct holes on the connector to achieve published loads. Other factors such as fastener material and finish are also important. Incorrect fastener selection or installation can compromise connector performance and could lead to failure. For more information about fasteners, see our Fastening Systems catalog or access our Fastener Finder software.

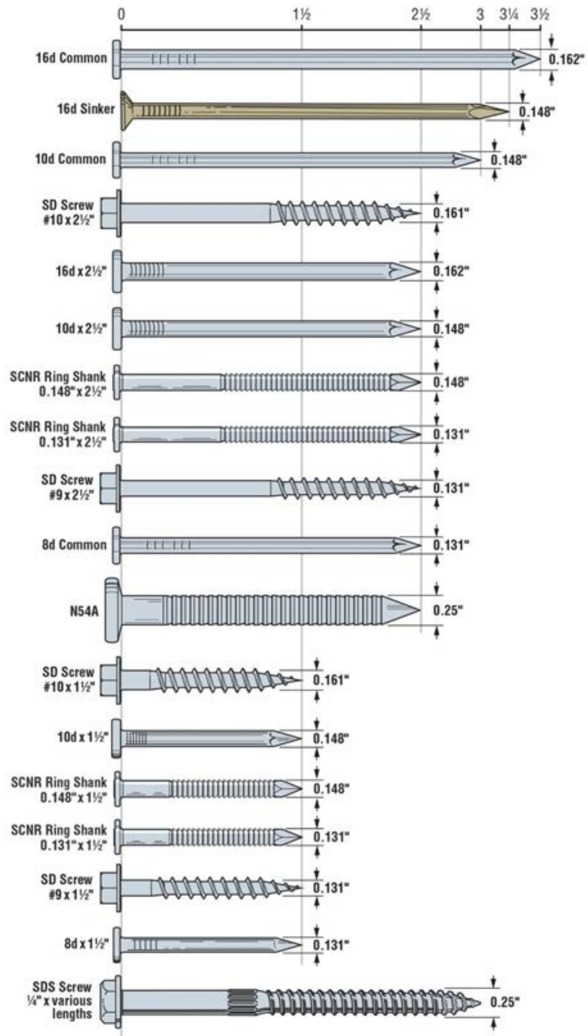
DESIGNED FOR CONNECTORS

The Simpson Strong-Tie® Strong-Drive® SD Connector screw is the only screw approved for use with our connectors.

SS

The allowable loads of stainless-steel connectors match those of carbon-steel connectors when installed with Simpson Strong-Tie® stainless- steel, SCNR ring-shank nails.

SIMPSON Strong-Tie®



SIMPSON Strong-Tie

Fastener Design Information

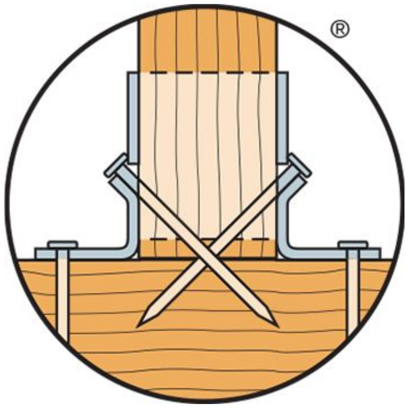
In some cases, it is desirable to install Simpson Strong-Tie face-mount joist hangers, post basses and caps, and straight straps and with nails that are a different type or size than what is called out in the load table. In these cases, these reduction factors must be applied to the allowable loads listed for the connector.

Load Adjustment Factors for Optional Fasteners Used with Face-Mount Hangers, Post Bases and Caps, and Straight Straps

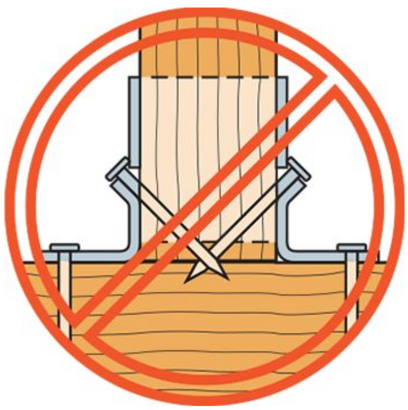
Connector Table Nail	Replacement Fastener	Allowable Load Adjustment Factor				
		Face-Mount Hangers			Post Bases and Caps	Straight Straps
		Straight Download/ Uplift	Double Shear			
			Uplift	Download		
0.131" x 1½"	#9 x 1½" SD Connector screw	1.00	N/A	N/A	N/A	1.00
0.131" x 2½"	0.131" x 1½"	0.85	N/A	N/A	N/A	1.00
	#9 x 1½" SD Connector screw	1.00	N/A	N/A	N/A	1.00
0.148" x 1½"	#9 x 1½" SD Connector screw	1.00	N/A	N/A	N/A	1.00
	0.131" x 1½"	0.83	N/A	N/A	N/A	0.83
0.148" x 3"	0.131" x 1½"	0.71	Not allowed	Not allowed	N/A	0.83
	0.131" x 2½"	0.83	0.65	0.83	0.83	0.83
	0.148" x 1¼"	0.64	Not allowed	Not allowed	N/A	1.00[9]
	0.148" x 1½"	0.77	Not allowed	Not allowed	N/A	1.00[9]
	0.148" x 2½"	1.00	0.80	1.00	1.00	1.00
	0.148" x 3¼"	1.00	1.00	1.00	1.00	1.00
	#9 x 1½" SD Connector screw	1.00	Not allowed	Not allowed	N/A	1.00
	#9 x 2½" SD Connector screw	1.00	See **strongtie.com**[4]		1.00	1.00
0.148" x 3¼"	0.148" x 1½"	0.77	N/A	N/A	N/A	1.00
	0.148" x 1¼"	0.64	N/A	N/A	N/A	1.00
	0.148" x 3"	1.00	1.00	1.00	1.00	1.00
	#9 x 1½" SD Connector screw	1.00	N/A	N/A	N/A	1.00
	#9 x 2½" SD Connector screw	1.00	N/A	N/A	N/A	1.00
0.162" x 2½"	#10 x 1½" SD Connector screw	1.00	Not allowed	Not allowed	N/A	1.00
	#10 x 2½" SD Connector screw	1.00	See **strongtie.com**[4]		1.00	1.00
0.162" x 3½"	0.162" x 2½"	1.00	0.67	1.00	1.00	1.00
	0.148" x 2½"	0.84	0.67	0.84	1.00	1.00
	0.148" x 3"	0.84	0.84	0.84	0.84	0.84
	0.148" x 3¼"	0.84	0.84	0.84	0.84	0.84
	0.148" x 1½"	0.64	Not allowed	Not allowed	Not allowed	0.84
	#10 x 1½" SD Connector screw	1.00	Not allowed	Not allowed	N/A	1.00
	#10 x 2½" SD Connector screw	1.00	See **strongtie.com**[4]		1.00	1.00

1. Allowable load adjustment factors shown in the table are applicable to all face-mount hangers, post bases and caps, and straight straps throughout this catalog, except as noted in the footnotes below.
2. Some products have been tested specifically with alternative fasteners and have allowable load adjustment factors or reduced capacities published on the specific product page. Values published on the product page may be used in lieu of using this table.
3. This table does not apply to SUR/SUL/HSUR/HSUL hangers or to hangers modified per allowed options, or to connectors made from steel thicker than 10 ga.
4. Strong-Drive® SD Connector screw substitutions in this table do not apply to sloped, skewed, or double-shear hangers. Strong-Drive SD Connector screws may be used in these connectors. For additional information and specific allowable loads, refer to **Strong-Drive SD Connector screws**.
5. Nails and Strong-Drive® SD Connector screws may not be combined in a connection.
6. Do not substitute 0.148" x 1 1/2" nails for face nails in slope and skew combinations or in skewed-only LSU.
7. For straps installed over wood structural panel sheathing, use a 21/2"-long fastener minimum.
8. Where noted, us~~e 0.80 for 10 g~~a., 11 ga., and 12 ga. products when using SPF lumber.
9. Where noted, use 0.92 for 10 ga., 11 ga., and 12 ga. products when using SPF lumber.

For LUS, MUS, HUS, LRU, HHUS and HGUS Hangers



Double-shear nailing shall use minimum 2 1/2"-long nails or 2 1/2"-long SD screws



Shorter fasteners may not be used as double-shear nails

TABLE 12—ALLOWABLE LOADS FOR THE HGUS SERIES JOIST HANGERS[6]

Model No.	DIMENSIONS[1]			FASTENERS[2]		ALLOWABLE LOADS[3]			
						Uplift[5]	Download		
	W	H	B	Header	Joist[4]	$C_D = 1.6$	$C_D = 1.0$	$C_D = 1.15$	$C_D = 1.25$
HGUS26	$1\frac{5}{8}$	$5\frac{3}{8}$	5	20-16d	8-16d	875	4,340	4,850	5,170
HGUS28	$1\frac{5}{8}$	$7\frac{1}{8}$	5	36-16d	12-16d	1,650	7,275	7,275	7,275
HGUS210	$1\frac{5}{8}$	$9\frac{1}{8}$	5	46-16d	16-16d	2,090	9,100	9,100	9,100
HGUS26-2	$3\frac{7}{16}$	$5\frac{7}{16}$	4	20-16d	8-16d	2,155	4,340	4,850	5,170
HGUS28-2	$3\frac{7}{16}$	$7\frac{3}{16}$	4	36-16d	12-16d	3,235	7,460	7,460	7,460
HGUS210-2	$3\frac{7}{16}$	$9\frac{3}{16}$	4	46-16d	16-16d	4,095	9,100	9,100	9,100
HGUS46	$3\frac{5}{8}$	$5\frac{1}{4}$	4	20-16d	8-16d	2,155	4,340	4,850	5,170
HGUS48	$3\frac{5}{8}$	7	4	36-16d	12-16d	3,235	7,460	7,460	7,460
HGUS410	$3\frac{5}{8}$	9	4	46-16d	16-16d	4,095	9,100	9,100	9,100
HGUS412	$3\frac{5}{8}$	$10\frac{7}{16}$	4	56-16d	20-16d	4,085	9,045	9,045	9,045
HGUS414	$3\frac{5}{8}$	$12\frac{7}{16}$	4	66-16d	22-16d	4,580	9,525	9,525	9,525
HGUS26-3	$4\frac{15}{16}$	$5\frac{7}{16}$	4	20-16d	8-16d	2,155	4,340	4,850	5,170
HGUS28-3	$4\frac{15}{16}$	$7\frac{3}{16}$	4	36-16d	12-16d	3,235	7,460	7,460	7,460
HGUS210-3	$4\frac{15}{16}$	$9\frac{3}{16}$	4	46-16d	16-16d	4,095	9,100	9,100	9,100
HGUS212-3	$4\frac{15}{16}$	$10\frac{3}{4}$	4	56-16d	20-16d	4,085	9,045	9,045	9,045
HGUS214-3	$4\frac{15}{16}$	$12\frac{3}{4}$	4	66-16d	22-16d	4,580	9,525	9,525	9,525
HGUS26-4	$6\frac{9}{16}$	$5\frac{7}{16}$	4	20-16d	8-16d	2,155	4,340	4,850	5,170
HGUS28-4	$6\frac{9}{16}$	$7\frac{3}{16}$	4	36-16d	12-16d	3,235	7,460	7,460	7,460
HGUS210-4	$6\frac{9}{16}$	$9\frac{3}{16}$	4	46-16d	16-16d	4,095	9,100	9,100	9,100
HGUS212-4	$6\frac{9}{16}$	$10\frac{9}{16}$	4	56-16d	20-16d	4,085	9,045	9,045	9,045
HGUS214-4	$6\frac{9}{16}$	$12\frac{9}{16}$	4	66-16d	22-16d	4,580	9,525	9,525	9,525

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

[1]Refer to Figure 12 (this page) for definitions of hanger nomenclature (W, H, B).
[2]Refer to Section 3.2.3 of this report for nail sizes and required minimum physical properties.
[3]Tabulated allowable loads must be selected based on duration of load as permitted by the applicable building code.
[4]Joist nails must be driven at a 45 degree angle through the joist into the header/beam (double shear nailing) to achieve tabulated loads.
[5]Allowable uplift loads have been increased for wind or earthquake loading with no further increase allowed. The allowable uplift loads must be reduced when other load durations govern.
[6]HGUS series hangers provide torsional resistance, which is defined as the moment of not less than 75 pounds (334 N) times the depth of the joist at which the lateral movement of the top or bottom of the joist with respect to the vertical position of the joist is 0.125" (3.2 mm). The height, H, of the joist hanger must be at least 60 percent of the height of the joist unless additional lateral restraint is provided, as designed by others.

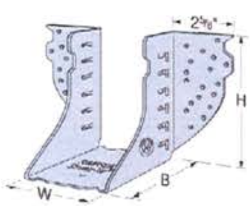


FIGURE 12—HGUS SERIES JOIST HANGER

ES ICC EVALUATION SERVICE
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ICC-ES Evaluation Report

ESR-2549 LABC and LARC Supplement

Issued July 2018

This report is subject to renewal January 2019.

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Section: 06 05 23—Wood, Plastics, and Composite Fastenings

REPORT HOLDER:

SIMPSON STRONG-TIE COMPANY INC.
5956 WEST LAS POSITAS BOULEVARD
PLEASANTON, CALIFORNIA 94588
(800) 999-5099
www.strongtie.com

EVALUATION SUBJECT:

SIMPSON STRONG-TIE® FACE-MOUNT HANGERS FOR WOOD FRAMING

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that Simpson Strong-Tie® face-mount hangers used as wood framing connectors, described in ICC-ES master evaluation report ESR-2549, have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2017 *City of Los Angeles Building Code* (LABC)
- 2017 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The Simpson Strong-Tie® face-mount hangers used as wood framing connectors, described in Sections 2.0 through 7.0 of the master evaluation report ESR-2549, comply with the LABC Chapter 23, and the LARC, and are subjected to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The Simpson Strong-Tie face-mount hangers used as wood framing connectors, described in this evaluation report must comply with all of the following conditions:

- All applicable sections in the master evaluation report ESR-2549.
- The design, installation, conditions of use and labeling are in accordance with the 2015 *International Building Code®* (2015 IBC) provisions noted in the master evaluation report ESR-2549.
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.

This supplement expires concurrently with the master report, issued January 2018, revised July 2018.

TABLE 10A—DIMENSIONS, NAILING SCHEDULES AND DESIGN VALUES FOR HTU SERIES HANGERS
($^1/_2$ Inch Maximum Gap between Supporting Member and Supported Member – Maximum Number of Nails into Supporting Member)

MODEL No.	DIMENSIONS[3] (inches)			FASTENERS[4] (Quantity-Type)		ALLOWABLE LOADS[5, 6, 7] (lbf)					
	W	H	B	Into Supporting Member	Into Supported Member	Uplift[8]	Download				
						C_D=1.6	C_D=0.9	C_D=1.0	C_D=1.15	C_D=1.25	C_D=1.6
Single 2X Sizes											
HTU26 ($^1/_2$" Gap – Min Nail)[1]	$1^5/_8$	$5^7/_{16}$	$3^1/_2$	20-16d	11-10dx$1^1/_2$	635	2,395	2,395	2,395	2,395	2,395
	$1^5/_8$	$5^7/_{16}$	$3^1/_2$	20-16d	14-10dx$1^1/_2$	1,175	2,640	2,940	3,100	3,100	3,100
HTU26 ($^1/_2$" Gap – Max Nail)[2]	$1^5/_8$	$5^7/_{16}$	$3^1/_2$	20-16d	20-10dx$1^1/_2$	1,215	2,640	2,940	3,320	3,580	3,630
HTU28 ($^1/_2$" Gap – Min Nail)[1]	$1^5/_8$	$7^1/_{16}$	$3^1/_2$	26-16d	14-10dx$1^1/_2$	1,110	3,430	3,770	3,770	3,770	3,770
HTU28 ($^1/_2$" Gap – Max Nail)[2]	$1^5/_8$	$7^1/_{16}$	$3^1/_2$	26-16d	26-10dx$1^1/_2$	1,920	3,430	3,820	4,315	4,655	5,015
HTU210 ($^1/_2$" Gap – Min Nail)[1]	$1^5/_8$	$9^1/_{16}$	$3^1/_2$	32-16d	14-10dx$1^1/_2$	1250	3,600	3,600	3,600	3,600	3,600
HTU210 ($^1/_2$" Gap – Max Nail)[2]	$1^5/_8$	$9^1/_{16}$	$3^1/_2$	32-16d	32-10dx$1^1/_2$	3255	4,225	4,705	5,020	5,020	5,020
Double 2X Sizes											
HTU26-2 ($^1/_2$" Gap – Min Nail)[1]	$3^5/_{16}$	$5^7/_{16}$	$3^1/_2$	20-16d	14-10d	1,515	2,640	2,940	3,320	3,500	3,500
HTU26-2 ($^1/_2$" Gap – Max Nail)[2]	$3^5/_{16}$	$5^7/_{16}$	$3^1/_2$	20-16d	20-10d	1,910	2,640	2,940	3,320	3,500	3,500
HTU28-2 ($^1/_2$" Gap – Min Nail)[1]	$3^5/_{16}$	$7^1/_{16}$	$3^1/_2$	26-16d	14-10d	1,490	3,430	3,820	3,980	3,980	3,980
HTU28-2 ($^1/_2$" Gap – Max Nail)[2]	$3^5/_{16}$	$7^1/_{16}$	$3^1/_2$	26-16d	26-10d	3,035	3,430	3,820	4,315	4,655	5,520
HTU210-2 ($^1/_2$" Gap – Min Nail)[1]	$3^5/_{16}$	$9^1/_{16}$	$3^1/_2$	32-16d	14-10d	1,755	4,225	4,255	4,255	4,255	4,255
HTU210-2 ($^1/_2$" Gap – Max Nail)[2]	$3^5/_{16}$	$9^1/_{16}$	$3^1/_2$	32-16d	32-10d	3,855	4,225	4,705	5,310	5,730	6,470

For **SI:** 1 inch = 25.4 mm, 1 pound = 4.45 N.

[1]The suffix '($^1/_2$" Gap – Min Nail)' corresponds to installed conditions where the gap between the supporting member and supported member is more than $^1/_8$ inch (3.2 mm) and less than or equal to $^1/_2$ inch (12.7 mm), and, at a minimum, the number of nails specified in the table above are installed into the supported wood truss. Refer to Figure 10B on page 11 for a typical installation detail.
[2]The suffix '($^1/_2$" Gap – Max Nail)' corresponds to installed conditions where the gap between the supporting member and supported member is more than $^1/_8$ inch (3.2 mm) and less than or equal to $^1/_2$ inch (12.7 mm), and all of the pre-punched nail holes in the U-shaped portion of the hanger supporting the truss (joist) are filled with nails. This is designated in the table as "Max Nail" and is shown in Figure 10B on page 11.
[3]Refer to Figure 10A for definitions of hanger nomenclature (W, H, B).
[4]Allowable loads correspond to installations where the maximum possible number of nails is driven into the supporting member. Refer to Section 3.2.3 of this report for nail sizes and required minimum physical properties.
[5]Tabulated allowable loads are for installations in wood members complying with Section 3.2.2 of this report.
[6]Tabulated loads must be selected based on the applicable load duration factor, C_D, as permitted by the applicable building code. See Sections 4.1 and 4.2 for design and installation requirements.
[7]HTU series hangers provide torsional resistance, which is defined as a moment of not less than 75 pounds (334 N) times the depth of the joist at which the lateral movement of the top or bottom of the joist with respect to its vertical position is 0.125 inch (3.2 mm), for joists having a height no greater than the height (H) of the hanger.
[8]Allowable uplift loads have been increased for wind or earthquake loading with no further increase allowed. The tabulated allowable uplift loads must be reduced proportionally when other load durations govern.

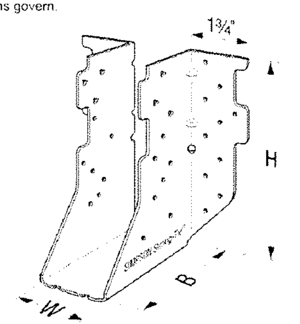

FIGURE 10A—HTU SERIES HANGER

TABLE 10B—DIMENSIONS, NAILING SCHEDULES AND DESIGN VALUES FOR HTU SERIES HANGERS
($^1/_8$ Inch Maximum Gap between Supporting Member and Supported Member – Maximum Number of Nails into Supporting Member)

MODEL No.	DIMENSIONS[3] (inches)			FASTENERS[4] (Quantity-Type)		ALLOWABLE LOADS[5, 6, 7] (lbf)					
	W	H	B	Into Supporting Member	Into Supported Member	Uplift[8]	Download				
						C_D=1.6	C_D=0.9	C_D=1.0	C_D=1.15	C_D=1.25	C_D=1.6
Single 2X Sizes											
HTU26 ($^1/_8$" Gap – Min Nail)[1]	$1^5/_8$	$5^7/_{16}$	$3^1/_2$	20-16d	11-10dx$1^1/_2$	640	2,640	2,670	2,670	2,670	2,670
	$1^5/_8$	$5^7/_{16}$	$3^1/_2$	20-16d	14-10dx$1^1/_2$	1,250	2,640	2,940	3,200	3,200	3,200
HTU26 ($^1/_8$" Gap – Max Nail)[2]	$1^5/_8$	$5^7/_{16}$	$3^1/_2$	20-16d	20-10dx$1^1/_2$	1,555	2,640	2,940	3,320	3,580	4,010
HTU28 ($^1/_8$" Gap – Min Nail)[1]	$1^5/_8$	$7^1/_{16}$	$3^1/_2$	26-16d	14-10dx$1^1/_2$	1,235	3,430	3,820	3,895	3,895	3,895
HTU28 ($^1/_8$" Gap – Max Nail)[2]	$1^5/_8$	$7^1/_{16}$	$3^1/_2$	26-16d	26-10dx$1^1/_2$	2,020	3,430	3,820	4,315	4,655	5,435
HTU210 ($^1/_8$" Gap – Min Nail)[1]	$1^5/_8$	$9^1/_{16}$	$3^1/_2$	32-16d	14-10dx$1^1/_2$	1,330	4,225	4,300	4,300	4,300	4,300
HTU210 ($^1/_8$" Gap – Max Nail)[2]	$1^5/_8$	$9^1/_{16}$	$3^1/_2$	32-16d	32-10dx$1^1/_2$	3,315	4,225	4,705	5,310	5,730	5,995
Double 2X Sizes											
HTU26-2 ($^1/_8$" Gap – Min Heel)[1]	$3^5/_{16}$	$5^7/_{16}$	$3^1/_2$	20-16d	14-10d	1,515	2,640	2,940	3,320	3,580	3,910
HTU26-2 ($^1/_8$" Gap – Max Nail)[2]	$3^5/_{16}$	$5^7/_{16}$	$3^1/_2$	20-16d	20-10d	2,175	2,640	2,940	3,320	3,580	4,480
HTU28-2 ($^1/_8$" Gap – Min Nail)[1]	$3^5/_{16}$	$7^1/_{16}$	$3^1/_2$	26-16d	14-10d	1,530	3,430	3,820	4,310	4,310	4,310
HTU28-2 ($^1/_8$" Gap – Max Nail)[2]	$3^5/_{16}$	$7^1/_{16}$	$3^1/_2$	26-16d	26-10d	3,485	3,430	3,820	4,315	4,655	5,825
HTU210-2 ($^1/_8$" Gap – Min Nail)[1]	$3^5/_{16}$	$9^1/_{16}$	$3^1/_2$	32-16d	14-10d	1,755	4,225	4,705	4,815	4,815	4,815
HTU210-2 ($^1/_8$" Gap – Max Nail)[2]	$3^5/_{16}$	$9^1/_{16}$	$3^1/_2$	32-16d	32-10d	4,110	4,225	4,705	5,310	5,730	6,515

For **SI:** 1 inch = 25.4 mm, 1 pound = 4.45 N.

[1]The suffix '($^1/_8$" Gap – Min Nail)' corresponds to installed conditions where the gap between the supporting member and supported wood truss is $^1/_8$ inch (3.2 mm) or less, and at a minimum, the number of nails specified in the table above are installed into the supported wood truss. Refer to Figure 10B for a typical installation detail.
[2]The suffix '($^1/_8$" Gap – Max Nail)' corresponds to installed conditions where the gap between the supporting member and supported wood truss is $^1/_8$ inch (3.2 mm) or less, and the all of the pre-punched nail holes in the U-shaped portion of the hanger supporting the truss (joist) are filled with nails. This is designated in the table as "Max Nail" and is shown in Figure 10B on this page.
[3]Refer to Figure 10A for definitions of hanger nomenclature (W, H, B).
[4]Allowable loads correspond to installations where the maximum possible number of nails is installed into the supporting member. Refer to Section 3.2.3 of this report for nail sizes and required minimum physical properties.
[5]Tabulated allowable loads are for installations in wood members complying with Section 3.2.2 of this report.
[6]Tabulated loads must be selected based on the applicable load duration factor, C_D, as permitted by the applicable building code. See Sections 4.1 and 4.2 for design and installation requirements.
[7]HTU series hangers provide torsional resistance, which is defined as a moment of not less than 75 pounds (334 N) times the depth of the joist at which the lateral movement of the top or bottom of the joist with respect to its vertical position is 0.125 inch (3.2 mm), for joists having a height no greater than the height (H) of the hanger.
[8]Allowable uplift loads have been increased for wind or earthquake loading with no further increase allowed. The tabulated allowable uplift loads must be reduced proportionally when other load durations govern.

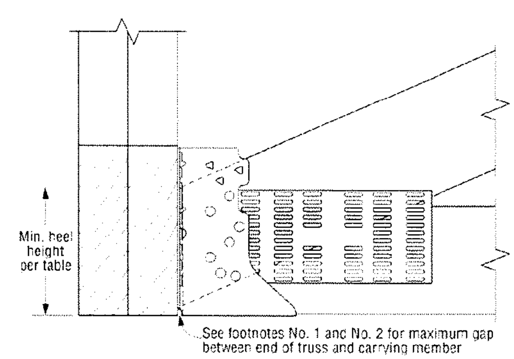

FIGURE 10B—TYPICAL HTU INSTALLATION

TABLE 4—ALLOWABLE LOADS FOR THE LUS SERIES JOIST HANGERS

MODEL NO.	DIMENSIONS[1] (inches)			COMMON NAILS[2] (Quantity-Type)		ALLOWABLE LOADS[3,4] (lbf)			
	W	H	B	Header	Joist[5]	Uplift[6]	Download		
						C_D = 1.6	C_D = 1.0	C_D = 1.15	C_D = 1.25
LUS24	$1^{9}/_{16}$	$3^{1}/_{8}$	$1^{3}/_{4}$	4-10d	2-10d	435	670	765	820
LUS26	$1^{9}/_{16}$	$4^{3}/_{4}$	$1^{3}/_{4}$	4-10d	4-10d	1,165	865	990	1,060
LUS28	$1^{9}/_{16}$	$6^{5}/_{8}$	$1^{3}/_{4}$	6-10d	4-10d	1,165	1,100	1,260	1,350
LUS210	$1^{9}/_{16}$	$7^{13}/_{16}$	$1^{3}/_{4}$	8-10d	4-10d	1,165	1,335	1,530	1,640
LUS24-2	$3^{1}/_{8}$	$3^{1}/_{8}$	2	4-16d	2-16d	410	800	905	980
LUS26-2	$3^{1}/_{8}$	$4^{13}/_{16}$	2	4-16d	4-16d	1,060	1,030	1,170	1,265
LUS28-2	$3^{1}/_{8}$	7	2	6-16d	4-16d	1,060	1,315	1,490	1,610
LUS210-2	$3^{1}/_{8}$	$8^{13}/_{16}$	2	8-16d	6-16d	1,445	1,830	2,075	2,245
LUS214-2	$3^{1}/_{8}$	$10^{13}/_{16}$	2	10-16d	6-16d	1,445	2,110	2,395	2,590
LUS26-3	$4^{5}/_{8}$	$4^{1}/_{8}$	2	4-16d	4-16d	1,060	1,030	1,170	1,265
LUS28-3	$4^{5}/_{8}$	$6^{1}/_{4}$	2	6-16d	4-16d	1,060	1,315	1,490	1,610
LUS210-3	$4^{5}/_{8}$	$8^{13}/_{16}$	2	8-16d	6-16d	1,445	1,830	2,075	2,245
LUS36	$2^{9}/_{16}$	$5^{1}/_{4}$	2	4-16d	4-16d	1,060	1,030	1,170	1,265
LUS44	$3^{9}/_{16}$	3	2	4-16d	2-16d	410	800	905	980
LUS46	$3^{9}/_{16}$	$4^{3}/_{4}$	2	4-16d	4-16d	1,060	1,030	1,170	1,265
LUS48	$3^{9}/_{16}$	$6^{3}/_{4}$	2	6-16d	4-16d	1,060	1,315	1,490	1,610
LUS410	$3^{9}/_{16}$	$8^{3}/_{4}$	2	8-16d	6-16d	1,445	1,830	2,075	2,245
LUS414	$3^{9}/_{16}$	$10^{3}/_{4}$	2	10-16d	6-16d	1,445	2,110	2,395	2,590

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

[1]Refer to Figure 4 (this page) for definitions of hanger nomenclature (W, H, B).
[2]Refer to Section 3.2.3 of this report for nail sizes and required minimum physical properties.
[3]Tabulated allowable loads must be selected based on duration of load as permitted by the applicable building code.
[4]LUS Series hangers provide torsional resistance, which is defined as a moment of not less than 75 pounds (334 N) times the depth of the joist at which the lateral movement of the top or bottom of the joist with respect to the vertical position of the joist is 0.125 inch (3.2 mm). The height, H, of the joist hanger must be at least 60 percent of the height of the joist unless additional lateral restraint is provided, as designed by others.
[5]Joist nails must be driven at a 45 degree angle through the joist into the header/beam (double shear nailing) to achieve the tabulated loads.
[6]Allowable uplift loads have been increased for wind or earthquake loading with no further increase is allowed. The allowable uplift loads must be reduced when other load durations govern.

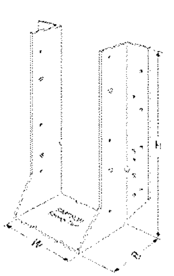

FIGURE 3a—HU SERIES HANGER
(See Table 3—Page 5)

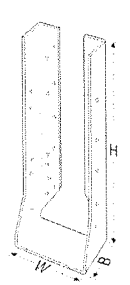

FIGURE 3b—HUC SERIES HANGER
(See Table 3, Footnote 3—Page 5)

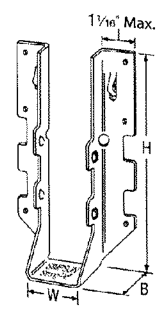

FIGURE 4—LUS SERIES HANGER
(See Table 4 above)

TABLE 5—ALLOWABLE LOADS FOR THE MUS SERIES HANGERS

MODEL NO.	DIMENSIONS[1] (inches)			COMMON NAILS[2] (Quantity-Type)		ALLOWABLE LOADS[3,4] (lbf)			
	W	H	B	Header	Joist[5]	Uplift[6]	Download		
						C_D = 1.6	C_D = 1.0	C_D = 1.15	C_D = 1.25
MUS26	$1^{9}/_{16}$	$5^{3}/_{16}$	2	6–10d	6–10d	930	1,295	1,480	1,560
MUS28	$1^{9}/_{16}$	$6^{3}/_{4}$	2	8–10d	8–10d	1,320	1,730	1,975	2,125

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

[1]Refer to Figure 5 (this page) for definitions of hanger nomenclature (W, H, B).
[2]Refer to Section 3.2.3 of this report for nail sizes and required minimum physical properties.
[3]Tabulated allowable loads must be selected based on duration of load as permitted by the applicable building code.
[4]MUS series hangers provide torsional resistance, which is defined as a moment of not less than 75 pounds (334 N) times the depth of the joist at which the lateral movement of the top or bottom of the joist with respect to the vertical position of the joist is 0.125 inch (3.2 mm). The height, H, of the joist hanger must be at least 60 percent of the height of the joist unless additional lateral restraint is provided, as designed by others.
[5]Joist nails must be driven at a 45 degree angle through the joist into the header/beam (double shear nailing) to achieve the tabulated loads.
[6]Allowable uplift loads have been increased for wind or earthquake loading with no further increase is allowed. The allowable uplift loads must be reduced when other load durations govern.

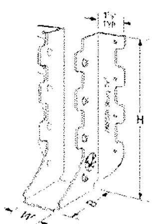

FIGURE 5—MUS HANGER (see Table 5)

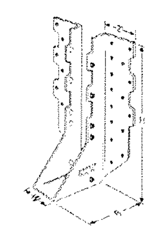
FIGURE 6—HUS SERIES HANGER (see Table 6)

TABLE 6—ALLOWABLE LOADS FOR THE HUS AND HUSC SERIES HANGERS

MODEL NO.	DIMENSIONS[1] (inches)			COMMON NAILS[2] (Quantity-Type)		ALLOWABLE LOADS[3,4,7] (lbf)			
	W	H	B	Header	Joist[5]	Uplift[6]	Download		
						C_D = 1.6	C_D = 1.0	C_D = 1.15	C_D = 1.25
HUS26	$1^{5}/_{8}$	$5^{3}/_{8}$	3	14-16d	6-16d	1,320	2,735	2,845	2,845
HUS28	$1^{5}/_{8}$	$7^{1}/_{16}$	3	22-16d	8-16d	1,760	3,695	3,695	3,695
HUS210	$1^{5}/_{8}$	$9^{1}/_{16}$	3	30-16d	10-16d	2,635	5,450	5,795	5,830
HUS46	$3^{9}/_{16}$	$4^{9}/_{16}$	2	4-16d	4-16d	1,165	1,055	1,195	1,290
HUS48	$3^{9}/_{16}$	$6^{15}/_{16}$	2	6-16d	6-16d	1,320	1,580	1,790	1,930
HUS410	$3^{9}/_{16}$	$8^{15}/_{16}$	2	8-16d	8-16d	3,220	2,110	2,385	2,575
HUS412	$3^{9}/_{16}$	$10^{3}/_{4}$	2	10-16d	10-16d	3,435	2,635	2,985	3,220
HUS26-2	$3^{1}/_{8}$	$5^{3}/_{16}$	2	4-16d	4-16d	1,165	1,055	1,195	1,290
HUS28-2	$3^{1}/_{8}$	$7^{3}/_{16}$	2	6-16d	6-16d	1,320	1,580	1,790	1,930
HUS210-2	$3^{1}/_{8}$	$9^{3}/_{16}$	2	8-16d	8-16d	3,220	2,110	2,385	2,575
HUS212-2	$3^{1}/_{8}$	11	2	10-16d	10-16d	3,435	2,635	2,985	3,220

For **SI:** 1 inch = 25.4 mm, 1 pound = 4.45 N.

[1]Refer to Figure 6 (this page) for definitions of hanger nomenclature (W, H, B).
[2]Refer to Section 3.2.3 of this report for nail sizes and required minimum physical properties.
[3]Tabulated allowable loads must be selected based on duration of load as permitted by the applicable building code.
[4]HUS series hangers provide torsional resistance, which is defined as a moment of not less than 75 pounds (334 N) times the depth of the joist at which the lateral movement of the top or bottom of the joist with respect to the vertical position of the joist is 0.125 inch (3.2 mm). The height, H, of the joist hanger must be at least 60 percent of the height of the joist unless additional lateral restraint is provided, as designed by others.
[5]Joist nails must be driven at a 45 degree angle through the joist into the header/beam (double shear nailing) to achieve the tabulated loads.
[6]Allowable uplift loads have been increased for wind or earthquake loading with no further increase is allowed. The allowable uplift loads must be reduced when other load durations govern.
[7]HUS series hangers with widths (W) equal to or greater than $3^{9}/_{16}$ inches (90 mm) are available with header flanges turned in (concealed) and are identified with the model designation HUSC#.

loads; Figure 7 for a drawing of a typical HHUS series hanger.

3.1.8 SUR/L and SUR/LC Series Hangers: The SUR/L series hangers are formed from No. 16 gage galvanized steel. SUR and SUL are mirror-image identical hangers, skewed at 45 degrees right and left, respectively. The 2-2x and 4x SUR/L models are available with the A_2 flanges concealed and are identified with the model designation SUR/LC. See Table 8 for the hanger dimensions, required fasteners, and allowable loads; and Figure 8 for a drawing of typical SUR/L series hangers.

3.1.9 HSUR/L and HSUR/LC Series Hangers: The HSUR/L series hangers are formed from No. 14 gage galvanized steel. SUR and SUL are mirror-image identical hangers, skewed at 45 degrees right and left, respectively. The 2-2x and 4x HSUR/L models are available with the A_2 flanges concealed and are identified with the model designation HSUR/LC. See Table 9 for the hanger dimensions, required fasteners, and allowable loads; and Figure 9 for a drawing of typical HSUR/L series hangers.

3.1.10 The HTU Series Hangers: The HTU hangers are designed to support trusses installed with full or partial heel heights and gaps between the truss and the supporting girders of up to, but not exceeding, $^1/_2$ inch (12.7 mm), as shown in Tables 10A and 10C, and $^1/_8$ inch (3.2 mm) as shown in Table 10B. Minimum and maximum nailing options are given in Tables 10A, 10B, and 10C to address varying heel heights and support conditions. The HTU hangers are formed from No. 16 gage galvanized steel. See Table 10A and Figures 10A and 10B for hanger dimensions, required fastener schedule, allowable loads and an installation detail for installations in which the gap between the truss and the supporting girders is less than or equal to $^1/_2$ inch (12.7 mm). See Table 10B and Figures 10A and 10B for hanger dimensions, required fastener schedule, allowable loads and an installation detail for installations in which the gap between the truss and the supporting girders is less than or equal to $^1/_8$ inch (3.2 mm). See Table 10C and Figures 10A and 10C for hanger dimensions, required fastener schedule, allowable loads and an installation detail for installations in which the minimum allowable number of nails is driven into the supporting girder, and the gap between the truss and supporting girder is less than or equal to $^1/_2$ inch (12.7 mm).

3.1.11 The LUCZ Series Hangers: The LUCZ hangers have concealed flanges to allow for installation near the end of a supporting member such as a ledger or header. The hangers are formed from No. 18 gage galvanized steel. See Table 11 and Figure 11 for hanger dimensions, required fastener schedule, allowable loads and a typical installation detail.

3.1.12 The HGUS Series Hangers: The HGUS series hangers are formed from No. 12 gage galvanized steel. The hangers have prepunched holes for the installation of nails that are driven at a 45 degree angle through the joist and into the header, which is described as double shear nailing in the installation instructions. See Table 12 for the HGUS series hanger model numbers, hanger dimensions, required fasteners, and allowable loads; and Figure 12 for a drawing of a typical HGS hanger.

3.2 Materials:

3.2.1 Steel: All hangers described in this report, with the exception of the HTU and HGUS series hangers, are manufactured from galvanized steel complying with ASTM A653, SS designation, Grade 33 with a minimum yield strength, F_y, of 33,000 psi (227 MPa) and a minimum tensile strength, F_u, of 45,000 psi (310 MPa). The HTU and HGUS series hangers are manufactured from galvanized steel complying with ASTM A653 SS designation, Grade 40 with a minimum yield strength, F_y, of 40,000 psi (276 MPa) and a minimum tensile strength, F_u, of 55,000 psi (379 MPa). Minimum base-steel thicknesses for the hangers in this report are as follows:

NOMINAL THICKNESS (gage)	MINIMUM BASE-METAL THICKNESS (inch)
No. 12	0.0975
No. 14	0.0685
No. 16	0.0555
No. 18	0.0445
No. 20	0.0335

For **SI:** 1 inch = 25.4 mm.

The hangers have a minimum G90 zinc coating specification in accordance with ASTM A653. Some models (designated with a model number ending with Z) are available with a G185 zinc coating specification in accordance with ASTM A653. Some models (designated with a model number ending with HDG) are available with a hot-dip galvanization, also known as "batch" galvanization, in accordance with ASTM A123, with a minimum specified coating weight of 2.0 ounces of zinc per square foot of surface area (600 g/m^2), total for both sides. Model numbers for all hangers in this report, except the LUCZ series hangers, do not include the Z or HDG ending, but the information shown applies. The lumber treater or holder of this report (Simpson Strong-Tie Company) should be contacted for recommendations on minimum corrosion resistance of steel connectors in contact with the specific proprietary preservative treated or fire retardant treated lumber.

3.2.2 Wood: Wood members with which the connectors are used must be either sawn lumber, structural glued laminated timber or other engineered lumber having a minimum specific gravity of 0.50 (minimum equivalent specific gravity of 0.50 for engineered lumber), and having a maximum moisture content of 19 percent (16 percent for structural glued laminated timber and engineered lumber) except as noted in Section 4.1. The thickness of the supporting wood member (header, beam, or ledger) must be equal to or greater than the length of the fasteners specified in the tables in this report, or as required by wood member design, whichever is greater.

3.2.3 Fasteners: Nails used for hangers described in this report must comply with ASTM F1667 and have the following minimum fastener dimensions and bending yield strengths (F_{yb}):

COMMON NAIL SIZE	SHANK DIAMETER (inch)	FASTENER LENGTH (inches)	F_{yb} (psi)
10d × 1$^1/_2$	0.148	1$^1/_2$	90,000
10d	0.148	3	90,000
16d × 2$^1/_2$	0.162	2$^1/_2$	90,000
16d	0.162	3$^1/_2$	90,000

For **SI:** 1 inch = 25.4 mm, 1 psi = 6.895 kPa.

Fasteners used in contact with preservative treated or fire retardant treated lumber must comply with 2018 and 2015 IBC Section 2304.10.5, 2012, 2009 and 2006 IBC Section 2304.9.5 or 2018, 2015, 2012 and 2009 IRC Section R317.3, or 2006 IRC Section R319.3, as applicable. The lumber treater or this report holder (Simpson Strong-Tie Company) should be contacted for recommendations on minimum corrosion resistance of fasteners and connection capacities of fasteners used with the specific proprietary preservative treated or fire retardant treated lumber.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The tabulated allowable loads shown in this report are based on allowable stress design (ASD) and include the load duration factor, C_D, corresponding with the applicable loads in accordance with the NDS.

Tabulated allowable loads apply to products connected to wood used under dry conditions and where sustained temperatures are 100°F (37.8°C) or less. When products are installed to wood having a moisture content greater than 19 percent (16 percent for engineered wood products), or where wet service is expected, the allowable loads must be adjusted by the wet service factor, C_M, specified in the NDS. When connectors are installed in wood that will experience sustained exposure to temperatures exceeding 100°F (37.8°C), the allowable loads in this report must be adjusted by the temperature factor, C_t, specified in the NDS.

Connected wood members must be analyzed for load-carrying capacity at the connection in accordance with the NDS.

4.2 Installation:

Installation of the connectors must be in accordance with this evaluation report and the manufacturer's published installation instructions. In the event of a conflict between this report and the manufacture's published installation instructions, the most restrictive governs.

5.0 CONDITIONS OF USE

The Simpson Strong-Tie face-mount hangers for wood-framed construction described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The connectors must be manufactured, identified and installed in accordance with this report and the manufacturer's published installation instructions. A copy of the instructions must be available at the jobsite at all times during installation. In the event of conflict between this report and the Simpson Strong-Tie published installation instructions, the more restrictive governs.

5.2 Calculations showing compliance with this report must be submitted to the code official. The calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.3 Adjustment factors noted in Section 4.1 and the applicable codes must be considered, where applicable.

5.4 Connected wood members and fasteners must comply, respectively, with Sections 3.2.2 and 3.2.3 of this report.

5.5 Use of connectors with preservative treated or fire retardant treated lumber must be in accordance with Section 3.2.1 of this report. Use of fasteners with preservative treated or fire retardant treated lumber must be in accordance with Section 3.2.3 of this report.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Joist Hangers and Similar Devices (AC13), dated March 2018.

7.0 IDENTIFICATION

7.1 The products described in this report are identified with a die-stamped label or an adhesive label, indicating the name of the manufacturer (Simpson Strong-Tie), the model number, and the number of an index evaluation report (ESR-2523) that is used as an identifier for the products recognized in this report.

7.2 The report holder's contact information is as follows:

SIMPSON STRONG-TIE COMPANY INC.
5956 WEST LAS POSITAS BOULEVARD
PLEASANTON, CALIFORNIA 94588
(800) 925-5099
www.strongtie.com

TABLE 1—ALLOWABLE LOADS FOR THE LU SERIES JOIST HANGERS

MODEL No.	DIMENSIONS[1] (inches)			FASTENERS[2] (Quantity-Type)		ALLOWABLE LOADS[3,4,5] (lbf)						
						Uplift[6]	Download					
	W	H	B	Header[5]	Joist	C_D = 1.6	C_D = 1.0		C_D = 1.15		C_D = 1.25	
							10d	16d	10d	16d	10d	16d
LU24	1$^9/_{16}$	3$^1/_8$	1$^1/_2$	4	2-10d x 1$^1/_2$	240	465	555	530	630	570	655
LU26	1$^9/_{16}$	4$^3/_4$	1$^1/_2$	6	4-10d x 1$^1/_2$	540	695	835	800	950	860	1,030
LU28	1$^9/_{16}$	6$^3/_8$	1$^1/_2$	8	6-10d x 1$^1/_2$	850	930	1,110	1,065	1,180	1,145	1,180
LU210	1$^9/_{16}$	7$^{13}/_{16}$	1$^1/_2$	10	6-10d x 1$^1/_2$	850	1,160	1,390	1,330	1,580	1,430	1,615

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

[1]Refer to Figure 1 for definitions of hanger nomenclature (W, H, B).
[2]Refer to Section 3.2.3 of this report for nail sizes and required minimum physical properties.
[3]Tabulated allowable loads must be selected based on duration of load as permitted by the applicable building code.
[4]LU Series hangers provide torsional resistance, which is defined as a moment of not less than 75 pounds (334 N) times the depth of the joist at which the lateral movement of the top or bottom of the joist with respect to its vertical position is 0.125 inch (3.2 mm). The height, H, of the joist hanger must be at least 60 percent of the height of the joist unless additional lateral restraint is provided, as designed by others.
[5]The quantity of 10d or 16d common nails specified in the "Header" column under "Fasteners" is required to achieve the tabulated allowable loads shown in the Allowable Download "10d" or "16d" columns.
[6]Allowable uplift loads are for hangers installed with either 10d or 16d common nails into the supporting header/beam, and have been increased for wind or earthquake loading with no further increase allowed. The allowable uplift loads must be reduced when other load durations govern.

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ESR-3096

Reissued January 2021
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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 05 23—Wood, Plastic, and Composite Fastenings

REPORT HOLDER:

SIMPSON STRONG-TIE COMPANY INC.

EVALUATION SUBJECT:

SIMPSON STRONG-TIE® CONNECTORS USING SD-SERIES SCREWS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, 2015, 2012, and 2009 *International Building Code®* (IBC)
- 2021, 2018, 2015, 2012, and 2009 *International Residential Code®* (IRC)

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBC), see ESR-3096 LABC and LARC Supplement.

Property evaluated:

Structural

2.0 USES

The Simpson Strong-Tie® structural connectors described in this report are used as wood framing connectors in accordance with Section 2304.10.4 of the 2021 IBC [Section 2304.10.3 of the 2018 and 2015 IBC and Section 2304.9.3 of the 2012 and 2009 IBC]. The products may also be used in structures regulated under the IRC when an engineered design is submitted in accordance with Section R301.1.3 of the IRC.

3.0 DESCRIPTION

3.1 General:

The structural connectors described in this report are used as wood-to-wood connections in structural systems that have been designed to transfer loads from their point of origin to load-resisting elements. All connectors are attached to wood using SD-Series screws recognized in ICC-ES evaluation report ESR-3046.

3.1.1 A21 and A23 Series Angles: The A21 and A23 angles are used to transfer lateral loads between wood framing members. They are fabricated from No. 18 gage steel. See Table 1 and Figure 1 for model numbers, dimensions, fastener schedules, allowable loads and a typical installation detail.

3.1.2 A33 and A44 Series Angles: The A33 and A44 angles are used to transfer lateral loads between wood framing members. They are fabricated from No. 12 gage steel. See Table 2 and Figure 2 for model numbers, dimensions, fastener schedules, allowable loads and a typical installation detail.

3.1.3 GA Gusset Angles: The GA1 and GA2 gusset angles are used to transfer lateral loads between wood framing members. They are fabricated from No. 18 gage steel. See Table 3 and Figure 3 for model numbers, dimensions, fastener schedules, allowable loads and a typical installation detail.

3.1.4 L Framing Connectors: The L framing connectors are used to transfer lateral loads between wood framing members. They are fabricated from No. 16 gage steel. See Table 4 and Figure 4 for model numbers, dimensions, fastener schedules, allowable loads and a typical installation detail.

3.1.5 A34 and A35 Framing Angles: The A34 and A35 framing angles are used to transfer lateral and uplift loads between wood framing members. They are fabricated from No. 18 gage steel. The connectors have cutouts on each leg and a prong to aid in installation. See Table 5 and Figure 5 for model numbers, dimensions, fastener schedules, allowable loads and typical installation details.

3.1.6 LTP4 Lateral Tie Plate: The LTP4 lateral tie plate transfers shear force from the wood top plate to wood rim joist or blocking members. It is fabricated from No. 20 gage steel. See Table 6 and Figure 6 for model numbers, dimensions, fastener schedules, allowable loads and typical installation details.

3.1.7 DJT14Z Deck Joist Tie: DJT14Z connector is used to attach joists to posts. It is fabricated from No. 14 gage steel. See Table 7 and Figure 7 for model numbers, dimensions, fastener schedules, allowable loads and a typical installation detail.

3.1.8 Hurricane Ties: Hurricane Ties are designed to tie rafters or joists to wall plates or studs. The H1, H2.5, H2.5A, H5, H8, and H10 are fabricated from 18 gage steel. The H4 is fabricated from 20 gage steel. See Table 8 and Figure 8 for model numbers, dimensions, fastener schedules, allowable loads and typical installation details.

3.1.9 RSP4 Reversible Stud Plate Tie: The RSP4 tie is designed to connect a nominally 2-inch-wide wood stud to either the double top plate or to the mudsill. The locating tabs aid in placing the tie on the double top plates or a single bottom plate. It is fabricated from 20-gage steel. See

Table 9 and Figure 9 for model numbers, dimensions, fastener schedules, allowable loads and typical installation details.

3.1.10 AC Series Post Caps: The AC post caps are used in pairs to transfer uplift and in-plane lateral loads between a beam and a post. They are fabricated from 18-gage steel. See Table 10 and Figure 10 for model types, dimensions, fastener schedules and allowable loads.

3.1.11 LCE4 Post Cap: The LCE post cap is used in pairs to transfer uplift and in-plane lateral loads between a beam and a post. It is fabricated from 20-gage steel. See Table 11 and Figure 11 for model numbers, dimensions, fastener schedules, allowable loads and a typical installation detail.

3.1.12 BC and BCS Series Post Caps: The BC and BCS are used to connect a beam to the end of a post. The BC and BCS post caps are designed to be used with beams having a width less than or equal to the post width, and can connect a continuous beam or the end of a beam to a post. The BCS has dome-shaped nail holes through which screws must be installed into the beam at a 45-degree angle. They are fabricated from 18-gage steel. See Table 12 and Figure 12 for model numbers, dimensions, fastener schedules, allowable loads and a typical installation detail.

3.1.13 BCO Series Post Bases: The BCO are used to connect the base of a post to a wood supporting member. They are fabricated from 18-gage steel. See Table 13 and Figure 13 for model numbers, dimensions, fastener schedules, allowable loads and a typical installation detail.

3.1.14 LPC4Z Light Post Cap: The LPC Light Post Cap is used in pairs to transfer uplift and in-plane lateral loads between a beam and a post. It is fabricated from 18-gage steel. See Table 14 and Figure 14 for model numbers, dimensions, fastener schedules, allowable loads and a typical installation detail.

3.1.15 PC and EPC Series Post Caps: The PC and EPC post caps are used to transfer uplift and in-plane lateral loads between a beam and a post. The EPC post caps are designed for end-post connections at the end of a beam. They are fabricated from 12 or 16 gage steel. Model numbers with a "-16" suffix are formed from 16-gage material. See Table 15 and Figure 15 for model numbers, dimensions, fastener schedules, allowable loads and typical installation details.

3.1.16 ABA Post Base Standoff: The ABA post base standoff elevates the post above concrete floors. A standard plate washer must be installed between the nut and the device along the anchor bolt. The ABA44 and ABA44R are fabricated from 16 gage and all other sizes from 14 gage steel. See Table 16 and Figure 16 for model numbers, dimensions, fastener schedules, allowable loads and a typical installation detail.

3.1.17 ABU Series Adjustable Post Base: The ABU adjustable post base connects a wood post to a concrete footing, elevating the base of the post 1 inch (25.4 mm) above the concrete footing. The ABU connector consists of a 16 gage channel, 12-gage standoff base and a 7-gage bearing plate. See Table 17 and Figure 17 for model numbers, dimensions, fastener schedules, allowable loads and a typical installation detail.

3.1.18 LU Series Hangers: The LU series hangers connect a joist to a supporting member such as a ledger or header. The models that support a single ply joist are fabricated from 20 gage steel. See Table 18 and Figure 18 for model numbers, dimensions, fastener schedules and allowable loads.

3.1.19 LUCZ Series Hangers: The LUCZ hangers connect a joist to a supporting member such as a ledger or header. They have concealed flanges to allow for installation near the end of the supporting member. They are fabricated from 18 gage steel. See Table 19 and Figure 19 for model numbers, dimensions, fastener schedules, allowable loads and a typical installation detail.

3.1.20 LUS Series Hangers: The LUS series hangers connect a joist to a supporting member such as a ledger or header. The joist fasteners must be installed at a 45-degree angle through the joist and into the header. They are fabricated from 18 gage steel. See Table 20 and Figure 20 for model numbers, dimensions, fastener schedules and allowable loads.

3.1.21 HUS Series Hangers: The HUS series hangers connect a joist to a supporting member such as a ledger or header. The joist fasteners must be installed at a 45-degree angle through the joist and into the header. They are fabricated from 16 gage steel. See Table 21 and Figure 21 for model numbers, dimensions, fastener schedules and allowable loads.

3.1.22 RR Ridge Rafter Connector: The RR ridge rafter connector supports a nominally 2-inch-wide rafter from a ridge board when the ridge board is a structural support. It is fabricated from 18 gage steel. The RR ridge rafter connector may be used with a rafter having a maximum slope of 7:12 (30 degrees). See Table 22 and Figure 22 for model numbers, dimensions, fastener schedules, allowable loads and a typical installation detail.

3.1.23 MTS Twist Straps: The MTS twist straps are used to connect wood trusses and wood rafters to double wood top plates, beams or studs and resist uplift loads. They are fabricated from 16 gage steel. See Table 23 and Figure 23 for model numbers, dimensions, fastener schedules, allowable loads and typical installation details.

3.1.24 ST Series Straps: The ST9, ST12, ST18, and ST 22 straps are 9 to $21^5/_8$ inches (229 to 549 mm) long and $1^1/_4$ inches (31.8 mm) wide. Each strap has unevenly spaced, $^{11}/_{64}$-inch-diameter (4.3 mm), prepunched fastener holes. See Figure 24 for a drawing of the ST9, ST12, ST18, and ST 22 tie straps.

The ST292, ST2122, ST2215, ST6215, ST6224, and ST6236 straps are $9^5/_{16}$ to $33^{13}/_{16}$ inches (236.5 to 858.8 mm) long, and have a constant width of $1^{13}/_{16}$ inches (46 mm). The total strap width between longitudinal edges is $2^1/_{16}$ inches (52.4 mm). Notches are $^9/_{32}$ inch (7.1 mm) deep and are spaced $1^3/_4$ inches (44.5 mm) on center. Each longitudinal edge of an ST strap has a row of $^{11}/_{64}$-inch-diameter (4.3 mm) prepunched fastener holes, spaced $1^3/_4$ inches (44.5 mm) on center. See Figure 25 for drawings of the ST292, ST2122, ST2215, ST6215, ST6224, and ST6236 tie straps.

The ST2115 strap is $16^5/_{16}$ inches (414.3 mm) long and $^3/_4$ inch (19.1 mm) wide, and has one row of $^{11}/_{64}$-inch-diameter (4.3 mm), prepunched fastener holes, spaced $1^5/_8$ inches (41.3 mm) on center. See Figure 26 for a drawing of the ST2115 tie strap.

See Table 24 for ST Series tie strap dimensions, fastener schedules, and allowable tension loads.

3.1.25 MST Series Straps: The MST Series tie straps are 27 to $37^1/_2$ inches long (686 to 953 mm) and $2^1/_{16}$ inches (52.4 mm) wide. Each strap has two rows of $^{11}/_{64}$-inch-diameter (4.3 mm) prepunched fastener holes spaced $1^3/_4$ inches (43.7 mm) on center. Additionally, the straps have $^5/_8$-inch-diameter (15.9 mm) prepunched bolt holes

TABLE 1—A21 AND A23 ANGLES

MODEL NO.	DIMENSIONS (in)			FASTENERS (Quantity-Type)		ALLOWABLE LOADS (lbs)[1,2,3,4]	
	L	W_1	W_2	Base	Post	F_1[5] C_D= 1.6	F_2 C_D= 1.6
A21	1³/₈	2	1¹/₂	2-SD9112	2-SD9112	430	165
A23	2³/₄	2	1¹/₂	4-SD9112	4-SD9112	670	560

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

1. Tabulated allowable loads have been adjusted for a load duration factor, C_D, of 1.6, corresponding to a ten-minute load duration (*i.e.*, wind or earthquake loading), in accordance with the NDS. The allowable loads do not apply to loads of other durations.
2. F_1 and F_2 loads cannot be combined.
3. The tabulated F_1 and F_2 allowable loads are for a single connector. The terminating member must be constrained against rotation for the F_2 load direction when the angle connectors are not used in pairs.
4. When angles are installed on each side of wood member, the minimum member thickness must be 3 inches.
5. The F_1 load direction is that which results in the terminating member bearing on the flange of the connector. Connectors are required on both sides of the terminating member to resist allowable F_1 loads in both directions.

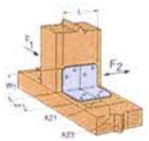


FIGURE 1—A21 AND A23 ANGLE INSTALLATION DETAIL

TABLE 2—A33 AND A44 ANGLES[1]

MODEL NO.	DIMENSIONS (in)			FASTENERS (Quantity-Type)		ALLOWABLE LOADS (lbs)[2,3,4,5]	
	L	W_1	W_2	Base	Post	F_1[6] C_D= 1.6	F_2 C_D= 1.6
A33	1¹/₂	3	3	4-SD9112	4-SD9112	830	335
A44	1¹/₂	4⁹/₁₆	4³/₈	4-SD9112	4-SD9112	805	290

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

1. Dimension nomenclature is as follows: L is the width, W_1 is the length of the flange attached to the terminating member, and W_2 is the length of the flange attached to the continuous member.
2. Tabulated allowable loads have been adjusted for a load duration factor, C_D, of 1.6, corresponding to a ten-minute load duration (i.e., wind or earthquake loading), in accordance with the NDS. The allowable loads do not apply to loads of other durations.
3. F_1 and F_2 loads cannot be combined.
4. The tabulated F_1 and F_2 allowable loads are for a single connector. The terminating member must be constrained against rotation for the F_2 load direction when the angle connectors are not used in pairs.
5. When angles are installed on each side of wood member, the minimum member thickness must be 3 inches.
6. The F_1 load direction is that which results in the terminating member bearing on the flange of the connector. Connectors are required on both sides of the terminating member to resist allowable F_1 loads in both directions.

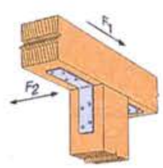


FIGURE 2—A33 AND A44 ANGLE INSTALLATION DETAIL

TABLE 3—GA ANGLES

MODEL NO.	L (in)	FASTENERS (Quantity-Type)	ALLOWABLE LOADS (lbs)[1,2,3,4]							
			F_1				F_2[5]			
			C_D=1.0	C_D=1.15	C_D=1.25	C_D = 1.6	C_D=1.0	C_D=1.15	C_D=1.25	C_D=1.6
GA1	2³/₄	4-SD9112	340	375	375	375	340	395	430	435
GA2	3¹/₄	6-SD9112	515	590	640	695	515	590	640	820

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

1. Tabulated allowable loads have been adjusted for load duration factors, C_D, as shown, in accordance with the NDS, and are not permitted to be adjusted for other load durations.
2. F_1 and F_2 loads cannot be combined.
3. The tabulated F_1 and F_2 allowable loads are for a single connector. The terminating member must be constrained against rotation for the F_1 load direction when the angle connectors are not used in pairs.
4. When angles are installed on each side of wood member, the minimum member thickness must be 3 inches.
5. The F_2 load direction is that which results in the terminating member bearing on the flange of the connector. Connectors are required on both sides of the terminating member to resist allowable F_2 loads in both directions.

FIGURE 3—GA ANGLE

TABLE 4—L REINFORCING ANGLES

MODEL NO.	L (in)	FASTENERS (Quantity-Type)	ALLOWABLE LOADS (lbs)[1,2,3,4]							
			F_1				F_2[5]			
			C_D=1.0	C_D=1.15	C_D=1.25	C_D=1.6	C_D=1.0	C_D=1.15	C_D=1.25	C_D=1.6
L30	3	4-SD9112	290	290	290	290	340	395	430	545
L50	5	6- SD9112	515	535	535	535	515	590	640	820
L70	7	8- SD9112	685	785	855	1,015	685	785	855	1,095
L90	9	10- SD9112	855	985	1,070	1,180	855	985	1,070	1,370

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

1. Tabulated allowable loads have been adjusted for load duration factors, C_D, as shown, in accordance with the NDS, and are not permitted to be adjusted for other load durations.
2. F_1 and F_2 loads cannot be combined.
3. The tabulated F_1 and F_2 allowable loads are for a single connector. The terminating member must be constrained against rotation for the F_1 load direction when the angle connectors are not used in pairs.
4. When angles are installed on each side of wood member, the minimum member thickness must be 3 inches.
5. The F_2 load direction is that which results in the terminating member bearing on the flange of the connector. Connectors are required on both sides of the terminating member to resist allowable F_2 loads in both directions.

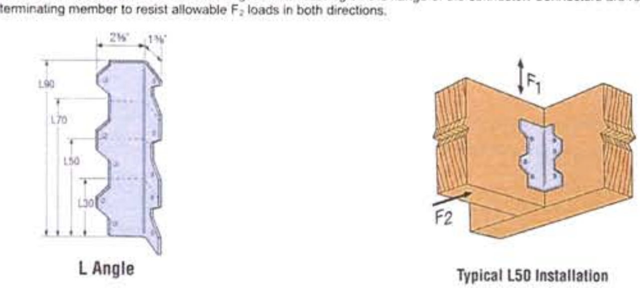


FIGURE 4—L REINFORCING ANGLE

TABLE 8—H-SERIES SEISMIC AND HURRICANE TIES

MODEL NO.	FASTENERS (Quantity-Type)		ALLOWABLE LOADS (lbs)[1,2,3,4,5]		
	TO RAFTER	TO PLATES	UPLIFT (C_D=1.6)	LATERAL (C_D=1.6)	
				F_1	F_2
H1	6-SD9112	4- SD9112	505	600	390
H2.5	5-SD9112	5-SD9112	480	305	165
H2.5A	5-SD9112	5-SD9112	625	450	110
H4	4-SD9112	4-SD9112	325 [6]	200	135
H5	4-SD9112	4-SD9112	480	565	235
H8	5-SD9112	5-SD9112	820 [7]	85	-
H10	8-SD9112	8-SD9112	1135	840	325

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

1. Tabulated allowable loads have been adjusted for a load duration factor, C_D, of 1.6, corresponding to a ten-minute load duration (i.e., wind or earthquake loading), in accordance with the NDS. The allowable loads do not apply to loads of other durations.
2. Allowable loads are for one anchor. A minimum rafter thickness of $2^1/_2$ inches must be used when framing anchors are installed on each side of the joist and on the same side of the plate.
3. Allowable lateral loads in the F_1 direction (parallel to the plate) must not be used to replace diaphragm boundary members or nailing, or replace solid blocking required by code to laterally support the ends of joists or rafters.
4. When cross-grain bending or cross-grain tension cannot be avoided, mechanical reinforcement to all such forces must be provided where required.
5. Tabulated allowable loads given for different load directions cannot be simultaneously combined, i.e., the tie must be subjected to only one direction of load for each loading condition.
6. Maximum allowable uplift load for the H4 stud bottom plate installation is 415 lbs.
7. Maximum allowable uplift load for the H8 stud bottom plate installation is 380 lbs.

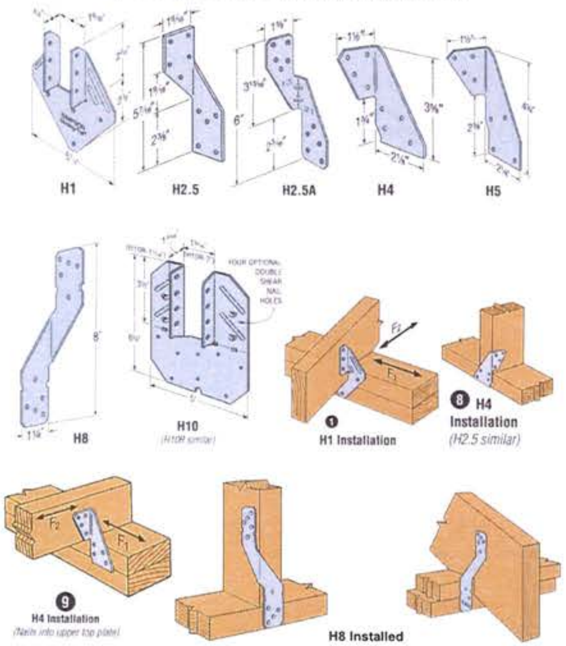


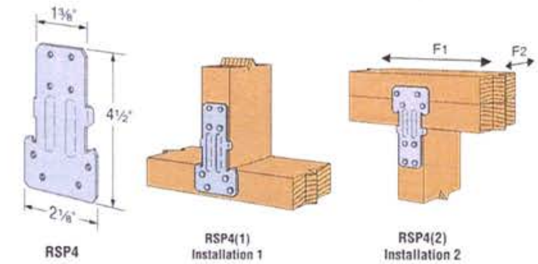
FIGURE 8—H-SERIES SEISMIC AND HURRICANE TIES

TABLE 9—RSP STUD PLATE TIE

MODEL NO.	DIMENSIONS (in)		FASTENERS (Quantity-Type)		ALLOWABLE UPLIFT LOADS (lbs)	ALLOWABLE LOADS (lbs)[1,2,3]	
						F_1	F_2
	W	L	STUD	PLATE	C_D=1.6	C_D=1.6	C_D=1.6
RSP4(1)	$2^1/_8$	$4^1/_2$	4-SD9112	4-SD9112	520	205	190
RSP4(2)			4-SD9112	4-SD9112	520	275	255

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

1. Tabulated allowable loads have been adjusted for a load duration factor, C_D, of 1.6, corresponding to a ten-minute load duration (i.e., wind or earthquake loading), in accordance with the NDS. The allowable loads do not apply to loads of other durations.
2. F_1 and F_2 loads cannot be combined.
3. The F_1 load direction is parallel to the plate, and the F_2 load direction is perpendicular to the plate.



U.S. Patent
5,697,725

FIGURE 9—RSP STUD PLATE TIES

TABLE 10—AC SERIES POST CAPS

MODEL NO.[1]	DIMENSIONS (in)		FASTENERS (Quantity-Type)		ALLOWABLE LOADS[2,3,4,5,6]	
	W	L	Beam	Post	Uplift	Lateral
					C_D=1.6	C_D=1.6
AC4 MAX	$3^9/_{16}$	$6^1/_2$	14 – SD10112	14 – SD10112	2,740	1,485
AC4R MAX	4	7	14 – SD10112	14 – SD10112	2,740	1,485
AC6 MAX	$5^1/_2$	$8^1/_2$	14 – SD10112	14 – SD10112	2,920	2,125
AC6R MAX	6	9	14 – SD10112	14 – SD10112	2,920	2,125

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

1. "MAX" suffix to the model number indicates that both round and triangular holes must be filled with the quantity of screws specified.
2. Tabulated allowable loads have been adjusted for a load duration factor, C_D, of 1.6, corresponding to a ten-minute load duration (i.e., wind or earthquake loading), in accordance with the NDS. The allowable loads do not apply to loads of other durations.
3. Tabulated allowable loads are for a pair of connectors, with one connector installed on each side of the beam.
4. Tabulated allowable loads apply only to cases in which the beam is continuous through the connector.
5. Tabulated uplift and lateral loads cannot be combined.
6. Allowable lateral loads are for loads applied parallel to the length of the beam.

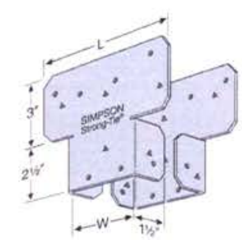


FIGURE 10—AC SERIES

TABLE 15—PC AND EPC SERIES POST CAPS

MODEL NO.	POST SIZE	DIMENSIONS (in)					FASTENERS[1] (Quantity per Flange - Type)			ALLOWABLE LOADS[2,3,4] (lbs)			
							SURFACES			UPLIFT		LATERAL[5]	
		W1	W2	L1	L2	L3	Post Flange	Beam Flange PC	Beam Flange EPC	PC C_D=1.6	EPC C_D=1.6	PC C_D=1.6	EPC C_D=1.6
PC44-16	4x4	$3^9/_{16}$	$3^9/_{16}$	$2^5/_8$	11	$7^3/_8$	4-SD10112	6-SD10112	4-SD10112	730	890	1,260	1,105
PC44	4x4	$3^9/_{16}$	$3^9/_{16}$	$2^5/_8$	11	$7^3/_8$	4-SD10112	6-SD10112	4-SD10112	1,930	1,150	1,600	1,785

For **SI:** 1 inch = 25.4 **mm**, 1 lbf = 4.45 N.

1. The tabulated fastener quantity is the number of screws required in each flange of the PC or EPC connector.
2. Tabulated allowable loads have been adjusted for a load duration factor, C_D, of 1.6, corresponding to a ten-minute load duration (i.e., wind or earthquake loading), in accordance with the NDS. The allowable loads do not apply to loads of other durations.
3. Tabulated allowable loads for the PC series post cap apply only to cases in which the beam is continuous through the connector.
4. Tabulated uplift and lateral loads cannot be combined.
5. Allowable lateral loads are for loads applied parallel to the length of the beam.

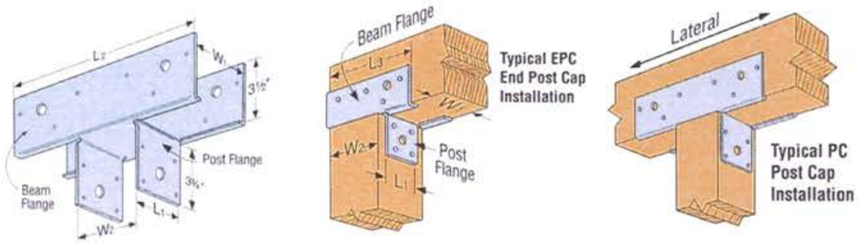


FIGURE 15—PC AND EPC SERIES

TABLE 16—ABA ADJUSTABLE POST BASE

MODEL NO.	DIMENSIONS (inches)			FASTENERS (Quantity-Size/Type)		ALLOWABLE LOADS (lbs)[1,2]	
	W	L	H	ANCHOR DIAMETER (inches)	POST	UPLIFT C_D=1.6	DOWNLOADS C_D=1.0, C_D=1.15, C_D=1.25
ABA44	$3^9/_{16}$	$3^1/_8$	$3^1/_{16}$	$^1/_2$	6-SD9112	610	6,000
ABA44R	$4^1/_{16}$	$3^1/_8$	$2^{13}/_{16}$	$^1/_2$	6-SD9112	610	8,000
ABA46	$3^9/_{16}$	$5^3/_{16}$	$3^1/_8$	$^5/_8$	8-SD10112	940	9,435
ABA46R	$4^1/_{16}$	$5^3/_{16}$	$2^7/_8$	$^5/_8$	8-SD10112	940	12,000
ABA66	$5^1/_2$	$5^1/_4$	$3^1/_8$	$^5/_8$	8-SD10112	970	10,665
ABA66R	6	$5^3/_{16}$	$2^7/_8$	$^5/_8$	8-SD10112	970	12,665

For **SI: 1 inch** = 25.4 mm, 1 lbf = 4.45 N.

1. Tabulated allowable loads have been adjusted for load duration factors, C_D, as shown, in accordance with the NDS, and are not permitted to be adjusted for other load durations.
2. Anchor bolts and concrete footings must be capable of resisting all loads and forces transferred from the post base connector.

ABA installation

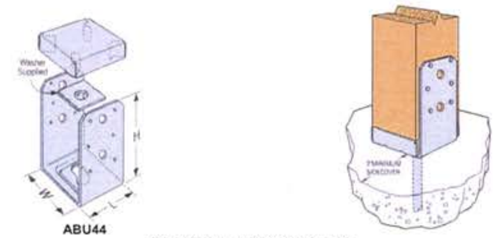
FIGURE 16—ABA ADJUSTABLE POST BASE

TABLE 17—ABU ADJUSTABLE POST BASE

MODEL NO.	DIMENSIONS (inches)			FASTENERS (Quantity-Type / Size)		ALLOWABLE LOADS[1,2] (lbs)	
	W	L	H	Post	Anchor Diameter (inches)	Uplift C_D=1.6	Download C_D=1.0, C_D=1.15, C_D=1.25
ABU44	$3^9/_{16}$	3	$5^1/_2$	12-SD10112	$^5/_8$	2,140	6,665

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

1. Tabulated allowable loads have been adjusted for load duration factors, C_D, as shown, in accordance with the NDS, and are not permitted to be adjusted for other load durations.
2. Anchor bolts and concrete footings must be capable of resisting all loads and forces transferred from the post base connector.



ABU44

FIGURE 17—ABU44 POST BASE

TABLE 18—LU SERIES JOIST HANGERS

MODEL No.	DIMENSIONS (inches)			FASTENERS (Quantity-Type)		ALLOWABLE LOADS[1,2] (lbs)			
						Uplift	Download		
	W	H	B	Header	Joist	C_D=1.6	C_D=1.0	C_D=1.15	C_D=1.25
LU24	$1^9/_{16}$	$3^1/_8$	$1^1/_2$	4-SD9112	2-SD9112	340	685	725	725
LU26	$1^9/_{16}$	$4^3/_4$	$1^1/_2$	6-SD9112	4-SD9112	915	1,025	1,030	1,030
LU28	$1^9/_{16}$	$6^3/_8$	$1^1/_2$	8-SD9112	6-SD9112	995	1,370	1,380	1,380
LU210	$1^9/_{16}$	$7^{13}/_{16}$	$1^1/_2$	10-SD9112	6-SD9112	1,150	1,710	1,965	2,010

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

1. Tabulated allowable loads have been adjusted for load duration factors, C_D, as shown, in accordance with the NDS, and are not permitted to be adjusted for other load durations.
2. LU series hangers provide torsional resistance, which is defined as a moment of not less than 75 pounds times the depth of the joist at which the lateral movement of the top or bottom of the joist with respect to its vertical position is 0.125 inch (3.2 mm). The height, H, of the joist hanger must be at least 60 percent of the height of the joist unless additional lateral restraint is provided, as designed by others.

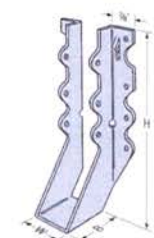


FIGURE 18—LU JOIST HANGER

TABLE 21—HUS SERIES JOIST HANGERS

MODEL NO.	DIMENSIONS (inches)			FASTENERS (Quantity-Type)		ALLOWABLE LOADS[1,2] (lbs)			
						Uplift	Download		
	W	H	B	Header	Joist[3]	C_D = 1.6	C_D=1.0	C_D=1.15	C_D=1.25
HUS26	$1\frac{5}{8}$	$5\frac{3}{8}$	3	14-SD10212	6-SD10212	1,100	3,040	3,125	3,125
HUS28	$1\frac{5}{8}$	7	3	22-SD10212	8-SD10212	2,135	3,880	3,880	3,880

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

1. Tabulated allowable loads have been adjusted for load duration factors, C_D, as shown, in accordance with the NDS, and are not permitted to be adjusted for other load durations.
2. LUS series hangers provide torsional resistance, which is defined as a moment of not less than 75 pounds times the depth of the joist at which the lateral movement of the top or bottom of the joist with respect to its vertical position is 0.125 inch (3.2 mm). The height, H, of the joist hanger must be at least 60 percent of the height of the joist unless additional lateral restraint is provided, as designed by others.
3. Joist screws must be installed at a 45-degree angle through the joist and into the header/beam to achieve the tabulated loads.

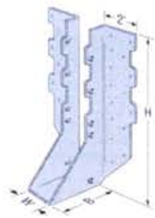


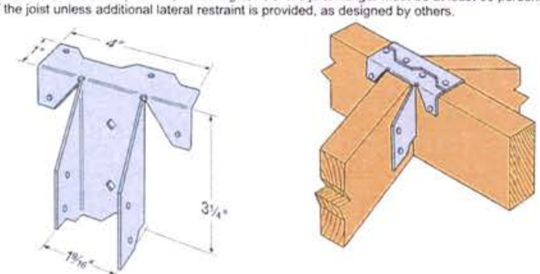
FIGURE 21—HUS HANGER

TABLE 22—ALLOWABLE LOADS FOR THE RR RIDGE RAFTER CONNECTOR

MODEL NO.	FASTENERS (Quantity – Size)		ALLOWABLE LOADS (lbs)			
			Uplift	Download		
	Header	Joist	C_D = 1.6	C_D = 1.0	C_D = 1.15	C_D = 1.25
RR	4 – SD9112	4 – SD9112	205	475	475	475

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

1. Tabulated allowable loads have been adjusted for load duration factors, C_D, as shown, in accordance with the NDS, and are not permitted to be adjusted for other load durations.
2. RR series hangers provide torsional resistance, which is defined as a moment of not less than 75 pounds times the depth of the joist at which the lateral movement of the top or bottom of the joist with respect to its vertical position is 0.125 inch (3.2 mm). The height, H, of the joist hanger must be at least 60 percent of the height of the joist unless additional lateral restraint is provided, as designed by others.



RR

RR Installed

FIGURE 22—RR CONNECTOR

TABLE 23—ALLOWABLE LOADS FOR MTS TWIST STRAPS

MODEL NO.	LENGTH (in)	FASTENERS[1,3] (Quantity-Type)	ALLOWABLE UPLIFT LOADS[2] (lbs)
			C_D=1.6
MTS12	12	14-SD9112	870
MTS16	16	14-SD9112	870
MTS20	20	14-SD9112	940

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

1. Half of the fasteners must be installed into each member to achieve the tabulated allowable uplift loads.
2. Tabulated allowable loads have been adjusted for a load duration factor, C_D, of 1.6, corresponding to a ten-minute load duration (i.e., wind or earthquake loading), in accordance with the NDS. The allowable loads do not apply to loads of other durations.
3. The MTS twist straps have more fastener holes than the minimum quantity of screws specified in the table.

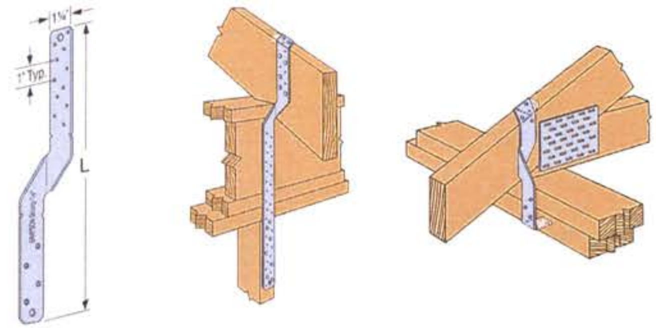


FIGURE 23—MTS TWIST STRAP AND TYPICAL INSTALLATIONS

TABLE 24—ALLOWABLE LOADS FOR ST STRAPS

MODEL SERIES	MODEL NO.	THE STRAP PROPERTIES				FASTENERS (Total Quantity-Type)	ALLOWABLE TENSION LOADS (lbs)
		Thickness (Gage No.)	Length (in.)	Min. F_y (ksi)	Min. F_u (ksi)		C_D=1.6
ST	ST292	20	$9\frac{5}{16}$	33	45	12-SD10112	1,215
	ST2122	20	$12\frac{13}{16}$	40	55	12-SD10112	1,480
	ST2115	20	$16\frac{5}{16}$	50	65	6-SD10112	660
	ST2215	20	$16\frac{5}{16}$	50	65	14-SD10112	1,750
	ST6215	16	$16\frac{5}{16}$	33	45	16-SD10112	2,010
	ST6224	16	$23\frac{5}{16}$	40	55	20-SD10112	2,460
	ST6236	14	$33\frac{13}{16}$	50	65	28-SD10112	3,590
	ST9	16	9	33	45	8-SD10112	1,105
	ST12	16	$11\frac{5}{8}$	33	45	10-SD10112	1,385
	ST18	16	$17\frac{3}{4}$	33	45	12-SD10112	1,420
	ST22	16	$21\frac{5}{8}$	33	45	20-SD10112	1,420

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 ksi = 6.895 MPa.

1. Half of the fasteners must be installed into each member to achieve the tabulated allowable uplift loads.
2. Tabulated allowable loads have been adjusted for a load duration factor, C_D, of 1.6, corresponding to a ten-minute load duration (i.e., wind or earthquake loading), in accordance with the NDS. The allowable loads do not apply to loads of other durations.

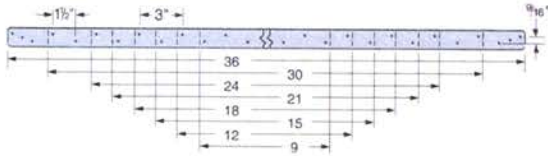


FIGURE 28—LSTA/MSTA STRAPS

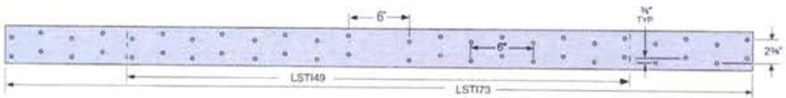


FIGURE 29—LSTI STRAPS

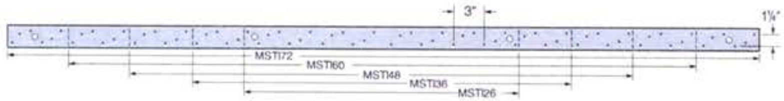


FIGURE 30—MSTI STRAPS

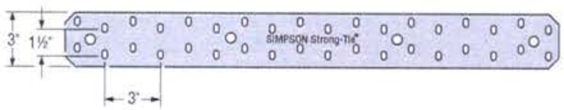


FIGURE 31—MSTC28, OTHER MODELS SIMILAR

TABLE 27—HTP37Z TIE STRAP

MODEL SERIES	MODEL NO.	THE STRAP PROPERTIES				FASTENERS (Total Quantity-Type)	ALLOWABLE TENSION LOADS (lbs)
		Thickness (Gage No.)	Length (in.)	Min. F_y (ksi)	Min. F_u (ksi)		C_D=1.6
HTP	HTP37Z	16	7	33	45	20-SD9112	2,735
HRS	HRS6	12	6	33	45	6-SD9112	820
	HRS8	12	8	33	45	10-SD9112	1,370
	HRS12	12	12	33	45	14-SD9112	1,915

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 ksi = 6.895 MPa.

1. Half of the fasteners must be installed into each member to achieve the tabulated allowable uplift loads.
2. Tabulated allowable loads have been adjusted for a load duration factor, C_D, of 1.6, corresponding to a ten-minute load duration (i.e., wind or earthquake loading), in accordance with the NDS. The allowable loads do not apply to loads of other durations.

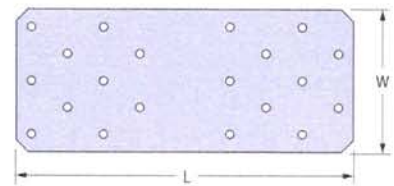


FIGURE 32—HTP37Z STRAP

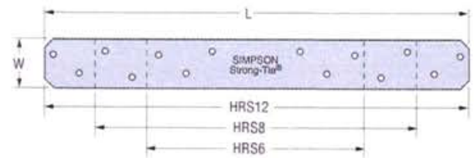


FIGURE 33—HRS STRAP

ES ICC EVALUATION SERVICE®

ICC-ES Evaluation Report

ESR-3096 LABC and LARC Supplement

Reissued January 2021

Revised February 2021

This report is subject to renewal January 2022.

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 05 23—Wood, Plastic, and Composite Fastenings

REPORT HOLDER:

SIMPSON STRONG-TIE COMPANY INC.

EVALUATION SUBJECT:

SIMPSON STRONG-TIE® CONNECTORS USING SD-SERIES SCREWS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that Simpson Strong-Tie® connectors used as wood framing connectors, described in ICC-ES evaluation report ESR-3096, have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2020 *City of Los Angeles Building Code* (LABC)
- 2020 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The Simpson Strong-Tie® connectors used as wood framing connectors, described in Sections 2.0 through 7.0 of the evaluation report ESR-3096, comply with the LABC Chapter 23, and the LARC, and are subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The Simpson Strong-Tie connectors used as wood framing connectors, described in this evaluation report supplement, must comply with all of the following conditions:

- All applicable sections in the evaluation report ESR-3096.
- The design, installation, conditions of use and labeling are in accordance with the 2018 *International Building Code®* (2018 IBC) provisions noted in the evaluation report ESR-3096.
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.

This supplement expires concurrently with the evaluation report, reissued January 2021 and revised February 2021.

ICC EVALUATION SERVICE

ICC-ES Evaluation Report

ESR-3445

Reissued October 2020

This report is subject to renewal October 2022.

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 05 23—Wood, Plastic, and Composite Fastenings

REPORT HOLDER:

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CHESTERFIELD, MISSOURI 63017
(800) 328-5934
www.mitek-us.com
uspcustomerservice@mii.com

EVALUATION SUBJECT:

MiTek USP FACE MOUNT HANGERS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018, 2015, 2012, 2009 and 2006 *International Building Code®* (IBC)
- 2018, 2015, 2012, 2009 and 2006 *International Residential Code®* (IRC)

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBS), see ESR-3445 LABC and LARC Supplement.

Property evaluated:

Structural

2.0 USES

The MiTek USP structural connectors described in this report (see Table 17 for complete listing) are used for connecting wood framing members in accordance with Section 2304.10.3 of the 2018 and 2015 IBC (Section 2304.9.3 of the 2012, 2009 and 2006 IBC). The connectors may also be used in structures regulated under the IRC when an engineered design is submitted to, and approved by, the code official, in accordance with Section R301.1.3 of the IRC.

3.0 DESCRIPTION

3.1 CLPBF Butterfly Hanger:

The CLPBF Butterfly Hanger is a face-mount hanger with triangular header flanges having prepunched nail holes for joist-to-header or truss-to-truss connections. The CLPBF Butterfly Hanger is cold-formed from No. 18 gage steel and is prepunched for 10d common nails into the header and 10d-by-1$^1/_2$-inch nails into the joist. See Table 1 and Figure 1 for product dimensions, fastener schedule, allowable loads, and a typical installation detail.

3.2 HD Face Mount Hanger:

The HD Face Mount Hanger is designed to support headers, joists and trusses. The HD Face Mount Hanger is cold-formed from No. 14 gage steel; and is prepunched for 16d common nails into the supporting member, and either 16d common, 10d common or 10d-by-1$^1/_2$-inch nails into the supported member. See Table 2 and Figure 2 for product dimensions, fastener schedule, allowable loads, and typical installation details. The HD, THD, THF and THFI offer increased allowable download and/or uplift values by installing additional nails into the diamond holes. Minimum ('min') load values require the installation of the specified nails into all round holes of the hanger to support the corresponding allowable loads. Maximum ('max') load values require the installation of the specified nails into all round and all diamond holes of the hanger to support the increased loads. Interpolation is not allowed between the min-max allowable load values and nail count.

3.3 HUS Slant Nail Joist Hanger:

The HUS Slant Nail Joist Hanger is designed to provide double shear nailing for joist/truss-to-beam connections. The HUS Slant Nail Joist Hanger is cold-formed from No. 14 gage or No. 16 gage steel and is prepunched for 16d common nails into both the joist and the header. See Table 3 and Figure 3 for product dimensions, fastener schedule, allowable loads, and typical installation details.

3.4 JL Standard Joist Hangers:

The JL Standard Joist Hangers are designed as face mount hangers for connecting nominal dimension lumber to headers, beams or girders. The JL hangers are cold-formed from No. 20 gage steel. The hangers are prepunched for 16d common or 10d common nails into the header, and 10d-by-1$^1/_2$-inch nails into the joist. See Table 4 and Figure 4 for product dimensions, fastener schedule, allowable loads, and a typical installation detail.

3.5 JN and JNE Power Nail Hangers:

JN and JNE Joist Hangers are designed to support one- and two-ply nominally 2-by-6 and 2-by-8 dimension lumber joists. The JN joist hangers are cold-formed from No.18 gage steel and have a seat depth of 1$^5/_8$ inches (41 mm). The JNE joist hangers are cold-formed from

No. 20 gage steel and have a seat depth of 2 inches (51 mm). JN and JNE joist hangers are not prepunched for nails. See Table 5 and Figure 5 for product dimensions, required fastener schedule, allowable loads, and a typical installation detail.

3.6 JUS Slant Nail Joist Hanger:

The JUS Slant Nail Joist Hanger is designed for face-mount applications to provide double shear nailing for joist/truss-to-beam connections. The JUS Slant Nail Joist Hanger is cold-formed from No. 18 gage steel and is prepunched for either 10d common or 16d common nails into both the joist and the header. See Table 6 and Figure 6 for product dimensions, fastener schedule, allowable loads, and a typical installation detail.

3.7 SUH Joist Hanger:

The SUH Joist Hanger is designed as a face-mount hanger to support nominal dimension lumber joists. The SUH Joist Hanger is cold-formed from No. 16 gage steel. The SUH Joist Hanger has prongs in the header flanges to temporarily position the hanger on the header. The hanger is prepunched for 10d common or 16d common nails into the header and 10d-by-1$^1/_2$, 10d common, or 16d common nails into the joist. See Table 7 and Figure 7 for product dimensions, fastener schedule, allowable loads, and a typical installation detail.

3.8 THD Face Mount Hanger:

The THD Face Mount Hanger is designed to support metal-plate-connected wood trusses and can also support LVL, LSL and PSL members. The THD Face Mount Hanger is cold-formed from either No. 12 gage, No. 14 gage, or No. 16 gage steel; and is prepunched for 16d common nails into the header, and either 10d common or 10d-by-1$^1/_2$-inch nails into the joist. See Table 8 and Figure 8 for product dimensions, required fastener schedule, allowable loads, and a typical installation detail.

3.9 THDH Face Mount Hanger:

The THDH Face Mount Hanger is designed as a hanger for metal-plate-connected wood trusses and can also support LVL, LSL and PSL members. The THDH Face Mount Hanger is cold-formed from No. 12 gage steel and is prepunched for 16d common nails. See Table 9 and Figure 9 for product dimensions, fastener schedule, allowable loads, and a typical installation detail.

3.10 THF Face Mount Hanger:

The THF Face Mount Hanger is designed to provide lateraltop chord support for I-joist-to-header applications. The supporting header may be wood I-joists, LVL, LSL, PSL, or solid sawn lumber. The THF Face Mount Hanger is cold-formed from either No. 18 gage, No. 16 gage, or No. 12 gage steel; and is prepunched for 10d common nails into the header, and either 10d common or 10d-by-1$^1/_2$-inch nails into the joist. See Table 10 and Figure 10 for product dimensions, fastener schedule, allowable loads, and a typical installation detail.

3.11 THFI Face Mount Hanger:

The THFI Face Mount Hanger is designed to provide lateral top chord support for I-joist-to-header applications with the added benefit of having six locking prongs in the hanger seat. The supporting header may be wood I-joists, LVL, LSL, PSL, or solid sawn lumber. The locking prongs provide a consistent uplift capacity for I-joists of all bottom flange thicknesses without the need of hanger-to-joist nails. The THFI also has a patented self-supporting top tab that securely grips to the header and holds the hanger in place without needing manual assistance while fasteners are installed. The THFI Face Mount Hanger is cold formed from No. 18 gage steel and is pre-punched for 10d common nails into the header. See Table 11 and Figure 11 for product dimensions, fastener schedule, allowable loads and a typical installation detail.

3.12 LGU/MGU/HGU Girder Hanger:

The LGU/MGU/HGU Girder Hangers are designed as face mount hangers for attaching glulam beams to glulam headers. Header fasteners are located high on the side flanges to allow a deeper supported member to be attached top flush to a shallower supporting member. The LGU/MGU/HGU Girder Hangers are cold formed from either No. 10 gage or No. 7 gage steel and are pre-punched for $^1/_4$-inch-diameter MiTek Pro Series WS3 (3-inch-length) wood screws. The MiTek Pro Series wood screws are proprietary screws described in ESR-2761 and are shipped with the hangers. The LGU/MGU/HGU Girder Hangers can also be used to attach LVL, LSL and PSL beams and headers together. See Table 12 and Figure 12 for product dimensions, fastener schedule, allowable loads and a typical installation detail.

3.13 THDHQ Girder Truss Hanger:

The THDHQ Girder Truss Hangers are designed as face mount hangers for attaching multi-ply metal plated wooded girder trusses together. The THDHQ hangers are cold formed from No. 12 gage steel and are pre-punched for $^1/_4$-inch-diameter MiTek Pro Series WS3 (3-inch-length), WS45 (4$^1/_2$-inch-length) or WS6 (6-inch-length) wood screws. The MiTek Pro Series wood screws are proprietary screws described in ESR-2761 and are shipped with the THDHQ hangers. The THDHQ hangers can also be used to connect LVL, LSL and PSL beams and headers together. See Table 13 and Figure 13 for product dimensions, fastener schedule, allowable loads and a typical installation detail.

3.14 IHF Face Mount Hanger:

The IHF Face Mount Hanger is designed to resist the gravity and uplift loads from wood I-joists. Sized specifically for wood I-joists, the sides of the IHF Face Mount Hanger provide lateral support to the I-joist top flange. The IHF Face Mount hanger is intended to support wood I-joists with flanges manufactured from structural composite lumber (SCL). Design values for the IHF Face Mount Hanger and I-joist flange property requirements are provided in Table 14. The supporting header may be wood I-joist, LVL, LSL, PSL, or solid sawn lumber. The IHF Face Mount Hanger is cold-formed from No. 16 gage steel, and is prepunched for either 10d common or 16d common nails installed into the header and 10d-by-1$^1/_2$-inch nails installed into the joist flanges. Diamond holes in the hanger flanges for hanger-to-header nailing provide for customizable (MIN/MAX) fastening to match the allowable download capacity needed as indicated in Table 14. The IHF Face Mount Hanger dimensions and typical installations are shown in Figure 14.

3.15 IHFL Face Mount Hanger:

The IHFL Face Mount Hanger is designed to resist the gravity and uplift loads from wood I-joists. Sized specifically for wood I-joists, the sides of the IHFL Face Mount Hanger provide lateral support to the I-joist top flange. The IHFL Face Mount Hanger is intended to support wood I-joists with flanges manufactured from sawn lumber or structural composite lumber (SCL). Design values for the IHFL Face Mount Hanger and I-joist flange property requirements are provided in Table 15. The supporting header may be wood I-joist, LVL, LSL, PSL, or solid sawn lumber. The IHFL Face Mount Hanger is cold-formed from No. 18 gage steel, and is prepunched for 10d common nails installed into the header. Uplift resistance is provided by six Seat Cleat® prongs that

TABLE 2—HD FACE MOUNT HANGER ALLOWABLE LOADS[1,2,3,4,5,6]

STOCK NO.	STEEL GAGE	HANGER DIMENSIONS (inches)			MIN /MAX	FASTENER SCHEDULE				ALLOWABLE LOADS (lbs)			
						HEADER		JOIST		DOWNLOAD			UPLIFT
		W	H	D		Qty	Type	Qty	Type	C_D = 1.0	C_D = 1.15	C_D = 1.25	C_D = 1.6
HD26	14	1 9/16	3 1/2	2 1/2	min	4	16d Common	2	10d x 1 1/2	615	695	745	335
					max	4	16d Common	4	10d x 1 1/2	615	695	745	565
HD28	14	1 9/16	5 1/4	2 1/2	min	8	16d Common	4	10d x 1 1/2	1,230	1,390	1,490	760
					max	8	16d Common	6	10d x 1 1/2	1,230	1,390	1,490	760
HD210	14	1 9/16	7 3/16	2 1/2	min	10	16d Common	4	10d x 1 1/2	1,540	1,735	1,865	760
					max	14	16d Common	6	10d x 1 1/2	2,155	2,430	2,610	1,170
HD212	14	1 9/16	9 1/16	2 1/2	min	14	16d Common	6	10d x 1 1/2	2,155	2,430	2,610	1,170
					max	20	16d Common	10	10d x 1 1/2	3,080	3,475	3,725	1,510
HD214	14	1 9/16	10 15/16	2 1/2	min	16	16d Common	8	10d x 1 1/2	2,465	2,780	2,980	1,190
					max	24	16d Common	12	10d x 1 1/2	3,695	4,125	4,250	1,510
HD216	14	1 9/16	12 7/8	2 1/2	min	18	16d Common	8	10d x 1 1/2	2,770	3,125	3,355	1,510
					max	26	16d Common	12	10d x 1 1/2	3,930	4,125	4,250	1,900
HD24-2	14	3 1/8	3 1/2	2 1/2	- -	4	16d Common	2	10d Common	615	695	745	365
HD26-2	14	3 1/8	5 1/4	2 1/2	min	8	16d Common	4	10d Common	1,230	1,390	1490	760
					max	12	16d Common	6	10d Common	1,850	2,085	2,235	1,170
HD28-2	14	3 1/8	7 1/8	2 1/2	min	10	16d Common	4	10d Common	1,540	1,735	1,865	780
					max	14	16d Common	6	10d Common	2,155	2,430	2,610	1,170
HD210-2	14	3 1/8	9	2 1/2	min	14	16d Common	6	10d Common	2,155	2,430	2,610	1,170
					max	20	16d Common	10	10d Common	3,080	3,475	3,725	1,950
HD212-2	14	3 1/8	11	2 1/2	min	16	16d Common	8	10d Common	2,465	2,780	2,980	1,395
					max	24	16d Common	12	10d Common	3,695	4,170	4,470	2,340
HD214-2	14	3 1/8	13	2 1/2	min	18	16d Common	8	10d Common	2,770	3,125	3,355	1,510
					max	26	16d Common	12	10d Common	4,005	4,515	4,845	2,340
HD216-2	14	3 1/8	14	2 1/2	min	22	16d Common	10	10d Common	3,390	3,820	4,100	1,950
					max	30	16d Common	14	10d Common	4,620	5,035	5,035	2,735
HD26-3	14	4 5/8	4 1/2	2 1/2	min	8	16d Common	4	10d Common	1,230	1,390	1,490	760
					max	12	16d Common	6	10d Common	1,850	2,085	2,235	1,170
HD28-3	14	4 5/8	6 3/8	2 1/2	min	10	16d Common	4	10d Common	1,540	1,735	1,865	780
					max	14	16d Common	6	10d Common	2,155	2,430	2,610	1,170
HD210-3	14	4 5/8	8 1/4	2 1/2	min	14	16d Common	6	10d Common	2,155	2,430	2,610	1,170
					max	20	16d Common	10	10d Common	3,080	3,475	3,725	1,950
HD212-3	14	4 5/8	10 1/4	2 1/2	min	16	16d Common	8	10d Common	2,465	2,780	2,980	1,395
					max	24	16d Common	12	10d Common	3,695	4,170	4,470	2,340
HD214-3	14	4 5/8	12 1/4	2 1/2	min	18	16d Common	8	10d Common	2,770	3,125	3,355	1,510
					max	26	16d Common	12	10d Common	4,005	4,515	4,845	2,340
HD216-3	14	4 5/8	13 3/4	2 1/2	min	22	16d Common	10	10d Common	3,390	3,820	4,100	1,950
					max	30	16d Common	14	10d Common	4,620	5,035	5,035	2,735
HD28-4	14	6 1/8	7	2 1/2	min	10	16d Common	4	16d Common	1,540	1,735	1,865	870
					max	14	16d Common	6	16d Common	2,155	2,430	2,610	1,305
HD210-4	14	6 1/8	9 1/4	2 1/2	min	14	16d Common	6	16d Common	2,155	2,430	2,610	1,305
					max	16	16d Common	8	16d Common	2,770	3,125	3,355	1,845
HD34	14	2 9/16	3	2 1/2	min	4	16d Common	2	10d x 1 1/2	615	695	745	335
					max	4	16d Common	4	10d x 1 1/2	615	695	745	585
HD36	14	2 9/16	4 1/2	2 1/2	min	8	16d Common	4	10d x 1 1/2	1,230	1,390	1,490	760
					max	8	16d Common	6	10d x 1 1/2	1,230	1,390	1,490	760
HD38	14	2 9/16	6 11/16	2 1/2	min	10	16d Common	4	10d x 1 1/2	1,540	1,735	1,865	760
					max	14	16d Common	6	10d x 1 1/2	2,155	2,430	2,610	1,170
HD310	14	2 9/16	7 7/16	2 1/2	min	10	16d Common	4	10d x 1 1/2	1,540	1,735	1,865	760
					max	14	16d Common	6	10d x 1 1/2	2,155	2,430	2,610	1,170
HD312	14	2 9/16	9 7/16	2 1/2	min	14	16d Common	6	10d x 1 1/2	2,155	2,430	2,610	1,170
					max	20	16d Common	10	10d x 1 1/2	3,080	3,475	3,725	1,510
HD314	14	2 9/16	11 5/16	2 1/2	min	16	16d Common	8	10d x 1 1/2	2,465	2,780	2,980	1,190
					max	24	16d Common	12	10d x 1 1/2	3,695	4,170	4,435	1,900
HD316	14	2 9/16	13 3/16	2 1/2	min	18	16d Common	8	10d x 1 1/2	2,770	3,125	3,355	1,510
					max	26	16d Common	12	10d x 1 1/2	4,005	4,435	4,435	1,900
HD38-2	14	5 1/8	6 3/4	2 1/2	min	10	16d Common	4	10d Common	1,540	1,735	1,865	780
					max	14	16d Common	6	10d Common	2,155	2,430	2,610	1,170
HD310-2	14	5 1/8	8	2 1/2	min	14	16d Common	6	10d Common	2,155	2,430	2,610	1,170
					max	20	16d Common	10	10d Common	3,080	3,475	3,725	1,510

TABLE 2—HD FACE MOUNT HANGER ALLOWABLE LOADS[1,2,3,4,5,6] (Continued)

STOCK NO.	STEEL GAGE	HANGER DIMENSIONS (inches)			MIN /MAX	FASTENER SCHEDULE				ALLOWABLE LOADS (lbs)			
						HEADER		JOIST		DOWNLOAD			UPLIFT
		W	H	D		Qty	Type	Qty	Type	C_D = 1.0	C_D = 1.15	C_D = 1.25	C_D = 1.6
HD312-2	14	5 1/8	10	2 1/2	min	16	16d Common	8	10d Common	2,465	2,780	2,980	1,305
					max	24	16d Common	12	10d Common	3,695	4,170	4,470	2,340
HD44	14	3 9/16	3 3/16	2 1/2	- -	4	16d Common	2	10d Common	615	695	745	390
HD46	14	3 9/16	5 1/16	2 1/2	min	8	16d Common	4	10d Common	1,230	1,390	1,490	760
					max	12	16d Common	6	10d Common	1,850	2,085	2,235	1,170
HD48	14	3 9/16	6 15/16	2 1/2	min	10	16d Common	4	10d Common	1,540	1,735	1,865	780
					max	14	16d Common	6	10d Common	2,155	2,430	2,610	1,170
HD410	14	3 9/16	8 11/16	2 1/2	min	14	16d Common	6	10d Common	2,155	2,430	2,610	1,170
					max	20	16d Common	10	10d Common	3,080	3,475	3,725	1,950
HD412	14	3 9/16	10 11/16	2 1/2	min	16	16d Common	8	10d Common	2,465	2,780	2,980	1,305
					max	24	16d Common	12	10d Common	3,695	4,170	4,470	2,340
HD414	14	3 9/16	12 11/16	2 1/2	min	18	16d Common	8	10d Common	2,770	3,125	3,355	1,510
					max	26	16d Common	12	10d Common	4,005	4,515	4,815	2,340
HD416	14	3 9/16	14 7/16	2 1/2	min	22	16d Common	10	10d Common	3,390	3,820	4,100	1,950
					max	30	16d Common	14	10d Common	4,620	4,990	4,990	2,245
HD418	14	3 9/16	16 1/2	2 1/2	-	28	16d Common	8	10d Common	4,310	4,815	4,815	1,560
HD66	14	5 1/2	4 7/16	2 1/2	min	8	16d Common	4	16d Common	1,230	1,390	1,490	870
					max	12	16d Common	6	16d Common	1,850	2,085	2,235	1,305
HD68	14	5 1/2	5 15/16	2 1/2	min	10	16d Common	4	16d Common	1,540	1,735	1,865	920
					max	14	16d Common	6	16d Common	2,155	2,430	2,610	1,305
HD610	14	5 1/2	7 15/16	2 1/2	min	14	16d Common	6	16d Common	2,155	2,430	2,610	1,305
					max	20	16d Common	10	16d Common	3,080	3,475	3,725	2,305
HD612	14	5 1/2	9 15/16	2 1/2	min	16	16d Common	8	16d Common	2,465	2,780	2,980	1,305
					max	24	16d Common	12	16d Common	3,695	4,170	4,470	2,765
HD614	14	5 1/2	11 7/16	2 1/2	min	18	16d Common	8	16d Common	2,770	3,125	3,355	1,845
					max	26	16d Common	12	16d Common	4,005	4,515	4,845	2,765
HD616	14	5 1/2	13 7/16	2 1/2	min	22	16d Common	10	16d Common	3,390	3,820	4,100	2,305
					max	30	16d Common	14	16d Common	4,620	4,990	4,990	3,225
HD86	14	7 1/2	4 15/16	2 1/2	min	8	16d Common	4	16d Common	1,230	1,390	1,490	870
					max	10	16d Common	4	16d Common	1,540	1,735	1,865	920
HD88	14	7 1/2	6 15/16	2 1/2	min	10	16d Common	4	16d Common	1,540	1,735	1,865	920
					max	14	16d Common	6	16d Common	2,155	2,430	2,610	1,305
HD810	14	7 1/2	8 9/16	2 1/2	min	14	16d Common	6	16d Common	2,155	2,430	2,610	1,305
					max	18	16d Common	8	16d Common	2,770	3,125	3,355	1,845
HD812	14	7 1/2	10 1/2	2 1/2	min	16	16d Common	6	16d Common	2,465	2,780	2,980	1,305
					max	22	16d Common	8	16d Common	3,390	3,820	4,100	1,845
HD814	14	7 1/2	11 7/8	2 1/2	min	18	16d Common	8	16d Common	2,770	3,125	3,355	1,845
					max	24	16d Common	12	16d Common	3,695	4,170	4,435	2,765
HD816	14	7 1/2	12 15/16	2 1/2	min	20	16d Common	8	16d Common	3,080	3,475	3,725	1,845
					max	26	16d Common	12	16d Common	4,005	4,435	4,435	2,765
HD1770	14	1 13/16	7 1/8	2 1/2	min	12	16d Common	4	10d x 1 1/2	1,850	2,085	2,235	760
					max	16	16d Common	8	10d x 1 1/2	2,465	2,780	2,980	1,190
HD17925	14	1 13/16	9 1/8	2 1/2	min	18	16d Common	6	10d x 1 1/2	2,770	3,125	3,355	1,170
					max	24	16d Common	10	10d x 1 1/2	3,695	4,170	4,320	1,900
HD17112	14	1 13/16	11 1/8	2 1/2	min	22	16d Common	6	10d x 1 1/2	3,390	3,625	3,685	1,170
					max	30	16d Common	12	10d x 1 1/2	4,320	4,515	4,640	1,900
HD1714	14	1 13/16	13 1/16	2 1/2	min	28	16d Common	8	10d x 1 1/2	3,790	3,920	4,005	1,510
					max	36	16d Common	14	10d x 1 1/2	4,580	4,810	4,955	1,900
HD27925	14	2 3/4	9 1/16	2 1/2	min	14	16d Common	6	10d x 1 1/2	2,155	2,430	2,610	1,170
					max	20	16d Common	10	10d x 1 1/2	3,080	3,475	3,725	1,510
HD27112	14	2 3/4	11 1/16	2 1/2	min	16	16d Common	8	10d x 1 1/2	2,465	2,780	2,980	1,190
					max	24	16d Common	12	10d x 1 1/2	3,695	4,170	4,435	1,900
HD2714	14	2 3/4	13 1/16	2 1/2	min	18	16d Common	8	10d x 1 1/2	2,770	3,125	3,355	1,510
					max	26	16d Common	12	10d x 1 1/2	4,005	4,435	4,435	1,900
HD32105	14	3 1/4	9 15/16	2 1/2	min	16	16d Common	6	10d Common	2,465	2,780	2,980	1,170
					max	22	16d Common	10	10d Common	3,390	3,820	4,100	1,950
HD3212	14	3 1/4	11 1/8	2 1/2	min	18	16d Common	8	10d Common	2,770	3,125	3,355	1,510
					max	26	16d Common	12	10d Common	4,005	4,515	4,845	2,340

TABLE 4—JL STANDARD JOIST HANGER ALLOWABLE LOADS[1,2,3,4]

STOCK NO.	STEEL GAGE	DIMENSIONS (inches)			FASTENER SCHEDULE				ALLOWABLE LOADS (lbs)			
					Header		Joist		Download			Uplift
		W	H	D	Qty	Type	Qty	Type	C_D = 1.0	C_D = 1.15	C_D = 1.25	C_D = 1.6
JL24	20	1⁹/₁₆	3	1¹/₂	4	10d Common	2	10dx1¹/₂	470	540	580	295
					4	16d Common	2	10dx1¹/₂	560	640	695	295
JL26	20	1⁹/₁₆	4³/₄	1¹/₂	6	10d Common	4	10dx1¹/₂	710	805	870	600
					6	16d Common	4	10dx1¹/₂	840	960	1,045	600
JL28	20	1⁹/₁₆	6⁷/₈	1¹/₂	10	10d Common	6	10dx1¹/₂	1,180	1,345	1,450	815
					10	16d Common	6	10dx1¹/₂	1,400	1,600	1,740	815
JL210	20	1⁹/₁₆	8¹/₄	1¹/₂	14	10d Common	8	10dx1¹/₂	1,650	1,885	2,030	1,030
					14	16d Common	8	10dx1¹/₂	1,960	2,040	2,040	1,030

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi =6.895 kPa.

[1]Allowable loads have been adjusted for load duration factors, C_D, as shown, in accordance with the NDS. The allowable loads do not apply to loads of other durations, and are not permitted to be adjusted for other load durations. See Sections 4.1 and 4.2 for additional design and installations requirements.

[2]See Section 3.14.3 for required fastener dimensions and mechanical properties.

[3]Allowable loads shown are for installations in wood members complying with Section 3.14.2. Wood members must also have a minimum reference compression perpendicular to grain design value, $F_{c\perp}$, of 625 psi (3.17 MPa).

[4]JL hangers provide torsional resistance, up to a maximum joist depth of H + 1.0 inch (H + 25.4 mm), where torsional resistance is defined as a moment not less than 75 pounds (334 N) times the depth of the joist, at which the lateral movement of the top or bottom of the joist with respect to the vertical position of the joist is 0.125 inch (3.2 mm).

TYPICAL JL INSTALLATION

FIGURE 4—JL STANDARD JOIST HANGERS

TABLE 5—JN AND JNE POWER NAIL HANGER ALLOWABLE LOADS[1,2]

STOCK NO.	JOIST WIDTH	STEEL GAGE	Dimensions (in.)			Fastener Schedule[3,4,5]				Allowable Loads (lbs)[6]			
						Header		Joist		Download			Uplift
			W	H	D	Qty	Type	Qty	Type	C_D=1.0	C_D=1.15	C_D=1.25	C_D=1.6
JN26-2 JN28-2	(2) 1¹/₂ (2) 1¹/₂	18 18	3¹/₁₆ 3¹/₁₆	5³/₈ 7¹/₈	1⁵/₈ 1⁵/₈	8	P-nail	6	P-nail	490	560	610	585
						10	P-nail	6	P-nail	610	700	765	585
						12	P-nail	6	P-nail	730	840	915	585
						14	P-nail	6	P-nail	855	980	1,070	585
						16	P-nail	6	P-nail	975	1,120	1,220	585
						18	P-nail	6	P-nail	1,100	1,265	1,375	585
						20	P-nail	6	P-nail	1,220	1,405	1,525	585
						22	P-nail	6	P-nail	1,340	1,545	1,680	585
						24	P-nail	6	P-nail	1,465	1,685	1,830	585
JN26E JN28E JN210E	1¹/₂ 1¹/₂ 1¹/₂	20 20 20	1⁹/₁₆ 1⁹/₁₆ 1⁹/₁₆	5¹/₄ 6³/₄ 8¹/₄	2 2 2	8	P-nail	4	P-nail	480	550	600	305
						10	P-nail	4	P-nail	600	690	750	305
						12	P-nail	4	P-nail	720	830	900	305
						14	P-nail	4	P-nail	840	965	1,050	305
						16	P-nail	4	P-nail	960	1,105	1,200	305
						18	P-nail	4	P-nail	1,080	1,240	1,310	305
						20	P-nail	4	P-nail	1,325	1,325	1,325	305

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

[1]Allowable loads have been adjusted for load duration factors, C_D, as shown, in accordance with the NDS. The allowable loads do not apply to loads of other durations, and are not permitted to be adjusted for other load durations. See Sections 4.1 and 4.2 for additional design and installation requirements.

[2]Allowable loads shown are for installations in wood members complying with Section 3.14.2.

[3]The fastener designation "P-nail" refers to power-driven nails described in ESR-1539, and must have a minimum diameter, length, and bending yield strength as specified in Section 3.14.3 of this report.

[4]Fasteners must be driven in such a way as firmly seats the nail head against the hanger steel, without embedding the nail head through the plane of the metal surface, or otherwise punching through.

[5]The quantity of nails installed must be equally distributed to both sides of the hanger. The nails must be located within designated prepunched nailing areas at one inch (25.4 mm) spacing in a row, with the vertical rows spaced at ³/₈ inch (9.53 mm); also, nails must be no less than ⁵/₁₆ inch (7.94 mm) from any hanger edge.

[6]JN and JNE hangers provide torsional resistance, up to a maximum joist depth of 10 inches (254 mm), where torsional resistance is defined as a moment not less than 75 pounds (334 N) times the depth of the joist, at which the lateral movement of the top or bottom of the joist with respect to the vertical position of the joist is 0.125 inch (3.2 mm).

TYPICAL JN INSTALLATION

FIGURE 5—JN AND JNE POWER NAIL HANGERS

TABLE 8—THD FACE MOUNT HANGER ALLOWABLE LOADS[1,2,3,4,5]

STOCK NO.	STEEL GAGE	DIMENSIONS (in.)			FASTENER SCHEDULE				ALLOWABLE LOADS (lbs)			
					Header		Joist		Download			Uplift
		W	H	D	Qty	Type	Qty	Type	$C_D = 1.0$	$C_D = 1.15$	$C_D = 1.25$	$C_D = 1.60$
THD26	16	$1\frac{5}{8}$	$5\frac{1}{16}$	3	18	16d Common	12	$10d\times1\frac{1}{2}$	2,645	3,000	3,240	2,265
THD26max	16	$1\frac{5}{8}$	$5\frac{1}{16}$	3	20	16d Common	20	$10d\times1\frac{1}{2}$	2,940	3,240	3,240	2,315
THD28	16	$1\frac{5}{8}$	7	3	28	16d Common	16	$10d\times1\frac{1}{2}$	4,115	4,200	4,200	2,315
THD28max	16	$1\frac{5}{8}$	7	3	28	16d Common	26	$10d\times1\frac{1}{2}$	4,115	4,670	4,975	2,315
THD210	16	$1\frac{5}{8}$	9	3	38	16d Common	20	$10d\times1\frac{1}{2}$	5,315	5,620	5,660	3,775
THD210max	16	$1\frac{5}{8}$	9	3	38	16d Common	32	$10d\times1\frac{1}{2}$	5,585	6,145	6,145	4,035
THD175	14	$1\frac{7}{8}$	5	3	18	16d Common	12	$10d\times1\frac{1}{2}$	2,770	3,125	3,355	2,315
THD177	14	$1\frac{7}{8}$	$6\frac{7}{8}$	3	28	16d Common	16	$10d\times1\frac{1}{2}$	4,310	4,860	5,005	2,315
THD179	14	$1\frac{7}{8}$	$8\frac{7}{8}$	3	38	16d Common	20	$10d\times1\frac{1}{2}$	5,850	6,250	6,455	3,905
THD26-2	14	$3\frac{7}{16}$	$5\frac{1}{8}$	3	18	16d Common	12	10d Common	2,770	3,125	3,355	2,340
THD28-2	14	$3\frac{7}{16}$	$7\frac{1}{8}$	3	28	16d Common	16	10d Common	4,310	4,860	5,005	2,595
THD210-2	14	$3\frac{7}{16}$	$9\frac{1}{8}$	3	38	16d Common	20	10d Common	5,850	6,600	7,045	3,905
THD210-3	12	$5\frac{1}{8}$	9	3	38	16d Common	20	10d Common	6,535	7,255	7,745	4,035
THD210-4	12	$6\frac{1}{4}$	9	3	38	16d Common	20	10d Common	6,535	7,255	7,745	4,035
THD46	14	$3\frac{5}{8}$	$5\frac{5}{16}$	3	18	16d Common	12	10d Common	2,770	3,125	3,355	2,340
THD48	14	$3\frac{5}{8}$	$7\frac{1}{16}$	3	28	16d Common	16	10d Common	4,310	4,860	5,005	2,595
THD410	14	$3\frac{5}{8}$	$9\frac{1}{16}$	3	38	16d Common	20	10d Common	5,850	6,600	7,045	3,905
THD412	14	$3\frac{5}{8}$	11	3	48	16d Common	20	10d Common	7,045	7,045	7,045	3,905
THD414	14	$3\frac{5}{8}$	$12\frac{7}{8}$	3	58	16d Common	20	10d Common	7,045	7,045	7,045	3,905
THD610	12	$5\frac{1}{2}$	9	3	38	16d Common	20	10d Common	6,535	7255	7,745	4,035
THD612	12	$5\frac{1}{2}$	11	3	48	16d Common	20	10d Common	8,255	8,435	8,435	4,035
THD614	12	$5\frac{1}{2}$	$12\frac{7}{8}$	3	58	16d Common	20	10d Common	8,435	8,435	8,435	4,035
THD7210	12	$7\frac{1}{4}$	9	3	38	16d Common	20	10d Common	6,535	7,255	7,745	4,035

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.895 kPa.

[1]Allowable loads have been adjusted for load duration factors, C_D, as shown, in accordance with the NDS. The allowable loads do not apply to loads of other durations, and are not permitted to be adjusted for other load durations. See Sections 4.1 and 4.2 for additional design and installations requirements.
[2]See Section 3.14.3 for required fastener dimensions and mechanical properties.
[3]Allowable loads shown are for installations in wood members complying with Section 3.14.2. Wood members must also have a minimum reference compression perpendicular to grain design value, $F_{c\perp}$, of 625 psi.
[4]THD hangers provide torsional resistance, up to a maximum joist depth of H + 1.0 inch (H + 25.4 mm), where torsional resistance is defined as a moment not less than 75 pounds (334 N) times the depth of the joist, at which the lateral movement of the top or bottom of the joist with respect to the vertical position of the joist is 0.125 inch (3.2 mm).
[5]Some THD models feature nail holes along the bend line that must be filled with nails, driven into the header at a 45° angle, to achieve the tabulated allowable loads.

FIGURE 8—THD FACE MOUNT HANGER

TABLE 9—THDH FACE MOUNT HANGER ALLOWABLE LOADS[1,2,3,4]

STOCK NO.	STEEL GAGE	DIMENSIONS (in.)			FASTENER SCHEDULE				ALLOWABLE LOADS (lbs)			
		W	H	D	Header		Joist		Download			Uplift
					Qty	Type	Qty	Type	$C_D = 1.0$	$C_D = 1.15$	$C_D = 1.25$	$C_D = 1.6$
THDH26	12	$1\frac{5}{8}$	$5\frac{7}{16}$	5	20	16d Common	8	16d Common	4,375	4,895	5,180	2,805
THDH28	12	$1\frac{5}{8}$	$7\frac{3}{16}$	5	36	16d Common	12	16d Common	7,595	8,175	8,175	4,345
THDH210	12	$1\frac{5}{8}$	$9\frac{3}{16}$	5	46	16d Common	16	16d Common	9,310	9,710	9,710	5,290
THDH27925	12	$2\frac{3}{4}$	$9\frac{1}{4}$	4	46	16d Common	12	16d Common	9,020	9,020	9,020	4,345
THDH27112	12	$2\frac{3}{4}$	$10\frac{7}{8}$	4	56	16d Common	14	16d Common	9,710	9,710	9,710	4,345
THDH2714	12	$2\frac{3}{4}$	$12\frac{1}{4}$	4	66	16d Common	16	16d Common	11,185	11,325	11,325	5,290
THDH26-2	12	$3\frac{7}{16}$	$5\frac{3}{8}$	4	20	16d Common	8	16d Common	4,375	4,895	5,180	2,805
THDH28-2	12	$3\frac{7}{16}$	$7\frac{1}{8}$	4	36	16d Common	10	16d Common	7,360	8,175	8,175	3,000
THDH210-2	12	$3\frac{7}{16}$	$9\frac{1}{8}$	4	46	16d Common	12	16d Common	9,020	9,020	9,020	4,345
THDH212-2	12	$3\frac{3}{8}$	$10\frac{1}{2}$	4	56	16d Common	14	16d Common	9,710	9,710	9,710	4,345
THDH214-2	12	$3\frac{3}{8}$	$12\frac{1}{4}$	4	66	16d Common	16	16d Common	11,325	11,325	11,325	5,290
THDH3210	12	$3\frac{7}{16}$	$9\frac{3}{8}$	4	46	16d Common	12	16d Common	9,020	9,020	9,020	4,345
THDH3212	12	$3\frac{7}{16}$	$10\frac{5}{8}$	4	56	16d Common	14	16d Common	9,710	9,710	9,710	5,290
THDH46	12	$3\frac{9}{16}$	$5\frac{3}{8}$	4	20	16d Common	8	16d Common	4,375	4,895	5,180	2,805
THDH48	12	$3\frac{9}{16}$	$7\frac{1}{8}$	4	36	16d Common	10	16d Common	7,360	8,175	8,175	3,000
THDH410	12	$3\frac{9}{16}$	$9\frac{1}{8}$	4	46	16d Common	12	16d Common	9,020	9,020	9,020	4,345
THDH412	12	$3\frac{9}{16}$	$10\frac{1}{2}$	4	56	16d Common	14	16d Common	9,710	9,710	9,710	5,290
THDH414	12	$3\frac{9}{16}$	$13\frac{1}{16}$	4	66	16d Common	16	16d Common	11,325	11,325	11,325	5,305
THDH26-3	12	$5\frac{1}{8}$	$5\frac{7}{16}$	4	20	16d Common	8	16d Common	4,375	4,895	5,180	2,805
THDH28-3	12	$5\frac{1}{8}$	$7\frac{3}{16}$	4	36	16d Common	12	16d Common	7,595	8,175	8,175	4,345
THDH210-3	12	$5\frac{1}{8}$	$9\frac{3}{16}$	4	46	16d Common	16	16d Common	9,710	9,710	9,710	5,290
THDH212-3	12	$5\frac{1}{8}$	$11\frac{3}{16}$	4	56	16d Common	20	16d Common	9,530	9,530	9,530	5,290
THDH214-3	12	$5\frac{1}{8}$	$13\frac{1}{16}$	4	66	16d Common	22	16d Common	11,325	11,325	11,325	5,305
THDH5210	12	$5\frac{3}{8}$	$9\frac{1}{8}$	4	46	16d Common	16	16d Common	9,710	9,710	9,710	5,290
THDH5212	12	$5\frac{3}{8}$	$11\frac{1}{8}$	4	56	16d Common	20	16d Common	9,530	9,530	9,530	5,290
THDH5214	12	$5\frac{3}{8}$	$13\frac{1}{8}$	4	66	16d Common	22	16d Common	11,325	11,325	11,325	5,305
THDH610	12	$5\frac{1}{2}$	9	4	46	16d Common	16	16d Common	9,020	9,020	9,020	5,290
THDH612	12	$5\frac{1}{2}$	11	4	56	16d Common	20	16d Common	9,530	9,530	9,530	5,290
THDH614	12	$5\frac{1}{2}$	13	4	66	16d Common	22	16d Common	11,325	11,325	11,325	5,305
THDH26-4	12	$6\frac{9}{16}$	$5\frac{7}{16}$	4	20	16d Common	8	16d Common	4,375	4,895	5,180	2,805
THDH28-4	12	$6\frac{7}{16}$	$7\frac{9}{16}$	4	36	16d Common	12	16d Common	7,595	8,175	8,175	4,345
THDH6710	12	$6\frac{7}{8}$	$8\frac{13}{16}$	4	46	16d Common	12	16d Common	9,020	9,020	9,020	4,345
THDH6712	12	$6\frac{7}{8}$	$10\frac{13}{16}$	4	56	16d Common	14	16d Common	9,020	9,020	9,020	5,290
THDH6714	12	$6\frac{7}{8}$	$12\frac{13}{16}$	4	66	16d Common	16	16d Common	11,325	11,325	11,325	5,305
THDH7210	12	$7\frac{1}{4}$	9	4	46	16d Common	12	16d Common	9,020	9,020	9,020	4,345
THDH7212	12	$7\frac{1}{4}$	$10\frac{1}{2}$	4	56	16d Common	14	16d Common	9,020	9,020	9,020	5,290
THDH7214	12	$7\frac{1}{4}$	$12\frac{1}{4}$	4	66	16d Common	16	16d Common	11,325	11,325	11,325	5,305

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

[1]Allowable loads have been adjusted for load duration factors, C_D, as shown, in accordance with the NDS. The allowable loads do not apply to loads of other durations, and are not permitted to be adjusted for other load durations. See Sections 4.1 and 4.2 for additional design and installation requirements.
[2]Allowable loads shown are for installations in wood members complying with Section 3.14.2.
[3]See Section 3.14.3 for required fastener dimensions and mechanical properties.
[4]THDH hangers provide torsional resistance, up to a maximum joist depth of H + 1.0 inch (H + 25.4 mm) where torsional resistance is defined as a moment not less than 75 pounds (334 N) times the depth of the joist, at which the lateral movement of the top or bottom of the joist with respect to the vertical position of the joist is 0.125 inch (3.2 mm).
[5]Allowable loads shown are for installations in wood members complying with Section 3.11.2.
[6]Wood members must also have a minimum reference compression perpendicular to grain design value, $F_{c\perp}$, of 625 psi.
[7]Joist nails must be driven horizontally into the joist at an angle of 30- to 45-degrees from normal, such that they penetrate through the joist, and into the header.

FIGURE 9—THDH FACE MOUNT HANGER

TABLE 11—THFI FACE MOUNT HANGER ALLOWABLE LOADS[1,2,3,4]

STOCK NO.	STEEL GAGE	HANGER DIMENSIONS (in.) W	H	D	MIN/ MAX	FASTENING SCHEDULE Header[6] Qty	Header[6] Type	Joist[5] Qty	Joist[5] Type	ALLOWABLE LOADS (lbs) Download C_D = 1.0	Download C_D = 1.15	Download C_D = 1.25	Uplift C_D = 1.6
THFI1795	18	1 7/8	9 1/2	2	-	8	10d Common	-	-	960	1,095	1,180	125
THFI17118	18	1 7/8	11 7/8	2	-	10	10d Common	-	-	1,200	1,265	1,265	125
THFI1714	18	1 7/8	14	2	Min	12	10d Common	-	-	1,440	1,640	1,770	125
THFI1714	18	1 7/8	14	2	Max	14	10d Common	-	-	1,680	1,915	2,065	125
THFI1716	18	1 7/8	16	2	Min	14	10d Common	-	-	1,680	1,915	2,065	125
THFI1716	18	1 7/8	16	2	Max	16	10d Common	-	-	1,920	2,190	2,190	125
THFI2095	18	2 1/8	9 1/2	2	-	8	10d Common	-	-	960	1,095	1,180	125
THFI20118	18	2 1/8	11 7/8	2	-	10	10d Common	-	-	1,200	1,265	1,265	125
THFI2014	18	2 1/8	14	2	Min	12	10d Common	-	-	1,440	1,640	1,770	125
THFI2014	18	2 1/8	14	2	Max	14	10d Common	-	-	1,680	1,915	2,065	125
THFI2016	18	2 1/8	16	2	Min	14	10d Common	-	-	1,680	1,915	2,065	125
THFI2016	18	2 1/8	16	2	Max	16	10d Common	-	-	1,920	2,190	2,265	125
THFI2395	18	2 3/8	9 1/2	2	-	8	10d Common	-	-	960	1,095	1,180	125
THFI23118	18	2 3/8	11 7/8	2	-	10	10d Common	-	-	1,200	1,265	1,265	125
THFI2314	18	2 3/8	14	2	Min	12	10d Common	-	-	1,440	1,640	1,770	125
THFI2314	18	2 3/8	14	2	Max	14	10d Common	-	-	1,680	1,915	2,065	125
THFI2316	18	2 3/8	16	2	Min	14	10d Common	-	-	1,680	1,915	2,065	125
THFI2316	18	2 3/8	16	2	Max	16	10d Common	-	-	1,920	2,190	2,265	125
THFI25925	18	2 5/8	9 1/4	2	-	8	10d Common	-	-	960	1,095	1,180	125
THFI2595	18	2 5/8	9 1/2	2	-	8	10d Common	-	-	960	1,095	1,180	125
THFI25118	18	2 5/8	11 7/8	2	-	10	10d Common	-	-	1,200	1,265	1,265	125
THFI2514	18	2 5/8	14	2	Min	12	10d Common	-	-	1,440	1,640	1,770	125
THFI2514	18	2 5/8	14	2	Max	14	10d Common	-	-	1,680	1,915	2,065	125
THFI2516	18	2 5/8	16	2	Min	14	10d Common	-	-	1,680	1,915	2,065	125
THFI2516	18	2 5/8	16	2	Max	16	10d Common	-	-	1,920	2,190	2,265	125
THFI3595	18	3 5/8	9 1/2	2	-	10	10d Common	-	-	1,200	1,265	1,265	125
THFI35118	18	3 5/8	11 7/8	2	-	12	10d Common	-	-	1,440	1,640	1,770	125
THFI3514	18	3 5/8	14	2	Min	12	10d Common	-	-	1,440	1,640	1,770	125
THFI3514	18	3 5/8	14	2	Max	14	10d Common	-	-	1,680	1,915	2,065	125
THFI3516	18	3 5/8	16	2	Min	14	10d Common	-	-	1,680	1,915	2,065	125
THFI3516	18	3 5/8	16	2	Max	16	10d Common	-	-	1,920	2,190	2,265	125

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.895 kPa.

[1]Allowable loads have been adjusted for load duration factors, C_D, as shown, in accordance with the NDS. The allowable loads do not apply to loads of other durations, and are not permitted to be adjusted for other load durations. See Sections 4.1 and 4.2 for additional design and installations requirements.
[2]See Section 3.14.3 for required fastener dimensions and mechanical properties.
[3]Allowable loads shown are for installations in wood members complying with Section 3.14.2. Wood members must also have a minimum reference compression perpendicular to grain design value, $F_{c\text{-perp}}$, of 625 psi (4.31 MPa).
[4]For minimum (Min) nailing configuration, all round nail holes must be filled with nails. For maximum (Max) nailing configuration, all round and diamond holes must be filled with nails. The joist hangers are not intended for use with intermediate numbers of fasteners.
[5]Joists are held in hangers using seat cleats.
[6]Reinforce supporting I-joist headers as required per manufacturer's instructions

FIGURE 11—THFI FACE MOUNT HANGER

TABLE 12—LGU / MGU / HGU GIRDER HANGER ALLOWABLE LOADS

STOCK NO.	STEEL GAGE	DIMENSIONS (in.) W	H[1]	H_1	D	FASTENER SCHEDULE Header Qty	Header Type[3]	Joist Qty	Joist Type	ALLOWABLE LOADS[2,4] (lbs) Download C_D = 1.0	Download C_D = 1.15	Download C_D = 1.25	Uplift C_D = 1.6
LGU325	10	3 1/4	Specify	7 3/8	4 1/2	18	WS3	12	WS3	7,135	7,410	7,410	3,975
LGU363	10	3 5/8	Specify	7 3/8	4 1/2	18	WS3	12	WS3	7,135	7,410	7,410	3,975
LGU525	10	5 1/4	Specify	7 3/8	4 1/2	18	WS3	12	WS3	7,135	7,410	7,410	3,975
MGU363	10	3 5/8	Specify	8 5/8	4 1/2	24	WS3	16	WS3	9,515	10,940	11,890	5,060
MGU525	10	5 1/4	Specify	8 5/8	4 1/2	24	WS3	16	WS3	9,515	10,940	11,890	5,060
MGU550	10	5 1/2	Specify	8 5/8	4 1/2	24	WS3	16	WS3	9,515	10,940	11,890	5,060
MGU562	10	5 5/8	Specify	8 5/8	4 1/2	24	WS3	16	WS3	9,515	10,940	11,890	5,060
MGU700	10	7	Specify	8 5/8	4 1/2	24	WS3	16	WS3	9,515	10,940	11,890	5,060
HGU363	7	3 5/8	Specify	10 3/8	5 1/4	38	WS3	24	WS3	14,705	14,990	14,990	7,375
HGU525	7	5 1/4	Specify	10 3/8	5 1/4	38	WS3	24	WS3	14,705	14,990	14,990	7,375
HGU550	7	5 1/2	Specify	10 3/8	5 1/4	38	WS3	24	WS3	14,705	14,990	14,990	7,375
HGU562	7	5 5/8	Specify	10 3/8	5 1/4	38	WS3	24	WS3	14,705	14,990	14,990	7,375
HGU700	7	7	Specify	10 3/8	5 1/4	38	WS3	24	WS3	14,705	14,990	14,990	7,375
HGU725	7	7 1/4	Specify	10 3/8	5 1/4	38	WS3	24	WS3	14,705	14,990	14,990	7,375
HGU900	7	9	Specify	10 3/8	5 1/4	38	WS3	24	WS3	14,705	14,990	14,990	7,375

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.895 kPa.

[1]The minimum supported member heights, H, for the LGU, MGU, and HGU are 8", 9 1/4", and 11", respectively.
[2]Allowable loads have been adjusted for load duration factors, C_D, as shown, in accordance with the NDS. The allowable loads do not apply to loads of other durations, and are not permitted to be adjusted for other load durations. See Sections 4.1 and 4.2 for additional design and installations requirements.
[3]The WS3 is a 1/4" x 3" self-drilling screw described in ESR-2761 and are included with the hangers.
[4]Allowable loads shown are for installations in wood members complying with Section 3.14.2. Wood members must also have a minimum reference compression perpendicular to grain design value, $F_{c\text{-perp}}$, of 625 psi (4.31 MPa).

FIGURE 12—LGU / MGU / HGU GIRDER HANGER

TABLE 14—IHF JOIST HANGER ALLOWABLE LOADS[1,2,3,4,5,6] (Continued)

STOCK NO.	STEEL GAGE	DIMENSIONS (inches)			FASTENER SCHEDULE					ALLOWABLE LOADS (lbs.)			
		W	H	D	Nailing Configu-ration	Header		Joist		$F_{c\perp}$ = 750 psi			Uplift
						Qty	Type	Qty	Type	C_D =1.0	C_D =1.15	C_D =1.25	C_D =1.6
IHF15925-2	16	3 1/8	9 1/16	2 1/2	MIN	10	10d Common	2	10d Common	1,250	1,375	1,375	330
					MAX	24	16d Common	2	10d Common	3,530	4,000	4,320	330
IHF15112-2	16	3 1/8	10 11/16	2 1/2	MIN	10	10d Common	2	10d Common	1250	1,375	1,375	330
					MAX	24	16d Common	2	10d Common	3,530	3,960	3,960	330
IHF16925-2	16	3 5/8	9 1/16	2 1/2	MIN	10	10d Common	2	10d Common	1,250	1,375	1,375	330
					MAX	24	16d Common	2	10d Common	3,530	4,000	4,320	330
IHF16112-2	16	3 5/8	10 7/8	2 1/2	MIN	10	10d Common	2	10d Common	1,250	1,375	1,375	330
					MAX	24	16d Common	2	10d Common	3,530	3,960	3,960	330
IHF35925	16	3 1/2	8 5/8	2 1/2	MIN	10	10d Common	2	10d x 1 1/2	1,250	1,375	1,375	330
					MAX	24	16d Common	2	10d x 1 1/2	3,530	4,000	4,320	330
IHF35112	16	3 1/2	10 5/8	2 1/2	MIN	10	10d Common	2	10d x 1 1/2	1,250	1,375	1,375	330
					MAX	24	16d Common	2	10d x 1 1/2	3,530	3,960	3,960	330
IHF3514	16	3 1/2	12 15/16	2 1/2	MIN	12	10d Common	2	10d x 1 1/2	1,500	1,685	1,815	330
					MAX	28	16d Common	2	10d x 1 1/2	4,115	4,440	4,440	330
IHF3516	16	3 1/2	15	2 1/2	MIN	14	10d Common	2	10d x 1 1/2	1,750	1,965	2,120	330
					MAX	30	16d Common	2	10d x 1 1/2	4,410	4,440	4,440	330
IHF3518	16	3 1/2	16 9/16	2 1/2	MIN	14	10d Common	2	10d x 1 1/2	1,750	1,965	2,120	330
					MAX	30	16d Common	2	10d x 1 1/2	4,410	4,440	4,440	330
IHF20925-2	16	4 3/16	8 11/16	2 1/2	MIN	10	10d Common	2	10d Common	1,250	1,405	1,515	330
					MAX	24	16d Common	2	10d Common	3,530	3,960	3,960	330
IHF20112-2	16	4 3/16	11	2 1/2	MIN	10	10d Common	2	10d Common	1,250	1,405	1,515	330
					MAX	24	16d Common	2	10d Common	3,530	3,960	3,960	330
IHF2014-2	16	4 3/16	13 1/8	2 1/2	MIN	12	10d Common	2	10d Common	1,500	1,685	1,815	330
					MAX	28	16d Common	2	10d Common	3,960	3,960	3,960	330
IHF23925-2	16	4 3/4	8 7/8	2 1/2	MIN	10	10d Common	2	10d Common	1,250	1,405	1,515	330
					MAX	24	16d Common	2	10d Common	3,530	3,960	3,960	330
IHF25925-2	16	5 1/8	8 13/16	2 1/2	MIN	10	10d Common	2	10d Common	1,250	1,405	1,515	330
					MAX	24	16d Common	2	10d Common	3,530	3,960	3,960	330
IHF25112-2	16	5 1/8	10 7/16	2 1/2	MIN	10	10d Common	2	10d Common	1,250	1,405	1,515	330
					MAX	24	16d Common	2	10d Common	3,530	3,960	3,960	330

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi =6.895 kPa.

[1]Allowable loads have been adjusted for load duration factors, C_D, as shown, in accordance with the NDS. The allowable loads do not apply to loads of other durations, and are not permitted to be adjusted for other load durations. See Sections 4.1 and 4.2 for additional design and installation requirements.
[2]See Section 3.16.3 and 3.16.4 for fastener requirements.
[3]Allowable loads shown are for installations in wood members complying with Section 3.16.2. Wood I-joist flanges must have a minimum reference compression perpendicular to grain design value, $F_{c\perp}$, of 750 psi.
[4]Fill all round header nail holes for MIN nailing; and all round and diamond nail holes for MAX nailing. The joist hangers are not intended for use with intermediate numbers of fasteners.
[5]Diamond joist nail holes must be filled to achieve the tabulated uplift. With no joist nails installed, allowable uplift of 65 lbs is provided by Seat Cleat® engagement with I-joist flange.
[6]Web stiffeners are not required unless specified by the wood I-joist manufacturer.

IHF

TYPICAL IHF INSTALLATION

TYPICAL IHF DOUBLE I-JOIST TO HEADER INSTALLATION

FIGURE 14—IHF FACE MOUNT HANGER

TABLE 15—IHFL JOIST HANGER ALLOWABLE LOADS[1,2,3,4,5,6]

STOCK NO.	STEEL GAGE	DIMENSIONS (inches)			FASTENER SCHEDULE				ALLOWABLE LOADS (lbs.)			ALLOWABLE LOADS (lbs.)			
		W	H	D	Nailing Configu-ration	Header		Joist	$F_{c\perp}$ = 625 psi			$F_{c\perp}$ = 750 psi			Uplift [6]
						Qty	Type		C_D =1.0	C_D =1.15	C_D =1.25	C_D =1.0	C_D =1.15	C_D =1.25	C_D =1.6
IHFL15925	18	1 1/2	9 1/16	2 1/2	–	8	10d Common	–	960	1,095	1,180	960	1,095	1,180	50
IHFL15112	18	1 1/2	11 1/16	2 1/2	–	10	10d Common	–	1,200	1,370	1,475	1,200	1,370	1,475	50
IHFL17925	18	1 3/4	8 15/16	2 1/2	–	8	10d Common	–	960	1,095	1,180	960	1,095	1,180	50
IHFL17112	18	1 3/4	10 15/16	2 1/2	–	10	10d Common	–	1,200	1,370	1,475	1,200	1,370	1,475	50
IHFL1714	18	1 3/4	13 3/8	2 1/2	MIN	12	10d Common	–	1,440	1,640	1,770	1,440	1,640	1,770	50
					MAX	14	10d Common	–	1,680	1,915	2,065	1,680	1,915	2,065	50
IHFL1716	18	1 3/4	15 7/8	2 1/2	MIN	14	10d Common	–	1,680	1,915	2,065	1,680	1,915	2,065	50
					MAX	16	10d Common	–	1,920	2,190	2,360	1,920	2,190	2,360	50
IHFL20925	18	2 1/16	8 3/4	2 1/2	–	8	10d Common	–	960	1,095	1,180	960	1,095	1,180	50
IHFL20112	18	2 1/16	11 5/16	2 1/2	–	10	10d Common	–	1,200	1,370	1,475	1,200	1,370	1,475	50
IHFL2014	18	2 1/16	13 3/16	2 1/2	MIN	12	10d Common	–	1,440	1,640	1,770	1,440	1,640	1,770	50
					MAX	14	10d Common	–	1,680	1,915	2,065	1,680	1,915	2,065	50
IHFL2016	18	2 1/16	15 11/16	2 1/2	MIN	14	10d Common	–	1,680	1,915	2,065	1,680	1,915	2,065	50
					MAX	16	10d Common	–	1,920	2,190	2,360	1,920	2,190	2,360	50
IHFL23925	18	2 5/16	9 3/16	2 1/2	–	8	10d Common	–	960	1,095	1,180	960	1,095	1,180	50
IHFL23112	18	2 5/16	11 3/16	2 1/2	–	10	10d Common	–	1,200	1,370	1,475	1,200	1,370	1,475	50
IHFL2314	18	2 5/16	13 1/2	2 1/2	MIN	12	10d Common	–	1,440	1,640	1,770	1,440	1,640	1,770	50
					MAX	14	10d Common	–	1,680	1,915	2,065	1,680	1,915	2,065	50
IHFL2316	18	2 5/16	15 9/16	2 1/2	MIN	14	10d Common	–	1,680	1,915	2,065	1,680	1,915	2,065	50
					MAX	16	10d Common	–	1,920	2,190	2,360	1,920	2,190	2,360	50
IHFL25925	18	2 1/2	9 1/8	2 1/2	–	8	10d Common	–	960	1,095	1,180	960	1,095	1,180	50
IHFL25112	18	2 1/2	11 1/8	2 1/2	–	10	10d Common	–	1,200	1,370	1,475	1,200	1,370	1,475	50
IHFL2514	18	2 1/2	13 7/16	2 1/2	MIN	12	10d Common	–	1,440	1,640	1,770	1,440	1,640	1,770	50
					MAX	14	10d Common	–	1,680	1,915	2,065	1,680	1,915	2,065	50
IHFL2516	18	2 1/2	15 1/2	2 1/2	MIN	14	10d Common	–	1,680	1,915	2,065	1,680	1,915	2,065	50
					MAX	16	10d Common	–	1,920	2,190	2,360	1,920	2,190	2,360	50
IHFL35925	18	3 1/2	8 5/8	2 1/2	–	10	10d Common	–	1,200	1,370	1,475	1,200	1,370	1,475	50
IHFL35112	18	3 1/2	10 5/8	2 1/2	MIN	10	10d Common	–	1,200	1,370	1,475	1,200	1,370	1,475	50
					MAX	12	10d Common	–	1,440	1,640	1,770	1,440	1,640	1,770	50
IHFL3514	18	3 1/2	12 15/16	2 1/2	MIN	12	10d Common	–	1,440	1,640	1,770	1,440	1,640	1,770	50
					MAX	14	10d Common	–	1,680	1,915	2,065	1,680	1,915	2,065	50
IHFL3516	18	3 1/2	15	2 1/2	MIN	14	10d Common	–	1,680	1,915	2,065	1,680	1,915	2,065	50
					MAX	16	10d Common	–	1,920	2,190	2,360	1,920	2,190	2,360	50

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi =6.895 kPa.

[1]Allowable loads have been adjusted for load duration factors, C_D, as shown, in accordance with the NDS. The allowable loads do not apply to loads of other durations, and are not permitted to be adjusted for other load durations. See Sections 4.1 and 4.2 for additional design and installation requirements.
[2]See Section 3.16.3 and 3.16.4 for fastener requierments.
[3]Allowable loads shown are for installations in wood members complying with Section 3.16.2. Wood members must also have a minimum reference compression perpendicular to grain as shown above for utilization of the associated design value.
[4]Fill all round header nail holes for MIN nailing; and all round and diamond header nail holes for MAX nailing. The joist hangers are not intended for use with intermediate numbers of fasteners.
[5]Web stiffeners are not required unless specified by the I-joist manufacturer.
[6]Uplift resistance provided by Seat Cleat® engagement with I-joist flange. For additional uplift capacity, install (2) 10d x 1-1/2" nails through diamond holes in the bucket and into the joist member. Under these installation conditions, the allowable uplift load is 220 lbs (160%).

IHFL

TYPICAL IHFL INSTALLATION

FIGURE 15—IHFL FACE MOUNT HANGER

ESR-3445 FBC Supplement

Reissued October 2020

This report is subject to renewal October 2022.

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 05 23—Wood, Plastic, and Composite Fastenings

REPORT HOLDER:

MITEK®, INC.

EVALUATION SUBJECT:

MiTek USP FACE MOUNT HANGERS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that MiTek USP face mount hangers for connecting wood framing members, described in ICC-ES evaluation report ESR-3445, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2020 and 2017 *Florida Building Code—Building*
- 2020 and 2017 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The that MiTek USP face mount hangers, described in Sections 2.0 through 7.0 of the evaluation report ESR-3445, comply with the *Florida Building Code—Building* and the *Florida Building Code—Residential*, provided the design requirements are determined in accordance with the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable. The installation requirements noted in ICC-ES evaluation report ESR-3445 for the 2018 and 2015 *International Building Code®* meet the requirements of the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable.

Use of the MiTek USP Face Mount Hangers has also been found to be in compliance with the High-Velocity Hurricane Zone (HVHZ) provisions of the *Florida Building Code—Building* and the *Florida Building Code—Residential* with the following condition:

a) For connections subject to uplift, the connection must be designed for no less than 700 pounds (3114 N).

For products falling under Florida Rule 61G20-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official, when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report ESR-3445, reissued October 2020.

Additional Documents
Submitted by
Augusta County

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COUNTY OF AUGUSTA

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF COMMUNITY DEVELOPMENT
P.O. BOX 590
COUNTY GOVERNMENT CENTER
VERONA, VA 24482-0590

March 31, 2021

Office of the State Technical Review Board
600 East Main Street, Suite 300
Richmond VA, 23219

Members of the Board:

I am sending this updated letter due to additional information which has been submitted to our office regarding the trusses in item #6 of my February 17, 2021 letter to you. I have copied that part of the letter in the next paragraph for your reference. The appeal number is 21-02.

Item 6: On my July 8, 2020 inspection, Mrs. Davis showed me a photo of the trusses on the 2 X beam. She stated then that it was supposed to be a LVL. Our office performed the framing inspection on 11/12/2019 and I did not believe we would have missed something like that but out of an abundance of caution, I informed the contactor that an engineer would need to evaluate and approve or design repairs if needed. The engineer's report on item #3 states that the beam is adequate to safely support the loads at this location. He also looked at some additional trusses that were questioned by the Davises' and found them in compliance.

While I still feel that the Schnitzhofer engineering report satisfies these issues, some new truss issues have been discovered which will require additional evaluation. As such I cannot say all of the truss issues have been resolved on the project, just the ones in the Schnitzhofer report.

Basically, after my review of the report, and the new information I have received I found the report only fully resolved items 8, and 12 of the corrections letter to the contractor.

Sincerely,

G.W. Wiseman

G.W. Wiseman
Building Official

Staunton (540) 245-5700 | TOLL FREE NUMBERS From Deerfield (540) 939-4111 FAX (540) 245-5066 | Waynesboro (540) 942-5113

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VIRGINIA:

BEFORE THE
STATE BUILDING CODE TECHNICAL REVIEW BOARD

IN RE: Appeal of Anthony T. Grant Jr.
Appeal No. 21-03

CONTENTS

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VIRGINIA:

BEFORE THE
STATE BUILDING CODE TECHNICAL REVIEW BOARD

IN RE: Appeal of Anthony T. Grant
Appeal No. 21-03

REVIEW BOARD STAFF DOCUMENT

Suggested Statement of Case History and Pertinent Facts

1. In May of 2015, the City of Suffolk Planning and Community Development Office (City building official), the agency responsible for the enforcement of Part 1 of the 2009 Virginia Uniform Statewide Building Code (Virginia Construction Code or VCC), issued a final inspection and a subsequent Certificate of Occupancy to KEBCO, Inc. (KEBCO), a licensed Class A contractor, for a single-family dwelling it built at 4281 Cole Avenue in Suffolk.

2. In June of 2015, Ashley and Anthony T. Grant Jr. (Grant) purchased the dwelling from KEBCO.

3. In July of 2016, the City of Suffolk issued a summons to KEBCO. The summons listed three violations one of which was, Section M1401.3 "Improper sizing of heating and cooling equipment and appliances, Differences between original information submitted and 2nd reevaluation submitted."

4. In November of 2017 Grant filed an appeal to the City appeals board. In January of 2017, the City appeals board heard Grant's appeal and ruled to uphold the City building official's decision on several VCC Sections. The City appeals board also modified the City building official's decision concerning VCC Section M1401.3 (*Equipment and appliance sizing*) requiring additional testing; and chose to not render a decision.

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5. Review Board staff conducted an informal fact-finding conference (IFFC) in April of 2017. At the conference it was determined that since the City appeals board had modified, and not upheld or reversed the City building official's decision on the sizing of the heating and cooling system, that issue would not be included in the issues for consideration by the Review Board. In that regard, staff explained to the parties that once the City building official made a determination on that issue, specifically whether the heating and cooling system was properly sized for the home, Grant could then choose whether to appeal the issue to the City appeals board.

6. Grant further appealed to the Review Board on March 2, 2017. The appeal was heard at the June 15, 2017 Review Board meeting; however, as agreed upon at the IFFC in April of 2017, the Review Board did not hear the issue related to M1401.3 (*Equipment and appliance sizing*) as the local board has not yet ruled on the issue.

7. On March 28, 2017, through a memorandum from the Assistant Director of Community Development to the Chairman of the City appeals board, the City determined the size of the heating and cooling system was sufficient. Grant appealed the decision to the City appeals board.

8. In November of 2017, the City appeals board heard Grant's appeal and ruled to uphold the Assistant Director of Community Development's decision that the heating and cooling system was sized appropriately. Mr. Grant did not receive notification of the meeting; therefore, the City appeals board re-heard Grant's appeal in April of 2018 and again ruled to uphold the City Assistant Director of Community Development's decision that the heating and cooling system was sized appropriately.

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9. Grant further appealed to the Review Board on June 26, 2018. The Review Board heard Grant's appeal at its November 16, 2018 meeting; the Review Board final order was approved at the January 11, 2019 meeting where the Review Board overturned the decision of the City appeals board that the HVAC system was properly sized. The Review Board remanded the matter back to the City appeals board "for a better evaluation of the HVAC system based on the Manual S, J, and D calculations including all inputs to include but not limited to roof color, coefficient of shading, air changes per day, and insulated values of windows, doors, walls, ceilings and floors from the "as built" HVAC system conditions and calculations in order to make the determination as to the adequacy of the HVAC system within 60 days. The Review Board strongly suggests the City appeals board require this information from a third party HVAC contractor in addition to what may be provided by Able's."

10. Due to the lack of action by the City appeals board, on July 27, 2020 Grant, through his attorney, filed a Show Cause Order or Enforcement of Decision of the State Building Code Technical Review Board against the City of Suffolk, in the City of Suffolk Circuit Court.

11. On January 27, 2021, the City appeals board again ruled to uphold the decision of the City building official that the heating and cooling system was sized appropriately.

12. On February 23, 2021, Grant further appealed to the Review Board stating that the City appeals board had not complied with the Review Board Remand Order dated January 11, 2019.

13. This staff document along with a copy of all documents submitted will be sent to the parties and opportunity given for the submittal of additions, corrections or objections to the staff document, and the submittal of additional documents or written arguments to be included in

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the information distributed to the Review Board members for the appeal hearing before the Review Board.

Suggested Issue for Resolution by the Review Board

1. Whether the City of Suffolk has complied with the Remand Order dated January 11, 2019.

If the Review Board finds that the City of Suffolk has not complied with the Remand Order dated January 1, 2019 then:

2. How to handle the City's refusal to comply with the Remand Order dated January 11, 2019.

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Basic Documents

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5/27/2015

3:31PM

CERTIFICATE OF OCCUPANCY

This certificate is issued pursuant to the requirements of the Uniform Statewide Building Code, Zoning Ordinances and other applicable codes and ordinances certifying that at the time of issuance this structure is in compliance with the above mentioned codes and ordinances.

Owner or Contractor: **KEBCO ENTERPRISES INC**
1332 CAMBRIDGE WAY
CHESAPEAKE, VA 23320

Project No: **PRJ2014-02946**

Use Class: **NWR** **SFD** Bldg. Permit No: BLD2014-01071

Group:	***Occupancy Load:***	***Type Construction:***
R5		**5B**

Building Address: **4281 COLE AV**

Building Official: John S. Wilson **Date:** 5/27/2015

VAUSBC CODE EDITION 2009

Post on the Premises in a Conspicuous Place
Shall Not Be Removed Except by Building Official

This Certificate of Occupancy is not transferrable and becomes invalid upon any change of use or occupancy, or any changes to the building or premises, or upon any violation of the Uniform Statewide Building Code.

GREGORY S. BEAN
GBEAN@GRSM.COM
DIRECT DIAL: 757-903-0872
DIRECT FAX: 757-401-6770

GORDON&REES
SCULLY MANSUKHANI
YOUR 50 STATE PARTNER™

ATTORNEYS AT LAW
5425 DISCOVERY PARK BOULEVARD SUITE 200
WILLIAMSBURG, VA 23188
WWW.GRSM.COM

July 27, 2020

BY FEDEX OVERNIGHT

Hon. W. R. Carter Jr., Clerk
P.O. Box 1604
Mills E. Godwin, Jr. Courts Bldg.
150 North Main Street
Suffolk, VA 23439-1604

Re: Anthony Grant Jr. v. The City of Suffolk

Dear Clerk:

Enclosed please find the following:

1. Complaint Requesting Show Cause Order or Enforcement of Decision of State Building Code Technical Review Board
2. A Cover Sheet for Filing Civil Actions; and
3. This firm's check in the amount of $43.00 for the filing fee.

Please prepare the Complaint for service and forward it to the Sherriff's Office for service on the defendant The City of Suffolk.

Should you have any questions or need additional information, please do not hesitate to contact me.

Sincerely,

Gregory S. Bean

Enclosures

COVER SHEET FOR FILING CIVIL ACTIONS

COMMONWEALTH OF VIRGINIA

Case No. ....

(CLERK'S OFFICE USE ONLY)

City of Suffolk .... Circuit Court

Anthony Grant, Jr. .... v./*In re:* .... The City of Suffolk

PLAINTIFF(S) — DEFENDANT(S)

I, the undersigned [ ] plaintiff [ ] defendant [x] attorney for [x] plaintiff [ ] defendant hereby notify the Clerk of Court that I am filing the following civil action. (Please indicate by checking box that most closely identifies the claim being asserted or relief sought.)

GENERAL CIVIL

Subsequent Actions

- [ ] Claim Impleading Third Party Defendant
  - [ ] Monetary Damages
  - [ ] No Monetary Damages
- [ ] Counterclaim
  - [ ] Monetary Damages
  - [ ] No Monetary Damages
- [ ] Cross Claim
- [ ] Interpleader
- [ ] Reinstatement (other than divorce or driving privileges)
- [ ] Removal of Case to Federal Court

Business & Contract

- [ ] Attachment
- [ ] Confessed Judgment
- [ ] Contract Action
- [ ] Contract Specific Performance
- [ ] Detinue
- [ ] Garnishment

Property

- [ ] Annexation
- [ ] Condemnation
- [ ] Ejectment
- [ ] Encumber/Sell Real Estate
- [ ] Enforce Vendor's Lien
- [ ] Escheatment
- [ ] Establish Boundaries
- [ ] Landlord/Tenant
  - [ ] Unlawful Detainer
- [ ] Mechanics Lien
- [ ] Partition
- [ ] Quiet Title
- [ ] Termination of Mineral Rights

Tort

- [ ] Asbestos Litigation
- [ ] Compromise Settlement
- [ ] Intentional Tort
- [ ] Medical Malpractice
- [ ] Motor Vehicle Tort
- [ ] Product Liability
- [ ] Wrongful Death
- [ ] Other General Tort Liability

ADMINISTRATIVE LAW

- [ ] Appeal/Judicial Review of Decision of (select one)
  - [ ] ABC Board
  - [ ] Board of Zoning
  - [ ] Compensation Board
  - [ ] DMV License Suspension
  - [ ] Employee Grievance Decision
  - [ ] Employment Commission
  - [ ] Local Government
  - [ ] Marine Resources Commission
  - [ ] School Board
  - [ ] Voter Registration
  - [ ] Other Administrative Appeal

DOMESTIC/FAMILY

- [ ] Adoption
  - [ ] Adoption – Foreign
- [ ] Adult Protection
- [ ] Annulment
  - [ ] Annulment – Counterclaim/Responsive Pleading
- [ ] Child Abuse and Neglect – Unfounded Complaint
- [ ] Civil Contempt
- [ ] Divorce (select one)
  - [ ] Complaint – Contested*
  - [ ] Complaint – Uncontested*
  - [ ] Counterclaim/Responsive Pleading
  - [ ] Reinstatement – Custody/Visitation/Support/Equitable Distribution
- [ ] Separate Maintenance
  - [ ] Separate Maintenance Counterclaim

WRITS

- [ ] Certiorari
- [ ] Habeas Corpus
- [ ] Mandamus
- [ ] Prohibition
- [ ] Quo Warranto

PROBATE/WILLS AND TRUSTS

- [ ] Accounting
- [ ] Aid and Guidance
- [ ] Appointment (select one)
  - [ ] Guardian/Conservator
  - [ ] Standby Guardian/Conservator
  - [ ] Custodian/Successor Custodian (UTMA)
- [ ] Trust (select one)
  - [ ] Impress/Declare/Create
  - [ ] Reformation
- [ ] Will (select one)
  - [ ] Construe
  - [ ] Contested

MISCELLANEOUS

- [ ] Amend Death Certificate
- [ ] Appointment (select one)
  - [ ] Church Trustee
  - [ ] Conservator of Peace
  - [ ] Marriage Celebrant
- [ ] Approval of Transfer of Structured Settlement
- [ ] Bond Forfeiture Appeal
- [ ] Declaratory Judgment
- [ ] Declare Death
- [ ] Driving Privileges (select one)
  - [ ] Reinstatement pursuant to § 46.2-427
  - [ ] Restoration – Habitual Offender or 3rd Offense
- [ ] Expungement
- [ ] Firearms Rights – Restoration
- [ ] Forfeiture of Property or Money
- [ ] Freedom of Information
- [ ] Injunction
- [ ] Interdiction
- [ ] Interrogatory
- [ ] Judgment Lien-Bill to Enforce
- [ ] Law Enforcement/Public Official Petition
- [ ] Name Change
- [ ] Referendum Elections
- [ ] Sever Order
- [ ] Taxes (select one)
  - [ ] Correct Erroneous State/Local
  - [ ] Delinquent
- [ ] Vehicle Confiscation
- [ ] Voting Rights – Restoration
- [x] Other (please specify)
  Enforce SBCTRB Decision

[ ] Damages in the amount of $ 0.00 are claimed.

07/27/2020
DATE

[ ] PLAINTIFF [ ] DEFENDANT [x] ATTORNEY FOR [x] PLAINTIFF [ ] DEFENDANT

Gregory S. Bean, Esquire (VSB No. 80119)
PRINT NAME

Gordon Rees Scully Mansukhani, LLP
5425 Discovery Park Blvd, Ste 200, Williamsburg, VA 23188
ADDRESS/TELEPHONE NUMBER OF SIGNATOR

757-903-0872; gbean@grsm.com
EMAIL ADDRESS OF SIGNATOR (OPTIONAL)

*"Contested" divorce means any of the following matters are in dispute: grounds of divorce, spousal support and maintenance, child custody and/or visitation, child support, property distribution or debt allocation. An "Uncontested" divorce is filed on no fault grounds and none of the above issues are in dispute.

VIRGINIA: IN THE CIRCUIT COURT FOR THE CITY OF SUFFOLK

ANTHONY GRANT,	)	
	)	
Plaintiff,	)	
	)	
v.	)	
	)	
THE CITY OF SUFFOLK,	)	
	)	**CASE NO.: _________**
Serve: Patrick Roberts	)	
City Manager	)	
City of Suffolk	)	
442 W. Washington Street	)	
Suffolk, VA 23439	)	
	)	
Defendant.	)	

COMPLAINT REQUESTING SHOW CAUSE ORDER OR ENFORCEMENT OF DECISION OF STATE BUILDING CODE TECHNICAL REVIEW BOARD

Plaintiff Anthony Grant ("Grant"), by counsel, hereby files this Complaint Requesting Show Cause Order or Enforcement of Decision of State Building Code Technical Review Board against the City of Suffolk (the "City") and in support thereof states as follows:

The Parties

1. Grant is an individual and a resident of Suffolk, Virginia, and the owner of property located at 4281 Cole Avenue in the City of Suffolk (the "Property").

2. The City is a political entity created by the laws and statutes of the Commonwealth of Virginia.

Factual Background

3. In June 2016, the City issued a summons to KEBCO Enterprises, Inc. ("KEBCO") listing three violations one of which was, VCC Section M1401.3 "Improper sizing of the heating and cooling equipment and appliance, Differences between original information submitted and 2nd re-evaluation submitted."

4. In November 2016, Grant filed an appeal of the enforcement action under the Virginia Construction Code to the City appeals board which was heard in January 2017. The City appeals board modified the City building official's decision concerning VCC Section M1401.3 (Equipment and appliance sizing) requiring additional testing and chose not to render a decision.

5. Staff for the Virginia State Building Code Technical Review Board (the "Review Board") conducted an informal fact-finding conference (the "IFFC") in April 2017. At the conference, it was determined that, since the City appeals board had modified, and not upheld or reversed, the City building official's decision on the sizing of the heating and cooling system, that issue would not be included in the issues for consideration by the Review Board. In that regard, staff explained to the parties that once the City building official made a determination on that issue, specifically whether the heating and cooling system was properly sized for the home, Grant could then choose whether to appeal the issue to the City appeals board.

6. Grant further appealed to the Review Board on March 2, 2017. The appeal was heard at the June 15, 2017, Review Board meeting; however, as agreed upon at the IFFC in April of 2017, the Review Board did not hear the issue related to M1401.3 (Equipment and appliance sizing) as the local board has not yet ruled on the issue.

7. On March 28, 2017, through a memorandum from the Assistant Director of Community Development to the Chairman of the City appeals board, the City determined the size of the heating and cooling system was sufficient. Grant appealed the decision to the City appeals board.

8. In November of 2017, the City appeals board heard Grant's appeal and ruled to uphold the Assistant Director of Community Development's decision that the heating and cooling system was sized appropriately. Mr. Grant did not receive notification of the meeting;

therefore, the City appeals board re-heard Grant's appeal in April of 2018 and again ruled to uphold the City Assistant Director of Community Development's decision that the heating and cooling system was sized appropriately. Grant further appealed to the Review Board on June 26, 2018

9. On January 11, 2019, after conducting a hearing on the appeal, the Review Board issued a decision (the "Decision"). A copy of the Decision is attached as **Exhibit A**.

10. At the hearing, The City argued that they relied on the design calculations provided by the HVAC contractor who installed the system, Wayne Able's Heating and A/C (Able's), the product ratings for the equipment that was installed in the home, and Able's testimony at the City appeals board hearing to make the decision of the adequacy of the system.

11. Mr. Grant argued that the HVAC system was not the correct size for the home and that a larger unit or a second unit was needed based on an inspection by a home inspector, the evaluation of the system by two other HVAC contractors that did not install the system, and the load calculations provided by a HVAC third contractor.

12. The Review Board overturned the decision of the City appeals board that the HVAC system was properly sized.

13. The Review Board ordered matter to be remanded to the City appeals board for a better evaluation of the HVAC system based on the Manual S, J, and D calculations including all inputs to include but not limited to roof color, coefficient of shading, air changes per day, and insulated values of windows, doors, walls, ceilings and floors from the "as built" HVAC system conditions and calculations in order to make the determination as to the adequacy of the HVAC system within 60 days. The Review Board strongly suggested that the City appeals board require

this information from a third party HVAC contractor in addition to what may be provided by Able's.

14. The City failed to comply with the Decision. It has not made any significant efforts to comply with the Decision, despite ample opportunity to do so. Both Grant and his council have made multiple attempts to coordinate compliance without success.

15. Grant has been forced to retain counsel to enforce the Decision and has incurred costs in doing so. Additionally, he has been damaged by being forced to continue to live in a home that does not have appropriate cooling, and the City's inaction has prolonged resolution of the problem.

COUNT I – Motion for Show Cause Order

16. Pursuant to Virginia Code § 36-114, proceedings of the Review Board are governed by Virginia's Administrative Process Act (Virginia Code § 2.2-4000, *et seq.*).

17. Pursuant to the Administrative Process Act, under Virginia Code § 2.2-4023, final orders from any agency decision may be recorded, enforced, and satisfied as orders or decrees of a circuit court upon certification of such orders by the agency head or his designee.

18. The Decision, certified by the Chairman of the Review Board, is an order that is enforceable by this Court as any other order issued by this Court.

19. The City is in violation of the Decision and should be required to show cause why it should not be held in contempt of Court for failing to comply with the Order.

WHEREFORE, Grant respectfully moves this Court to enter an order:

A. Requiring the City to show cause as to why it should not be held in contempt of Court for failing to comply with the Order;

B. Requiring the City to immediately comply with the Decision;

C. Imposing a fine sufficient to encourage compliance by the City in an amount at least as much as Plaintiff's attorney's fees expended in this matter; and

D. Providing such other and further relief as may be warranted upon the facts and circumstances of this case.

Respectfully submitted,

ANTHONY GRANT

By: ______________________________
Counsel

Gregory S. Bean, Esq. (VSB# 80119)
Gordon Rees Scully Mansukhani LLP
5425 Discovery Park Boulevard, Suite 200
Williamsburg, Virginia 23188
Telephone: 757-903-0872
Facsimile: 757-401-6770
gbean@grsm.com
Council for Plaintiff

VIRGINIA:

BEFORE THE
STATE BUILDING CODE TECHNICAL REVIEW BOARD
(REVIEW BOARD)

IN RE: Appeal of Anthony Grant Jr.
Appeal No. 18-10

DECISION OF THE REVIEW BOARD

Procedural Background

The State Building Code Technical Review Board (Review Board) is a Governor-appointed board established to rule on disputes arising from application of regulations of the Department of Housing and Community Development. See §§ 36-108 and 36-114 of the Code of Virginia. The Review Board's proceedings are governed by the Virginia Administrative Process Act (§ 2.2-4000 et seq. of the Code of Virginia).

Case History

In May of 2015 the City of Suffolk Department of Planning and Community Development (City), the department responsible for code enforcement of Part I of the 2009 Virginia Uniform Statewide Building Code (Virginia Construction Code or VCC), issued a final inspection and a subsequent Certificate of Occupancy to KEBCO Enterprises, Inc. (KEBCO), the licensed Class A contractor for a single family dwelling built at 4281 Cole Avenue in the City of Suffolk.

Anthony and Ashley Grant Jr. purchased the home from KEBCO in June of 2015. In June of 2016 the City issued a summons to KEBCO listing three violations one of which was, VCC Section M1401.3 "Improper sizing of the heating and cooling equipment and appliance, Differences between original information submitted and 2nd re-evaluation submitted".

In November of 2016 Mr. Grant filed an appeal of the enforcement action under the Virginia Construction Code to the City appeals board which was heard in January of 2017. The

EXHIBIT
tabbies
A

City appeals board modified the City building official's decision concerning VCC Section M1401.3 (Equipment and appliance sizing) requiring additional testing; and chose not to render a decision.

Review Board staff conducted an informal fact-finding conference (IFFC) in April of 2017. At the conference it was determined that since the City appeals board had modified, and not upheld or reversed the City building official's decision on the sizing of the heating and cooling system, that issue would not be included in the issues for consideration by the Review Board. In that regard, staff explained to the parties that once the City building official made a determination on that issue, specifically whether the heating and cooling system was properly sized for the home, Grant could then choose whether to appeal the issue to the City appeals board.

Grant further appealed to the Review Board on March 2, 2017. The appeal was heard at the June 15, 2017 Review Board meeting; however, as agreed upon at the IFFC in April of 2017, the Review Board did not hear the issue related to M1401.3 (Equipment and appliance sizing) as the local board has not yet ruled on the issue.

On March 28, 2017, through a memorandum from the Assistant Director of Community Development to the Chairman of the City appeals board, the City determined the size of the heating and cooling system was sufficient. Grant appealed the decision to the City appeals board.

In November of 2017, the City appeals board heard Grant's appeal and ruled to uphold the Assistant Director of Community Development's decision that the heating and cooling system was sized appropriately. Mr. Grant did not receive notification of the meeting; therefore, the City appeals board re-heard Grant's appeal in April of 2018 and again ruled to uphold the City Assistant Director of Community Development's decision that the heating and cooling system was sized appropriately. Grant further appealed to the Review Board on June 26, 2018

Appearing at the Review Board hearing for the City of Suffolk were Stanley Skinner, Assistant Director of Community Development; Sam Adams, Inspector; and Kalli Jackson, Assistant City Attorney. Mr. Grant appeared at the hearing on behalf of the Grants.

Findings of the Review Board

The City filed a preliminary motion arguing that the case should be dismissed because the memorandum from the City building official to the Chairman of the City appeals board was not an application by the City building official, but rather a result of a request from the City appeals board. The City further argued that the appeal should be dismissed because the appeal was not properly before the board because the action related to the sizing of the HVAC system was not through a notice of violation, but rather through a summons for civil penalty in the City of Suffolk General District Court. The City also argued that the appeal should be dismissed because the appeal was untimely based on the date Mr. Grant received the decision of the City appeals board and the date he filed the appeal with the Review Board.

A. Whether or not the memorandum from the Assistant Director of Planning and Community Development to the Chairman of the City appeal board constitutes an enforcement decision by the City building official.

The City argued that the memorandum was not an enforcement decision of the City building official but rather was a result of a local appeals board hearing. The City further argued that the memorandum was a response to the request of the City appeals board to provide more information after re-studying the HVAC system numbers and to provide the City appeals board with a second opinion. Mr. Grant argued that the memorandum was a decision of the building official. The Review Board finds that the memorandum did constitute an application by the City building official.

B. Whether or not to dismiss the Grant's appeal as not properly before the Review Board since the only action required related to the sizing of the heating and cooling system was not through a notice of violation issued by the building official, but rather through a summons issued to KEBCO for a civil penalty in the city of Suffolk General District Court, and whether or not the decision of the City appeals board should be vacated.

The City argued that the appeal was not properly before the Review Board because the action required related to the sizing of the HVAC system was not through a notice of violation issued by the building official, but rather through a summons issued to KEBCO for a civil penalty. The City further argued that this decision had been previously decided by the Review Board in the final order for Appeal No. 17-3 filed by the Grants in 2017. Mr. Grant argued that the appeal was properly before the Board because the summons was issued as a result of KEBCO's refusal to make the needed corrections to the HVAC system and that the City did not follow through with the summons to ensure the cited items were corrected. The Review Board finds that the City building official, in the memorandum to the City's appeal board, performed an intervening action related to the HVAC issue cited under VCC Section M1401.3, by restating and making the same determination indicated in the summons; therefore, making it appropriate to hear the appeal and not inconsistent with the decision of Appeal 17-3.

C. Whether or not the Grant's appeal should be dismissed as untimely and whether or not the decision of the City appeals board should be vacated

The City argued that Mr. Grant received a copy of the City appeals board decision on June 4, 2018 and did not file an appeal to the Review Board until June 26, 2018: therefore, the appeal was not filed within the 21 day deadline and is untimely. Mr. Grant argued that his attorney, Mr. Bell, received a copy of the City appeals board decision on June 6, 2018; therefore, the appeal was filed within 21 days and was timely. The City argued that it sent a copy of the decision to Mr. Bell, who represented Mr. Grant is other court proceedings, only as a courtesy. The City further argued that Mr. Grant filed the application to the City appeals board and represented himself at the City appeals board hearings; therefore, the date of record was when the decision was received by

Mr. Grant. The Review Board finds that the City created confusion by sending the decision to Mr. Bell, that because Mr. Grant was represented at the time the timeline should begin when his attorney received the copy, and further finds the appeal to be timely. Having ruled against the City's argument for procedural dismissal, the Board moved onto the arguments on merits.

D. <u>Whether or not to overturn the decision of the City building official and the City appeals board that a violation of VCC Section M1401.3 (Equipment and appliance sizing) does not exist concerning the sizing of the heating and cooling system.</u>

The City argued that they relied on the design calculations provided by the HVAC contractor who installed the system, Wayne Able's Heating and A/C (Able's), the product ratings for the equipment that was installed in the home, and Able's testimony at the City appeals board hearing to make the decision of the adequacy of the system.

Mr. Grant argued that the HVAC system was not the correct size for the home and that a larger unit or a second unit was needed based on an inspection by a home inspector, the evaluation of the system by two other HVAC contractors that did not install the system, and the load calculations provided by a HVAC third contractor. The Review Board finds there to be insufficient information present to make an informed decision and remands the appeal back to the City appeals board for a better evaluation of the HVAC system.

<u>Order</u>

A. <u>Whether or not the memorandum from the Assistant Director of Planning and Community Development to the Chairman of the City appeal board constitutes an enforcement decision by the City building official.</u>

The appeal having been given due regard, and for the reasons set out herein, the Review Board members order the decision of the City appeals board that the memorandum was an action of the City building official to be, and hereby is, upheld.

B. <u>Whether or not to dismiss the Grant's appeal as not properly before the Review Board since the only action required related to the sizing of the heating and cooling system was not</u>

through a notice of violation issued by the building official, but rather through a summons issued to KEBCO for a civil penalty in the city of Suffolk General District Court, and whether or not the decision of the City appeals board should be vacated.

The appeal having been given due regard, and for the reasons set out herein, the Review Board members order the decision of the City appeals board that the appeal was properly before the Board to be, and hereby is, upheld.

C. Whether or not the Grant's appeal should be dismissed as untimely and whether or not the decision of the City appeal board should be vacated.

The appeal having been given due regard, and for the reasons set out herein, the Review Board members order the decision of the City appeals board that the appeal was timely to be, and hereby is, upheld.

D. Whether or not to overturn the decision of the City building official and the City appeals board that a violation of VCC Section M1401.3 (Equipment and appliance sizing) does not exist concerning the sizing of the heating and cooling system.

The appeal having been given due regard, and for the reasons set out herein, the Review Board members order the decision of the City appeals board that the HVAC system is properly sized to be, and hereby is, overturned.

Remand Order

The appeal having been given due regard, and for the reasons set out herein, the Review Board orders this matter to be, and hereby is, remanded to the City appeals board for a better evaluation of the HVAC system based on the Manual S, J, and D calculations including all inputs to include but not limited to roof color, coefficient of shading, air changes per day, and insulated values of windows, doors, walls, ceilings and floors from the "as built" HVAC system conditions and calculations in order to make the determination as to the adequacy of the HVAC system within 60 days. The Review Board strongly suggests the City appeals board require this information from a third party HVAC contractor in addition to what may be provided by Able's.

Chairman, State Building Code Technical Review Board

Date entered: _____January 11, 2019__________

As provided by Rule 2A:2 of the Supreme Court of Virginia, you have thirty (30) days from the date of service (the date you actually received this decision or the date it was mailed to you, whichever occurred first) within which to appeal this decision by filing a Notice of Appeal with W. Travis Luter, Sr., Secretary of the Review Board. In the event that this decision is served on you by mail, three (3) days arc added to that period.

City of Suffolk
Community Development
Phone: 757-514-4150
Fax: 757-514-4199

Board of Building Code Appeals
c/o Community Development
442 W. Washington Street
Suffolk, VA 23434

RECEIVED
DEC 01 2016
By____________

APPLICATION FOR APPEAL

Appellant Information (Name, address and telephone number of applicant for appeal.)

Anthony T. Grant Jr. 4281 Cole Ave Suffolk, VA 23435
(757) 737-9995

Related Party Information (Name, address and telephone number of others involved.)

Ashley N. Grant 4281 Cole Ave Suffolk, VA 23435
(757) 535-8664

Additional Information (To be submitted with this application)

1. Copy of decision or action being appealed.
2. Statement of reason for appeal.
3. Statement of specific relief sought.

CERTIFICATE OF SERVICE

I hereby certify that on the 30th day of November, 2016, a completed true copy of the foregoing Application for Appeal, including any additional information required above, was delivered or sent to the Board of Appeals and all related parties listed.

Signature of Applicant: Anthony T. Grant Jr.
Name (print or type): Anthony T. Grant Jr.

November 30, 2016

To Whom It May Concern,

I would like to appeal the notice of violation for the dates of 5/18/15, 10/28/16, 5/13/16, 12/22/15, 4/25/16, and 6/24/16 regarding section N1102.4, section R-703.11, 408 and section R408. Also, VUSBC109.3, M1401.3, P2603.21, R403.1.6 and P2603.2.1. The inspection report project number SFC2014-00187. I am unsure of the code violations for our driveway; however the builder did not have a permit to build. Our driveway and garage floor is cracking severely. I spoke to the building official on the issue; he stated that it was not his department. I would like to appeal these violations because the building official issued them, and then removed them without them being addressed. My family and I have endured a lot during our first year within the home; due to a lot of violations that were passed that should not have been. We have contacted the builder, the city of Suffolk and numerous third party vendors to address the issues with our home. We have documentation from numerous reputable companies and a structural engineer report that stated the issues with our home. My family and I have been very patient with the building official in allowing him to address the violations, which have not been addressed appropriately. In my efforts in trying to have my home fixed, I feel defeated. The city in which I live has not fully taken responsibility for their negligence and my family and I have been suffering. With my sincerest regards, I hope this appeal will look at the documentation that is being presented and help me in addressing the issues, so that my family and I can enjoy living in the home we fell in love with, and the community in which we cherish. As I conclude, I would like you all to resolve these issues by addressing the code violations that are listed above. The builder has had numerous opportunities to correct some violations; however, he has failed to do so. He has displayed poor workmanship and professionalism. Again, we would like for the violations to be addressed accordingly. We do not want the builder to come back to our home to fix the issues, due to his poor workmanship, lack of professionalism and continuous issues due to his negligence. We would like for the builder to be fined, along with DPOR being notified of the violations.

Warm Regards,

Anthony T. Grant Jr.

Anthony T. Grant Jr

RESOLUTION NO. 01-2020

CITY OF SUFFOLK BOARD OF BUILDING CODE APPEALS
DECISION
4281 COLE AVE, SUFFOLK, VIRGINIA, ZONING MAP 13A *JAMES, PARCEL *18
LBBCA 01-2020

WHEREAS, The State Building Code Technical Review Board, by letter dated January 11, 2019, requested the this matter be remanded back to the City of Suffolk Board of Building Code Appeals as it relates to the sizing of Mr. Anthony Grant, Jr., HVAC system based on the Manual S, J, and D calculation including all inputs to include but not limited to roof color, coefficient of shading, air changers per day, and insulated value of windows, doors, walls, ceilings and floors from the "as built" HVAC system conditions and calculations in order to make the determination as the adequacy of the HVAC system; and

WHEREAS, the appeal hearing was held in the City of Suffolk Council Chambers on January 27, 2021, at 12:00 p.m. under New Business; and

WHEREAS, the applicant Anthony Grant and his Attorney Gregory Bean were present at the hearing and representing the City of Suffolk were Michael Robinson, Building Official, Sean Dolan, Assistant City Attorney II, Carl Stevens – Trademark Mechanical and Jeff Sadler - Ecovative Energy; and

NOW, THEREFORE, BE IT RESOLVED by the Board of Building Code Appeals of the City of Suffolk, Virginia, that:

1. ___**X**_____ UPHOLDS ________ REVERSES ________ MODIFIES the Building Official's decision with respect to appeal identified as M1401.3/No. 18-10 from the State Building Code Technical Review Board under New Business; and,

BE IF FURTHER RESOLVED that any person who was a party to the appeal may appeal to the State Review Board by submitting an application to such Board within 21 calendar days upon receipt by certified mail of this resolution. Application forms are available for the office of the State Review Board, 600 East Main Street, Richmond, Virginia 23219, and (804) 371-7150.

____
Acting Chairman, Denis Confer, Board of Building Code Appeals

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
State Building Codes Office and Office of the State Technical Review Board
Main Street Centre, 600 E. Main Street, Suite 300, Richmond, Virginia 23219
Tel: (804) 371-7150, Fax: (804) 371-7092, Email: sbco@dhcd.virginia.gov

APPLICATION FOR ADMINISTRATATIVE APPEAL

Regulation Serving as Basis of Appeal (check one):

- ☑ Uniform Statewide Building Code
  - ☑ Virginia Construction Code
  - ☐ Virginia Existing Building Code
  - ☐ Virginia Maintenance Code
- ☐ Statewide Fire Prevention Code
- ☐ Industrialized Building Safety Regulations
- ☐ Amusement Device Regulations

RECEIVED
FEB 23 2021
OFFICE OF THE REVIEW BOARD

Appealing Party Information (name, address, telephone number and email address):
Anthony T. Grant Jr.
4281 Cole Ave, Suffolk, VA 23435 v12shorty@gmail.com
(757) 737-9995

Opposing Party Information (name, address, telephone number and email address of all other parties):
Suffolk Planning and Community
442 W Washington St., Suffolk, VA 23434
(757) 514-4150

Additional Information (to be submitted with this application)
- Copy of enforcement decision being appealed
- Copy of the decision of local government appeals board (if applicable)
- Statement of specific relief sought

CERTIFICATE OF SERVICE

I hereby certify that on the 23 day of ~~2~~ February, 2021, a completed copy of this application, including the additional information required above, was either mailed, hand delivered, emailed or sent by facsimile to the Office of the State Technical Review Board and to all opposing parties listed.

> **Note:** This application must be received by the Office of the State Technical Review Board within five (5) working days of the date on the above certificate of service for that date to be considered as the filing date of the appeal. If not received within five (5) working days, the date this application is actually received by the Office of the Review Board will be considered to be the filing date.

Signature of Applicant: [signature]

Name of Applicant: Anthony T. Grant Jr.
(please print or type)

Commonwealth of Virginia

Luter, William <travis.luter@dhcd.virginia.gov>

Re: Appeal

Anthony Grant8 <v12shorty@gmail.com> Tue, Feb 23, 2021 at 11:45 AM
To: "Luter, William" <Travis.Luter@dhcd.virginia.gov>

Yes it is.

On Tue, Feb 23, 2021, 10:53 AM Luter, William <travis.luter@dhcd.virginia.gov> wrote:

> Mr. Grant,
>
> Based on your inquiries to Review Board staff via telephone related to your appeal application, your submitted documents thus far, and your email below it appears to Review Board staff that, in your opinion, the City of Suffolk has not complied with the Remand Order of the Review Board dated January 11, 2019. Is this an accurate assessment of your position? Is it also accurate that you would like the Review Board to determine whether the City has complied with the Remand Order and, if not, to force the City of Suffolk to comply with the order? Are there any other code related issues that you wish for the Review Board to consider?
>
> **W. Travis Luter, Sr.**
> Secretary to the State Building Code Technical Review Board
> Code and Regulation Specialist
> Virginia Department of Housing and Community Development (DHCD)
> 804-371-7163
> travis.luter@dhcd.virginia.gov
>
> *If you or someone you know is having difficulty in making rent payments due to the COVID-19 pandemic, you may be eligible for the Virginia Rent Relief Program (RRP). To find out if you may be eligible, visit www.dhcd.virginia.gov/eligibility. Mortgage relief applications are no longer being accepted at this time.*
>
> *Join DHCD for Creating Community Vitality, a yearlong training series that is focused on building your place's identity, supportive ecosystems and community in a format promoting monthly education, inspiration and application. For more information on the monthly topics, to download a workbook or to register, visit virginiamainstreet.com.*
>
> On Tue, Feb 23, 2021 at 10:23 AM Anthony Grant8 <v12shorty@gmail.com> wrote:
>
>> Goodmorning Mr. Luter,
>>
>> The resolution i would like is the city stop abusing the power against us. They was ordered over a year ago. They constantly ignored my emails and voice messages. Had to get my lawyer involved and spend like 3k just for them to only do only one calculation out of three that was ordered.
>>
>> We been going through this issue 6yrs. City has continued to ignore the situation. Also, requested transcript through email. No response to that also. Thank you
>>
>> ---------- Forwarded message ---------
>> From: **ashley grant** <agrant1527@gmail.com>
>> Date: Tue, Feb 23, 2021, 10:09 AM
>> Subject:
>> To: Anthony Grant <v12shorty@gmail.com>

Documents Submitted by the City of Suffolk

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CITY OF SUFFOLK

442 W. WASHINGTON ST., SUITE 1084A POST OFFICE BOX 1858, SUFFOLK, VIRGINIA 23439-1858

PHONE: (757) 514-4150 FAX: (757) 514-4199

DEPARTMENT OF
PLANNING & COMMUNITY DEVELOPMENT

Division of Community Development

The information below is submitted by The City of Suffolk for review by the Local Board of Building Code Appeals in relation to the appeal by Anthony Grant to the HVAC system sizing (2009VCC M1401.3), installed by Wayne Ables Heating and Air Conditioning, at 4281 Cole Avenue.

A. The Information previously provided by Wayne Ables relating to the appeal of 2009 VCC section M1401.3 (Equipment and appliance sizing) for 4281 Cole Ave, and the code section that was appealed(M1401.3).

B. The 2019 State Building Code Technical Review Board summary and decisions related to their review of the appeal.

C. "Building Information and Data Collection" provided by Ecovative Energy for the "as-built" conditions. Trademark Mechanical generated a house layout prior to the site visit by Ecovative using the site plan and building plans the City of Suffolk has on file, that Ecovative used for documenting hvac layout and information of windows and doors.

D. Test results from Ecovative' s testing of the house's duct tightness and building envelope tightness to establish the air changes per hour(ACH) of the building envelope and the amount of duct leakage in the "as-built" conditions. The relevant code sections from the applicable 2009 code year are attached to the results. (max. 12% total allowed for duct leakage, actual=2.9%; max. 7 ACH allowed for envelope air tightness, actual=6.13)

E. This is the updated Load calculation provided by Trademark Mechanical based on the "as-built condition" information provided by Ecovative and the applicable ACCA Manual of the time of construction.

F. Building analysis report provided by Ecovative. This report identifies observations that may contribute to comfortability of the home or that could be addressed to increase comfortability of the interior environment. Ecovative identified several observations in an effort to help provide direction for achieving the preferred interior environment of the homeowner.

G. Supplemental information provided by Ecovative in relation to their observations including the initial floorplan and load calculation performed by Trademark mechanical based on the building plans and images obtained during Ecovative's evaluation.

CITY INFORMATION: A

A

Wayne Ables Heating & Air Conditioning, Inc.

1226 Executive Boulevard
Suite 117
Chesapeake, VA 23320
757-547-9252
Fax 757-547-1502
Email: wayneables@hvac.hrcoxmail.com

July 20, 2016

Dear Sirs,

The original load calculations submitted were the load calculations from the first floor of Kenny's 2-story house with a 2-zone system, that was the first page and the 2nd page was the actual house on Cole Ave with a 1-zone system. My office clerk mixed up the paperwork . If you look at the load calculations that say 2 story one zone, the net gain is 22,720 which is almost the same as the load calculations that say 4281 Cole Ave. Its net gain is 23,512, 792 BTUs different. Not enough difference to matter on any day @ any temperature. As evidenced by the expanded cooling data. This unit supplies 26,300 BTUs, enough to cool the house on any given day. I have included a ACCA Manuel J information sheet about the "Proper" way to size a/c equipment

Thank you,
Wayne Ables

Wayne Ables Heating & Air Conditioning, Inc.

1226 Executive Boulevard
Suite 117
Chesapeake, VA 23320
757-547-9252
Fax 757-547-1502
Email: wayneables@hvac.hrcoxmail.com

Dear Mr. Wilson,

This is a re-do of the load calculations at 4281 Cole Ave. Cole Ave. has an outdoor unit, Model # GSZ130301 and an indoor unit, Model # ARUF30B14A. As supported by the load calculations and the expanded rating of the outdoor unit, this system is properly sized for this home.

The home inspector's feeling that the system is too small is not the proper method for sizing any heating and cooling system. It is possible that a properly sized system will run longer than an oversized system, but that is the benefit of a properly sized system. There is no such thing as a standard sized system for any home and a 3 ton system for this home is oversized and would be a code violation.

Too many home inspectors base the size of a system on a square foot per ton. This is only a guess-timation. It doesn't account for the different R values of the home, types of windows, or any other factors. No oversite was made with this system.

Thank you,

Wayne Ables

4281 Cole Ave.

Project Report

General Project Information

Project Title:	Kenny Bullock Fl 1
Project Date:	Sunday October 19, 2014

Design Data

Reference City:	Norfolk, Virginia
Building Orientation:	Front door faces West
Daily Temperature Range:	Medium
Latitude:	36 Degrees
Elevation:	22 ft.
Altitude Factor:	0.999
Elevation Sensible Adj. Factor:	1.000
Elevation Total Adj. Factor:	1.000
Elevation Heating Adj. Factor:	1.000
Elevation Heating Adj. Factor:	1.000

	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	22	20.45	80%	n/a	70	n/a
Summer:	91	76	51%	50%	75	47

Check Figures

Total Building Supply CFM:	530	CFM Per Square ft.:	0.574
Square ft. of Room Area:	924	Square ft. Per Ton:	1,247
Volume (ft³) of Cond. Space:	8,316		

Building Loads

Total Heating Required Including Ventilation Air:	11,948 Btuh	11.948 MBH	
Total Sensible Gain:	7,728 Btuh	87 %	
Total Latent Gain:	1,161 Btuh	13 %	
Total Cooling Required Including Ventilation Air:	8,889 Btuh	0.74 Tons (Based On Sensible + Latent)	

Notes

Rhvac is an ACCA approved Manual J and Manual D computer program.
Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D.
All computed results are estimates as building use and weather may vary.
Be sure to select a unit that meets both sensible and latent loads.

Kenny Bullock
4281 cole

PRJ 14-02946

4281 Cole Av.

Rhvac - Residential & Light Commercial HVAC Loads
Wayne Ables Heating And A/C
Fentress, VA 23322

Elite Software Development, Inc.
Kenny Bullock 2 Story One Zone
Page 1

Load Preview Report

Scope	Net Ton	ft.² /Ton	Area	Sen Gain	Lat Gain	Net Gain	Sen Loss	Sys Htg CFM	Sys Clg CFM	Sys Act CFM	Duct Size
Building	1.89	1,135	2,149	19,730	2,991	22,720	29,154	950	950	950	
System 1	1.89	1,135	2,149	19,730	2,991	22,720	29,154	950	950	950	14
Duct Latent					1,226	1,226					
Zone 1			924	8,994	543	9,537	14,065	458	433	433	10
1-Living			180	2,331	89	2,420	3,590	117	112	112	1–6
2-Dining			150	971	33	1,004	1,951	64	47	47	1–4
3-Kitchen			216	2,168	90	2,267	3,432	112	104	104	1–6
4-Family			224	2,328	299	2,627	3,334	109	112	112	1–5
5-1/2 Bath			154	1,196	23	1,219	1,748	57	58	58	1–4
Zone 2			1,225	10,735	1,222	11,957	15,089	492	517	517	12
6-Bed 4			234	2,712	297	3,009	3,699	127	131	131	1–7
7-Hall Bath			113	504	22	526	1,057	35	24	24	1–4
8-Bed 3			182	2,264	279	2,543	2,814	85	109	109	1–6
9-Bed 2			156	1,226	232	1,454	1,679	55	59	59	1–4
10-Master Bath			120	935	65	1,000	1,893	62	45	45	1–4
11-W I C			120	389	18	407	597	19	19	19	1–4
12-Master Bedroom			303	2,705	303	3,008	3,334	109	130	130	1–7

2149

Total Leakage Test Depress ______ Press ✓

Test Pressure: ______ (Pa)

Baseline Duct Pressure (optional): ______ (Pa)

Duct Press. (Pa)	Flow Ring Installed	Fan Press (Pa)	Flow (cfm)
25	m	25	63

Fan Model/SN: ______

Results:

Total Leakage (cfm): 63

Total Leakage as % System Airflow: ______

Total Leakage as % Floor Area: ______

Project Report

General Project Information

Project Title: Kebco 4281 Cole Ave
Project Date: Thursday, May 12, 2016

Design Data

Reference City:	Norfolk, Virginia
Building Orientation:	Front door faces North
Daily Temperature Range:	Medium
Latitude:	36 Degrees
Elevation:	22 ft.
Altitude Factor:	0.999
Elevation Sensible Adj. Factor:	1.000
Elevation Total Adj. Factor:	1.000
Elevation Heating Adj. Factor:	1.000
Elevation Heating Adj. Factor:	1.000

	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	22	20.45	80%	n/a	70	n/a
Summer:	91	76	51%	50%	75	47

Check Figures

Total Building Supply CFM:	1,090	CFM Per Square ft.:	0.473
Square ft. of Room Area:	2,303	Square ft. Per Ton:	1,175
Volume (ft^3) of Cond. Space:	19,333		

Building Loads

Total Heating Required Including Ventilation Air:	32,142 Btuh	32.142	MBH
Total Sensible Gain:	19,793 Btuh	84	%
Total Latent Gain:	3,719 Btuh	16	%
Total Cooling Required Including Ventilation Air:	23,512 Btuh	1.96	Tons (Based On Sensible + Latent)

Notes

Rhvac is an ACCA approved Manual J and Manual D computer program.
Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D.
All computed results are estimates as building use and weather may vary.
Be sure to select a unit that meets both sensible and latent loads.

This house only needs 23,512 BTU's. The system installed supplys 26,300 @ 95° & 25,000 @ 105°. Plenty of good cooling with this unit.

Thank you,
Wayne Ables

			Outdoor Ambient Temperature											
			65°F				75°F				85°F			
			Entering Indoor Wet Bulb Temperature											
IDB	Airflow		59	63	67	71	59	63	67	71	59	63	67	71
70	1173	MBh	27.4	28.4	31.1	-	26.8	27.8	30.4	-	26.1	27.1	29.7	-
		S/T	0.76	0.63	0.44	-	0.79	0.65	0.46	-	0.81	0.67	0.47	-
		ΔT	16	14	11	-	17	14	11	-	17	14	11	-
		kW	1.98	2.02	2.08	-	2.13	2.17	2.24	-	2.25	2.30	2.37	-
		Amps	7.8	7.9	8.2	-	8.3	8.5	8.8	-	9.0	9.2	9.5	-
		Hi PR	229	246	260	-	257	276	292	-	292	314	352	-
		Lo PR	107	114	124	-	113	120	131	-	117	125	136	-
	1050	MBh	27.0	28.0	30.7	-	26.4	27.4	30.0	-	25.8	26.7	29.3	-
		S/T	0.73	0.61	0.42	-	0.75	0.63	0.44	-	0.77	0.65	0.45	-
		ΔT	17	15	11	-	17	15	11	-	17	15	11	-
		kW	1.97	2.01	2.07	-	2.12	2.16	2.22	-	2.24	2.29	2.36	-
		Amps	7.7	7.9	8.1	-	8.3	8.5	8.8	-	9.0	9.2	9.5	-
		Hi PR	227	245	258	-	255	274	290	-	290	312	330	-
		Lo PR	106	113	123	-	112	119	130	-	116	124	135	-
	927	MBh	25.7	26.6	29.1	-	25.1	26.0	28.5	-	24.5	25.4	27.8	-
		S/T	0.70	0.58	0.40	-	0.72	0.60	0.42	-	0.74	0.62	0.43	-
		ΔT	18	15	12	-	18	16	12	-	18	16	12	-
		kW	1.94	1.98	2.04	-	2.08	2.13	2.19	-	2.21	2.25	2.32	-
		Amps	7.6	7.8	8.0	-	8.2	8.3	8.5	-	8.8	9.0	9.3	-
		Hi PR	223	240	253	-	250	269	284	-	284	306	323	-
		Lo PR	104	111	121	-	110	117	128	-	114	121	133	-
75	1173	MBh	27.89	28.71	31.08	33.36	27.24	28.05	30.36	32.58	26.59	27.38	29.64	31.81
		S/T	0.86	0.77	0.59	0.38	0.90	0.80	0.61	0.39	0.92	0.82	0.62	0.40
		ΔT	19	17	14	10	19	18	14	10	19	18	14	10
		kW	2.00	2.04	2.10	2.16	2.14	2.19	2.25	2.33	2.27	2.32	2.39	2.47
		Amps	7.8	8.0	8.2	8.5	8.4	8.6	8.9	9.2	9.1	9.3	9.6	10.0
		Hi PR	231	249	263	274	259	279	295	307	295	317	335	350
		Lo PR	108	115	125	133	114	121	132	141	118	126	138	147
	1050	MBh	27.5	28.3	30.6	32.9	26.8	27.6	29.9	32.1	26.2	27.0	29.2	31.3
		S/T	0.83	0.74	0.56	0.36	0.86	0.77	0.58	0.37	0.88	0.79	0.60	0.38
		ΔT	20	18	15	10	20	19	15	10	20	19	15	11
		kW	1.99	2.03	2.09	2.15	2.13	2.18	2.24	2.31	2.26	2.31	2.38	2.45
		Amps	7.8	8.0	8.2	8.5	8.4	8.6	8.8	9.1	9.1	9.3	9.6	9.9
		Hi PR	230	247	261	272	258	277	293	305	293	315	333	347
		Lo PR	107	114	124	133	113	120	131	140	118	125	137	146
	927	MBh	26.1	26.9	29.1	31.2	25.5	26.3	28.4	30.5	24.9	25.6	27.7	29.8
		S/T	0.79	0.71	0.54	0.35	0.82	0.73	0.56	0.36	0.84	0.75	0.57	0.37
		ΔT	21	19	15	11	21	19	16	11	21	19	16	11
		kW	1.96	2.00	2.06	2.12	2.10	2.14	2.21	2.28	2.22	2.27	2.34	2.42
		Amps	7.6	7.8	8.1	8.3	8.2	8.4	8.7	9.0	8.9	9.1	9.4	9.7
		Hi PR	225	242	256	267	252	272	287	299	287	309	326	340
		Lo PR	105	112	122	130	111	118	129	137	115	123	134	143

			Outdoor Ambient Temperature											
			95°F				105°F				115°F			
			Entering Indoor Wet Bulb Temperature											
IDB	Airflow		59	63	67	71	59	63	67	71	59	63	67	71
70	1173	MBh	25.5	26.4	29.0	-	24.2	25.1	27.5	-	22.4	23.3	25.5	-
		S/T	0.83	0.70	0.48	-	0.87	0.72	0.50	-	0.87	0.73	0.51	-
		ΔT	17	14	11	-	16	14	11	-	15	13	10	-
		kW	2.37	2.42	2.49	-	2.46	2.52	2.60	-	2.55	2.60	2.68	-
		Amps	9.6	9.8	10.2	-	10.2	10.5	10.8	-	10.8	11.1	11.4	-
		Hi PR	333	358	378	-	374	403	425	-	415	445	470	-
		Lo PR	123	131	143	-	129	137	150	-	134	142	155	-
	1050	MBh	25.1	26.1	28.5	-	23.9	24.7	27.1	-	22.1	22.9	25.1	-
		S/T	0.80	0.67	0.46	-	0.83	0.69	0.48	-	0.84	0.70	0.48	-
		ΔT	18	15	12	-	17	15	11	-	16	14	11	-
		kW	2.35	2.40	2.48	-	2.45	2.50	2.56	-	2.53	2.59	2.67	-
		Amps	9.6	9.8	10.1	-	10.2	10.4	10.7	-	10.7	11.0	11.3	-
		Hi PR	330	355	375	-	372	400	422	-	411	442	467	-
		Lo PR	122	130	142	-	128	136	149	-	133	141	154	-
	927	MBh	23.8	24.7	27.1	-	22.7	23.5	25.8	-	21.0	21.8	23.9	-
		S/T	0.77	0.64	0.44	-	0.79	0.66	0.46	-	0.80	0.67	0.46	-
		ΔT	18	16	12	-	18	15	12	-	17	14	11	-
		kW	2.32	2.37	2.44	-	2.41	2.46	2.54	-	2.49	2.54	2.62	-
		Amps	9.4	9.6	9.9	-	10.0	10.2	10.5	-	10.5	10.8	11.1	-
		Hi PR	324	348	368	-	364	392	414	-	402	433	457	-
		Lo PR	120	128	139	-	126	134	146	-	130	138	151	-
75	1173	MBh	25.94	26.71	28.91	31.03	24.65	25.38	27.47	29.48	22.83	23.51	25.44	27.31
		S/T	0.95	0.85	0.64	0.41	0.98	0.88	0.67	0.43	0.99	0.89	0.67	0.43
		ΔT	19	18	15	10	19	17	14	10	18	16	13	9
		kW	2.39	2.44	2.51	2.59	2.49	2.54	2.62	2.70	2.57	2.62	2.71	2.79
		Amps	9.7	9.9	10.3	10.6	10.3	10.5	10.9	11.3	10.9	11.2	11.5	11.9
		Hi PR	336	362	382	398	378	407	430	448	418	449	475	495
		Lo PR	124	132	145	154	130	139	151	161	135	144	157	167
	1050	MBh	25.6	26.3	28.5	30.6	24.3	25.0	27.1	29.0	22.5	23.2	25.1	26.9
		S/T	0.91	0.81	0.61	0.40	0.94	0.84	0.64	0.41	0.95	0.85	0.64	0.41
		ΔT	20	19	15	11	20	18	15	10	19	17	14	10
		kW	2.37	2.42	2.50	2.58	2.47	2.52	2.60	2.69	2.55	2.61	2.69	2.78
		Amps	9.6	9.9	10.2	10.6	10.2	10.5	10.8	11.2	10.8	11.1	11.4	11.9
		Hi PR	334	359	379	395	375	404	427	445	415	446	471	492
		Lo PR	124	131	144	153	130	138	150	160	134	143	156	165
	927	MBh	24.3	25.00	27.1	29.0	23.1	23.8	25.7	27.6	21.4	22.0	23.8	25.6
		S/T	0.87	0.78	0.59	0.38	0.90	0.81	0.61	0.39	0.91	0.81	0.62	0.40
		ΔT	21	19	16	11	21	19	16	11	19	18	15	10
		kW	2.34	2.38	2.46	2.54	2.43	2.48	2.56	2.64	2.51	2.56	2.65	2.73
		Amps	9.5	9.7	10.0	10.4	10.1	10.3	10.6	11.0	10.6	10.9	11.2	11.6
		Hi PR	327	352	372	388	368	396	418	436	406	437	462	482
		Lo PR	121	129	141	150	127	135	147	157	131	140	152	162

IDB: Entering Indoor Dry Bulb Temperature
High and low pressures are measured at the liquid and suction service valves.

Shaded area reflects ACCA (TVA) Rating Conditions

kW = Total system power
Amps = Outdoor unit amps (compressor + fan)

CHAPTER 14
HEATING AND COOLING EQUIPMENT

SECTION M1401
GENERAL

M1401.1 Installation. Heating and cooling *equipment* and *appliances* shall be installed in accordance with the manufacturer's installation instructions and the requirements of this code.

M1401.2 Access. Heating and cooling *equipment* shall be located with respect to building construction and other *equipment* to permit maintenance, servicing and replacement. Clearances shall be maintained to permit cleaning of heating and cooling surfaces; replacement of filters, blowers, motors, controls and vent connections; lubrication of moving parts; and adjustments.

M1401.3 Sizing. Heating and cooling *equipment* shall be sized in accordance with ACCA Manual S based on building loads calculated in accordance with ACCA Manual J or other *approved* heating and cooling calculation methodologies.

M1401.4 Exterior installations. *Equipment* installed outdoors shall be *listed* and *labeled* for outdoor installation. Supports and foundations shall prevent excessive vibration, settlement or movement of the *equipment*. Supports and foundations shall be level and conform to the manufacturer's installation instructions.

M1401.5 Flood hazard. In areas prone to flooding as established by Table R301.2(1), heating and cooling *equipment* and *appliances* shall be located or installed in accordance with Section R322.1.6.

SECTION M1402
CENTRAL FURNACES

M1402.1 General. Oil-fired central furnaces shall conform to ANSI/UL 727. Electric furnaces shall conform to UL 1995.

M1402.2 Clearances. Clearances shall be provided in accordance with the *listing* and the manufacturer's installation instructions.

M1402.3 Combustion air. *Combustion air* shall be supplied in accordance with Chapter 17. *Combustion air* openings shall be unobstructed for a distance of not less than 6 inches (152 mm) in front of the openings.

SECTION M1403
HEAT PUMP EQUIPMENT

M1403.1 Heat pumps. The minimum unobstructed total area of the outside and return air ducts or openings to a heat pump shall be not less than 6 square inches per 1,000 Btu/h (13 208 mm^2/kW) output rating or as indicated by the conditions of the listing of the heat pump. Electric heat pumps shall conform to UL 1995.

M1403.2 Foundations and supports. Supports and foundations for the outdoor unit of a heat pump shall be raised at least 3 inches (76 mm) above the ground to permit free drainage of defrost water, and shall conform to the manufacturer's installation instructions.

SECTION M1404
REFRIGERATION COOLING EQUIPMENT

M1404.1 Compliance. Refrigeration cooling *equipment* shall comply with Section M1411.

SECTION M1405
BASEBOARD CONVECTORS

M1405.1 General. Electric baseboard convectors shall be installed in accordance with the manufacturer's installation instructions and Chapters 34 through 43 of this code.

SECTION M1406
RADIANT HEATING SYSTEMS

M1406.1 General. Electric radiant heating systems shall be installed in accordance with the manufacturer's installation instructions and Chapters 34 through 43 of this code.

M1406.2 Clearances. Clearances for radiant heating panels or elements to any wiring, outlet boxes and junction boxes used for installing electrical devices or mounting luminaires shall comply with Chapters 34 through 43 of this code.

M1406.3 Installation of radiant panels. Radiant panels installed on wood framing shall conform to the following requirements:

1. Heating panels shall be installed parallel to framing members and secured to the surface of framing members or mounted between framing members.
2. Panels shall be nailed or stapled only through the unheated portions provided for this purpose and shall not be fastened at any point closer than $^1/_4$ inch (6.4 mm) to an element.
3. Unless *listed* and *labeled for field cutting, heating panels shall be installed as complete units.*

M1406.4 Installation in concrete or masonry. Radiant heating systems installed in concrete or masonry shall conform to the following requirements:

1. Radiant heating systems shall be identified as being suitable for the installation, and shall be secured in place as specified in the manufacturer's installation instructions.
2. Radiant heating panels or radiant heating panel sets shall not be installed where they bridge expansion joints unless protected from expansion and contraction.

AHRI CERTIFIED

Certificate of Product Ratings

AHRI Certified Reference Number: 8358271 **Date: 3/16/2017**

Product: Split System: Heat Pump with Remote Outdoor Unit-Air-Source

Outdoor Unit Model Number: GSZ130301A*

Indoor Unit Model Number: ARUF30B14A*

Manufacturer: GOODMAN MANUFACTURING CO., LP.

Trade/Brand name: GOODMAN; JANITROL; AMANA DISTINCTIONS; EVERREST; ONE HOUR AIR CONDITIONING AND HEATING; ENERGI AIR

Series name: GSZ13

Manufacturer responsible for the rating of this system combination is GOODMAN MANUFACTURING CO., LP.

Rated as follows in accordance with AHRI Standard 210/240-2008 for Unitary Air-Conditioning and Air-Source Heat Pump Equipment and subject to verification of rating accuracy by AHRI-sponsored, independent, third party testing:

Cooling Capacity (Btuh):	27200	TOTAL
EER Rating (Cooling):	11.00	
SEER Rating (Cooling):	13.00	
Heating Capacity(Btuh) @ 47 F:	27000	TOTAL
Region IV HSPF Rating (Heating):	8.00	
Heating Capacity(Btuh) @ 17 F:	16500	

* Ratings followed by an asterisk (*) indicate a voluntary rerate of previously published data, unless accompanied with a WAS, which indicates an involuntary rerate.

CERTIFICATE VERIFICATION
The information for the model cited on this certificate can be verified at www.ahridirectory.org, click on "Verify Certificate" link and enter the AHRI Certified Reference Number and the date on which the certificate was issued, which is listed above, and the Certificate No., which is listed at bottom right.

AHRI
AIR-CONDITIONING, HEATING, & REFRIGERATION INSTITUTE
we make life better™

CERTIFICATE NO.: 131341428052233091

CITY INFORMATION: B

Staff Note: This document was removed as it was a duplicate copy of the Review Board Final Order 18-5 which is in the Basic Documents section of the record.

CITY INFORMATION: C

C

ecovative APPLIED BUILDING SCIENCE

Building Information and Data Collection

August 31, 2020
4281 Cole Ave, Suffolk VA
Client: City of Suffolk

Exterior Notes:
-Siding is light beige vinyl with white trim
-Medium color brick veneer over crawlspace foundation walls
-Medium color asphalt shingles
-Front of home is facing N/NW
-Shading from trees on SW side of home

First Floor Notes:
-Thermostat centrally located at bottom of stairs. One system, one zone
-No return duct on first floor
-Flooring is all VCT on entire first floor
-Sits on top of vented crawlspace with vapor barrier
-Floor joist insulation is paper-faced fiberglass batt (5.5" thick - R-value lettering not visible due to mold and moisture stains on paper face of insulation batts)
-Foundation walls are 2' high from grade to bottom of framing
-Floor joists are 2x8 @16" OC
-Insulation on exterior walls confirmed as fiberglass batts, but thickness and face vs. unfaced is unknown

Second Floor Notes:
-All flooring is carpet except for Master bathroom which is tile
-Floor joists are 2x8 @ 16" OC
-Master BR has different ceiling height and drop soffit where only supply grill is located
-Insulation of floor joists for room over garage confirmed, but thickness unknown
-Insulation on exterior walls confirmed as fiberglass batts, but thickness and face vs. unfaced is unknown

Window Notes:
-All windows are double pane with <u>no</u> Low-E coating
-Bottom half have bug screens on outside of pane
-All windows have 45 deg. angle blinds (except windows noted on drawings without)
-All windows are vinyl frame and sash
-Front entry door only exterior door with glazing (noted on drawings)

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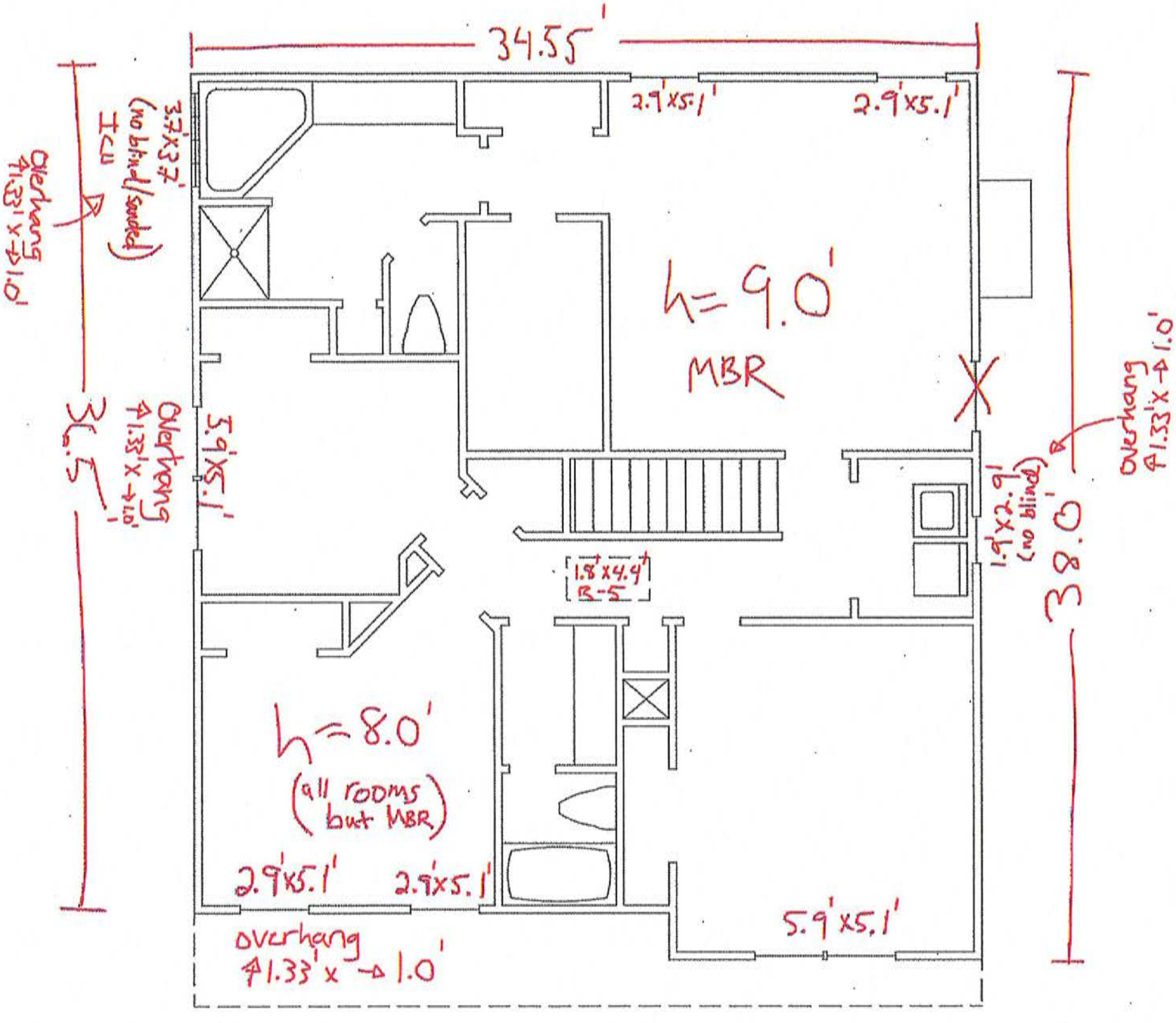
Attic Notes:
-Ceiling joists are 2x8 @ 16" OC
-Insulation is blown in loose-fill fiberglass @ 14-15" high (7-8" continuous R-value over studs)
-Attic pulldown stairs has R-5 foam board on door panel
-Attic is vented with soffits and static vents near ridge
-AHU located in attic

Ductwork Notes:
-All ductwork in attic is R-8 insulation and all flex duct except for plenum boxes off of AHU and transition boxes for some of the smaller supply branch lines (noted on drawings)
-Duct leakage is meeting 2015 code at 2.9% total leakage and 2.0% leakage to the outdoors, but boots/return box are not sealed to the sheetrock

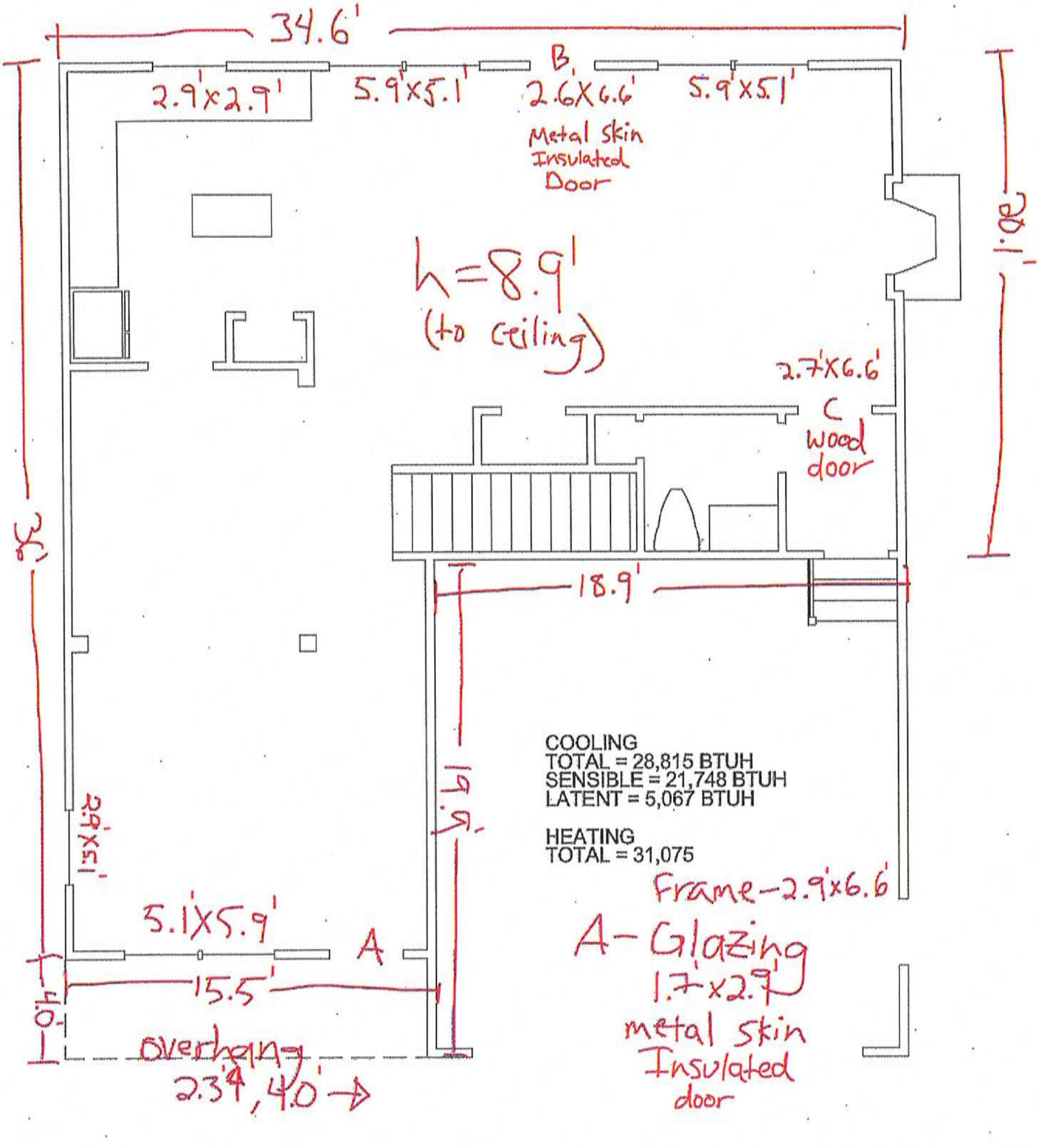
Blower Door Test Result:
-1,949 CFM@50Pa = approximately 6.13 ACH@50Pa

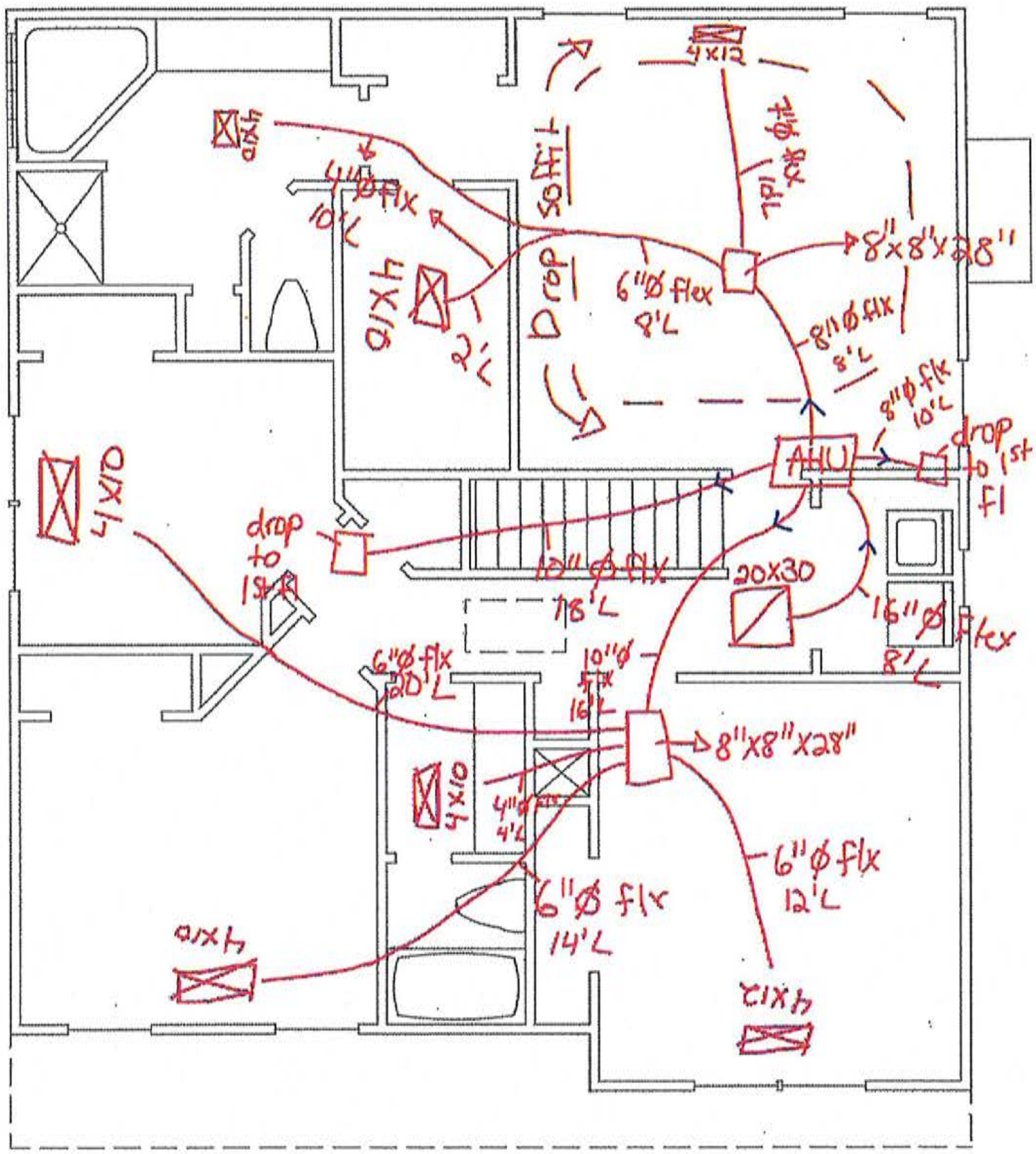
Bathroom Ventilation Rates:
Downstairs half bath - 35 CFM
Upstairs hallway full bath - 28 CFM
Master bath - 22 CFM
Master toilet - 28 CFM



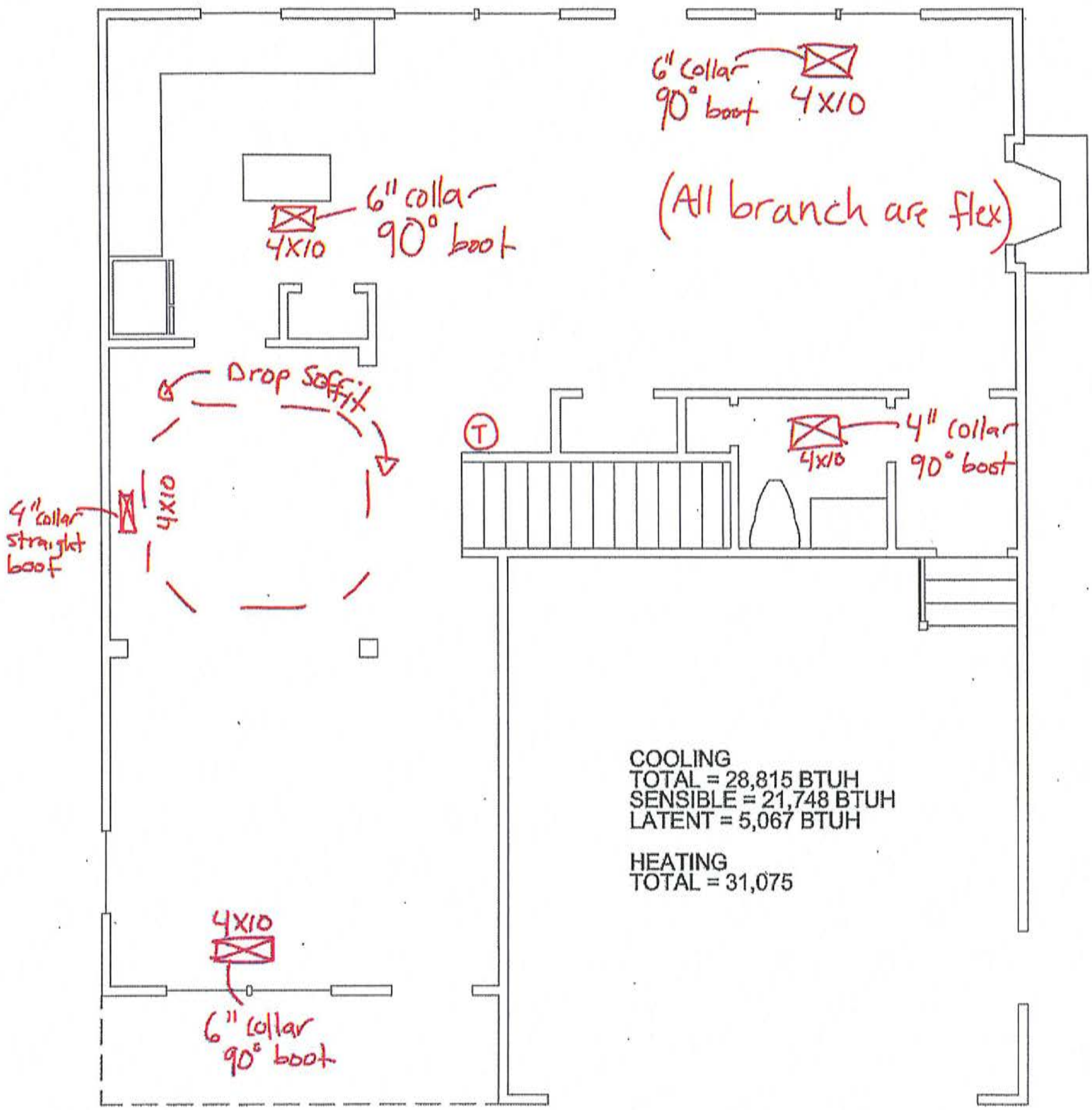
34.55'
2.9'x5.1'
2.9'x5.1'
3.7'x3.7' (no blind/sealed)
I=1
Overhang ↑1.33' x → 1.0'
h=9.0'
MBR
36.5'
Overhang ↑1.33' x → 1.0'
3.9'x5.1'
Overhang ↑1.33' x → 1.0'
1.9'x2.9' (no blind)
38.0'
1.8'x4.4' B-5
h=8.0'
(all rooms but MBR)
2.9'x5.1'
2.9'x5.1'
5.9'x5.1'
overhang ↑1.33' x → 1.0'

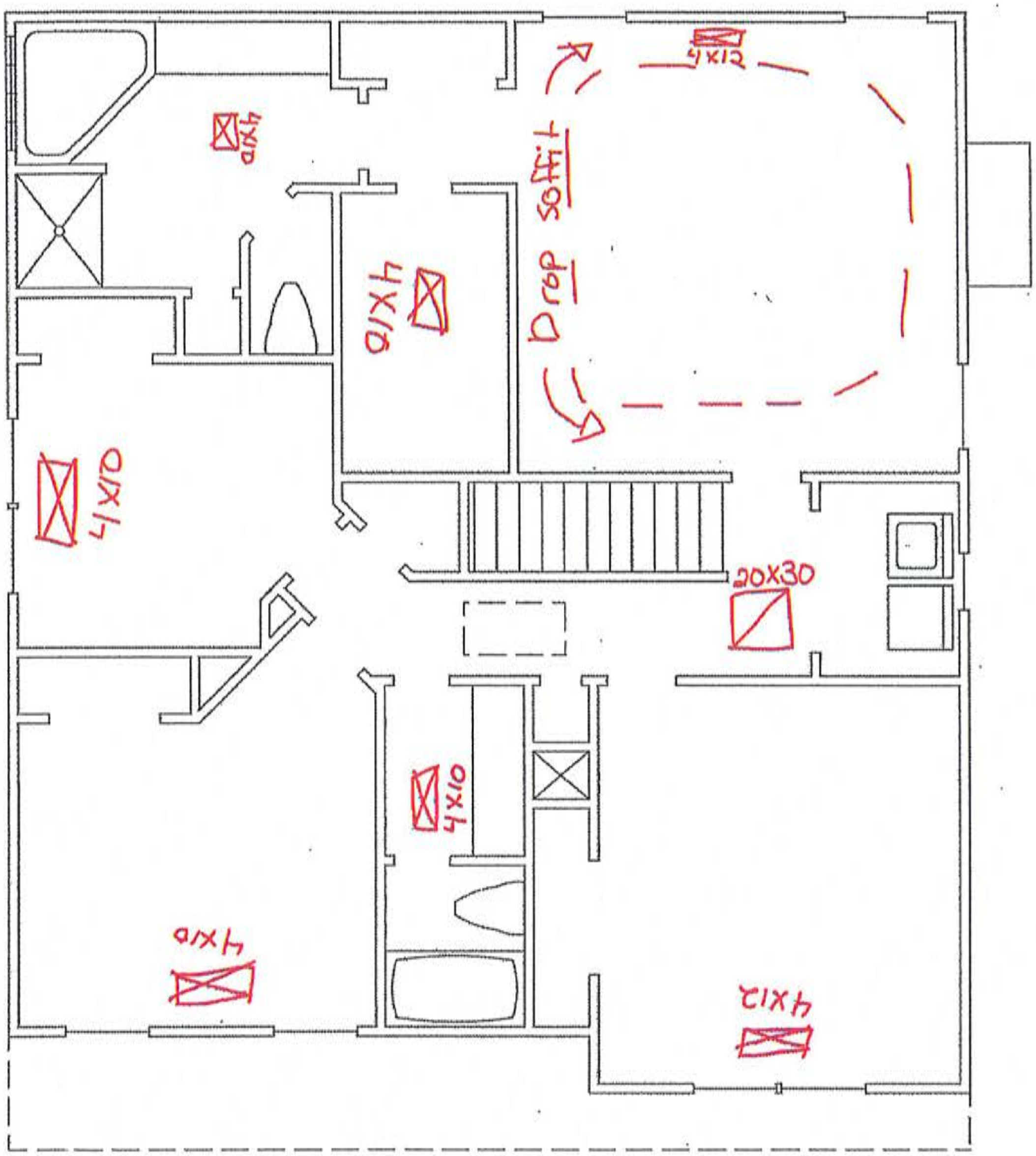
SCALE = 1/8" = 1'


34.6'
B
2.9'x2.9'
5.9'x5.1'
2.6X6.6'
5.9'x5.1'
Metal Skin Insulated Door
h=8.9'
(to ceiling)
2.7'X6.6'
C
wood door
18.9'
COOLING
TOTAL = 28,815 BTUH
SENSIBLE = 21,748 BTUH
LATENT = 5,067 BTUH
HEATING
TOTAL = 31,075
Frame-2.9'x6.6'
5.1'X5.9'
A
A-Glazing
1.7'x2.9'
metal skin
Insulated
door
15.5'
overhang
2.34', 4.0'


4x12
4x10
4"Ø flx
10'L
4x10
2'L
drop soffit
6"Ø flex
8'L
8"x8"x28"
8"Ø flx
8'L
AHU
8"Ø flx
10'L
drop to 1st fl
4x10
drop to 1st fl
10"Ø flx
18'L
20X30
16"Ø flex
8'L
6"Ø flx
20'L
10"Ø flx
16'L
8"x8"x28"
4x10
4"Ø flx
4'L
6"Ø flx
14'L
6"Ø flx
12'L
4x10
4x12

SCALE = 1/8" = 1'


6" Collar 90° boot
4X10
6" collar 90° boot
4X10
(All branch are flex)
Drop Soffit
T
4" collar 90° boot
4X10
4" collar straight boot
4X10
COOLING
TOTAL = 28,815 BTUH
SENSIBLE = 21,748 BTUH
LATENT = 5,067 BTUH
HEATING
TOTAL = 31,075
4X10
6" collar 90° boot



SCALE = 1/8" = 1'

CITY INFORMATION: D

D

DUCT CHECK PRO

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APPLIED BUILDING SCIENCE

All testing performed by Ecovative Energy is completed by Certified Third Party testing specialists who follow the ANSI/RESNET/ICC 380-2016 Standard for Testing Airtightness of Building Enclosures, Airtightness of Heating and Cooling Air Distribution Systems, and Airflow of Mechanical Ventilation Systems.

ecovative
Third Party
Verified

4281 Cole Avenue

Suffolk, Virginia

Job Details		
Client Name	Client Phone Number	Client Email
City of Suffolk		
Square Footage Served	Air Handler Location	Duct System Location(s)
2227	Vented Attic	Vented Attic/Between Floors

TEST RESULTS		
System Identity	Pass or Does Not Pass	Standard Selected
Whole House	**PASS**	**2015 Virginia Building Code**
Date	Test results (cfm@25pa)	Maximum Allowed (cfm@25pa)
Aug 31, 2020	**64**	**89.1**

Testing Standards			
Select	Applicable Standard	Standard Criteria	Applied Standard (cfm@25pa)
	2012 Virginia Building Code	6%	NA
✓	2015 Virginia Building Code	4%	89.1
	2015 Va Building Code -AHU	3%	NA
	EarthCraft Va	Varies	NA
	ENERGYSTAR Homes (V3R8)	4%	NA

Testing Details			
Test #	Total Duct Leakage (% of sq. ft.)	Tested LTO (cfm@25pa)	Outdoor Duct Leakage (% of sq. ft.)
1	2.9%	50	2%
# Of Returns	Positive or Negative Test	Test Equipment Location	Test Probe Location
1	Positive	Central Return	Hallway Bathroom Supply

This test is guaranteed to be accurate by: Jeffrey Sadler
RESNET CERTIFICATION RATER ID #4828461

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N1103.2.2.1 Testing option. Duct tightness shall be verified by either of the following:

1. Post-construction test: Leakage to outdoors shall be less than or equal to 8 cfm (3.78 L/s) per 100 square feet (9.29 m^2) of conditioned floor area or a total leakage less than or equal to 12 cfm (5.66 L/s) per 100 square feet (9.29 m^2) of conditioned floor area when tested at a pressure differential of 0.1 inch w.g. (25 Pa) across the entire system, including the manufacturer's air handler end closure. All register boots shall be taped or otherwise sealed during the test.
2. Rough-in test: Total leakage shall be less than or equal to 6 cfm (2.83 L/s) per 100 square feet (9.29 m^2) of conditioned floor area when tested at a pressure differential of 0.1 inch w.g. (25 Pa) across the roughed in system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 4 cfm (1.89 L/s) per 100 square feet (9.29 m^2) of conditioned floor area.

Exception: Duct tightness test is not required if the air handler and all ducts are located within conditioned space.

When this option is chosen, testing shall be performed by approved qualified individuals, testing agencies or contractors. Testing and results shall be as prescribed in Section N1103.2.2 and approved recognized industry standards.

N1103.2.2.2 Visual inspection option. In addition to the inspection of ducts otherwise required by this code, when the air handler and all ducts are not within conditioned space and this option is chosen to verify duct tightness, duct tightness shall be considered acceptable when the requirements of Section N1103.2.2 are field verified.

N1103.2.3 Building cavities. Building framing cavities shall not be used as supply ducts.

N1103.3 Mechanical system piping insulation. Mechanical system piping capable of carrying fluids above 105°F (40°C) or below 55°F (13°C) shall be insulated to a minimum of R-3.

N1103.4 Circulating hot water systems. All circulating service hot water piping shall be insulated to at least R-2. Circulating hot water systems shall include an automatic or *readily accessible* manual switch that can turn off the hot water circulating pump when the system is not in use.

N1103.5 Mechanical ventilation. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

N1103.6 Equipment sizing. Heating and cooling *equipment* shall be sized as specified in Section M1401.3.

N1103.7 Snow melt system controls. Snow- and ice-melting systems supplied through energy service to the building shall include automatic controls capable of shutting off the system when the pavement temperature is above 50°F (10°C) and no precipitation is falling and an automatic or manual control that will allow shutoff when the outdoor temperature is above 40°F (5°C).

N1103.8 Pools. Pools shall be provided with energy conserving measures in accordance with Sections N1103.8.1 through N1103.8.3.

N1103.8.1 Pool heaters. All pool heaters shall be equipped with a *readily accessible* on-off switch to allow shutting off the heater without adjusting the thermostat setting. Pool heaters fired by natural gas or LPG shall not have continuously burning pilot lights.

N1103.8.2 Time switches. Time switches that can automatically turn off and on heaters and pumps according to a preset schedule shall be installed on swimming pool heaters and pumps.

Exceptions:

1. Where public health standards require 24-hour pump operation.
2. Where pumps are required to operate solar- and waste-heat-recovery pool heating systems.

N1103.8.3 Pool covers. Heated pools shall be equipped with a vapor retardant pool cover on or at the water surface. Pools heated to more than 90°F (32°C) shall have a pool cover with a minimum insulation value of R-12.

SECTION N1104
LIGHTING SYSTEMS

N1104.1 Lighting equipment. A minimum of 50 percent of the lamps in permanently installed lighting fixtures shall be *high-efficacy lamps*.

ENVELOPE CHECK PRO

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Property Address: 4281 Cole Avenue, Suffolk VA **Date:** 8/31/2020

Year of Construction: 2016 **Approximate Square Feet:** 2,227

Bedrooms: 4 **Bathrooms:** 3 **Floors:** 2

ENVELOPE INFILTRATION AND AIR QUALITY

Approximate Volume (cubic feet):

19,063

Fan Flow at 50 pa (cfm):

1949

Air Change Rate at 50 pa:

6.13

Standard	**Air Change Rate @ 50 pa**
IECC 2012	< 5
Earthcraft VA	< 5
ENERGY STAR	< 4
PassivHaus	< 0.6

Natural Air Changes Per Hour:

0.38

ASHRAE 62.2 Whole Building Ventilation Rate (cfm):

53.3

TEST OUT READING

Verified

Your Ecovative Expert: Jeffrey Sadler
RESNET CERTIFICATION RATER
ID:4828461

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APPLIED BUILDING SCIENCE

Tel 757.277.0107 info@ecovativeenergy.com Fax 757.963.1443

N1102.4 Air leakage.

N1102.4.1 Building thermal envelope. The *building thermal envelope* shall be durably sealed to limit infiltration. The sealing methods between dissimilar materials shall allow for differential expansion and contraction. The following shall be caulked, gasketed, weatherstripped or otherwise sealed with an air barrier material, suitable film or solid material.

1. All joints, seams and penetrations.
2. Site-built windows, doors and skylights.
3. Openings between window and door assemblies and their respective jambs and framing.
4. Utility penetrations.
5. Dropped ceilings or chases adjacent to the thermal envelope.
6. Knee walls.
7. Walls and ceilings separating the garage from *conditioned spaces*.
8. Behind tubs and showers on *exterior walls*.
9. Common walls between *dwelling units*.
10. Attic access openings.
11. Rim joists junction.
12. Other sources of infiltration.

N1102.4.2 Air sealing and insulation. Building envelope air tightness and insulation installation shall be demonstrated to comply with one of the following options given by Section N1102.4.2.1 or N1102.4.2.2.

N1102.4.2.1 Testing option. Tested air leakage is less than 7 ACH when tested with a blower door at a pressure of 50 pascals (0.007 psi). Testing shall occur after rough in and after installation of penetrations of the building envelope, including penetrations for utilities, plumbing, electrical, ventilation and combustion appliances.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed;
2. Dampers shall be closed, but not sealed; including exhaust, intake, makeup air, back draft, and flue dampers;
3. Interior doors shall be open;
4. Exterior openings for continuous ventilation systems and heat recovery ventilators shall be closed and sealed;
5. Heating and cooling system(s) shall be turned off;
6. HVAC ducts shall not be sealed; and
7. Supply and return registers shall not be sealed.

N1102.4.2.2 Visual inspection option. The items listed in Table N1102.4.2, applicable to the method of construction, are field verified. Where required by the code official, an *approved* party independent from the installer of the insulation, shall inspect the air barrier and insulation.

N1102.4.3 Fireplaces. New wood-burning fireplaces shall have gasketed doors and outdoor combustion air.

N1102.4.4 Fenestration air leakage. Windows, skylights and sliding glass doors shall have an air infiltration rate of no more than 0.3 cubic foot per minute per square foot [1.5(L/s)/m^2], and swinging doors no more than 0.5 cubic foot per minute per square foot [2.5(L/s)/m^2], when tested according to NFRC 400 or AAMA/WDMA/CSA 101/I.S.2/A440 by an accredited, independent laboratory, and listed and *labeled* by the manufacturer.

Exception: Site-built windows, skylights and doors.

N1102.4.5 Recessed lighting. Recessed luminaires installed in the *building thermal envelope* shall be sealed to limit air leakage between conditioned and unconditioned spaces. All recessed luminaires shall be IC-rated and *labeled* as meeting ASTM E 283 when tested at 1.57 psf (75 Pa) pressure differential with no more than 2.0 cfm (0.944 L/s) of air movement from the *conditioned space* to the ceiling cavity. All recessed luminaires shall be sealed with a gasket or caulk between the housing and the interior wall or ceiling covering.

SECTION N1103
SYSTEMS

N1103.1 Controls. At least one thermostat shall be installed for each separate heating and cooling system.

N1103.1.1 Programmable thermostat. Where the primary heating system is a forced air furnace, at least one thermostat per *dwelling unit* shall be capable of controlling the heating and cooling system on a daily schedule to maintain different temperature set points at different times of the day. This thermostat shall include the capability to set back or temporarily operate the system to maintain zone temperatures down to 55°F (13°C) or up to 85°F (29°C). The thermostat shall initially be programmed with a heating temperature set point no higher than 70°F (21°C) and a cooling temperature set point no lower than 78°F (26°C).

N1103.1.2 Heat pump supplementary heat. Heat pumps having supplementary electric-resistance heat shall have controls that, except during defrost, prevent supplemental heat operation when the heat pump compressor can meet the heating load.

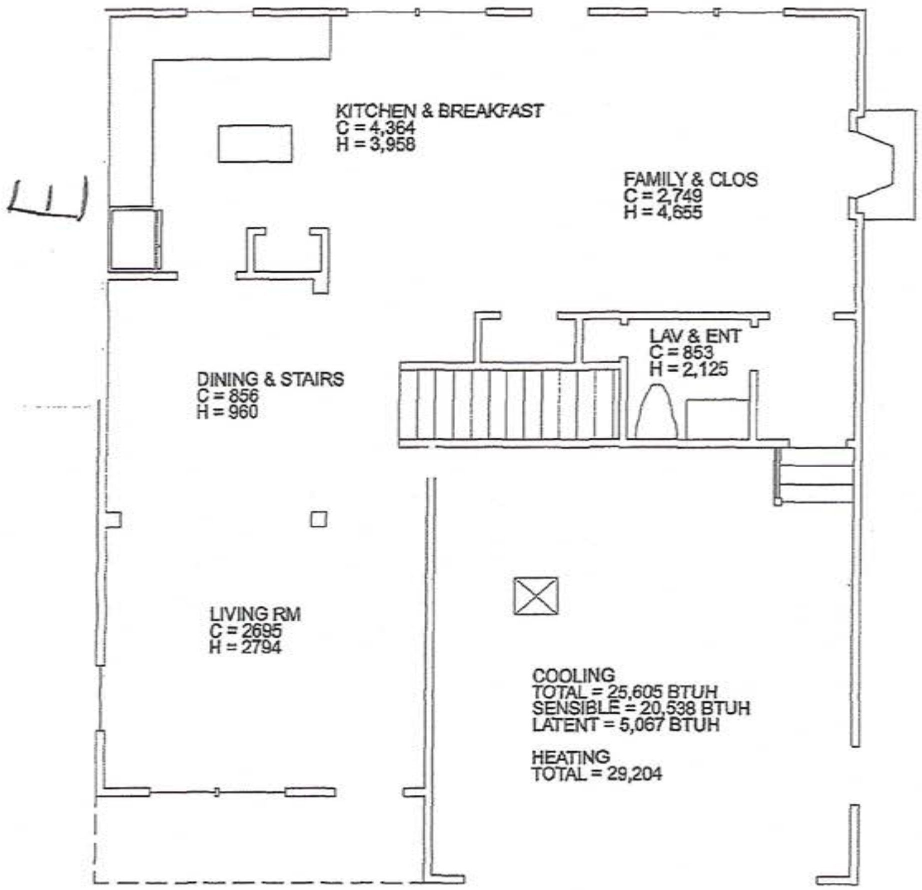
N1103.2 Ducts.

N1103.2.1 Insulation. Supply ducts in attics shall be insulated to a minimum of R-8. All other ducts shall be insulated to a minimum of R-6.

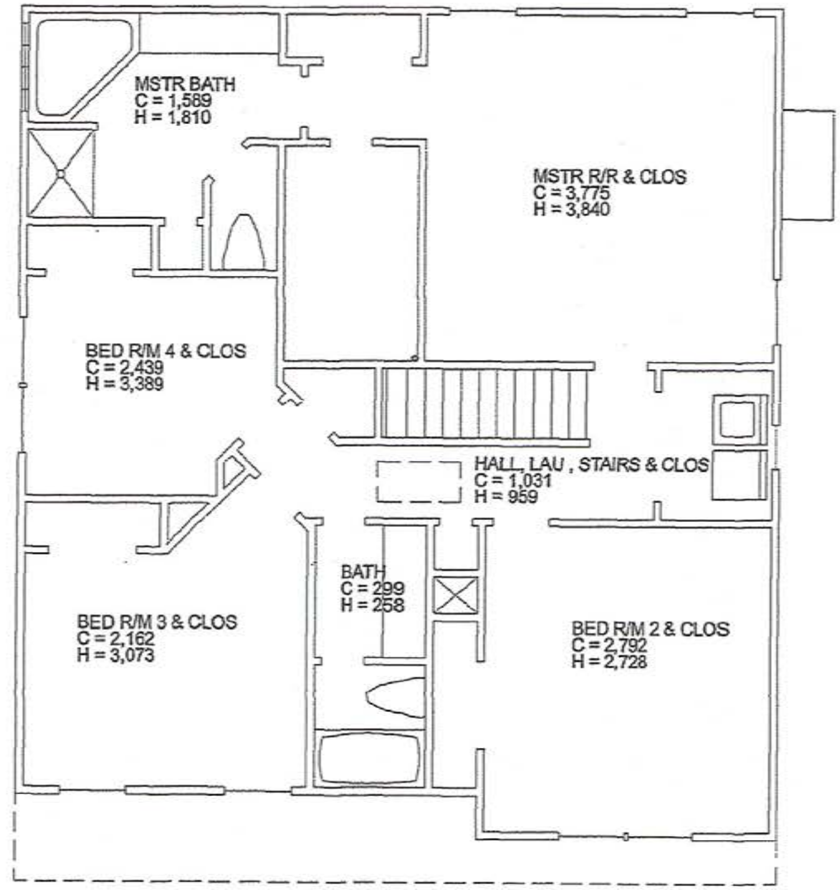
Exception: Ducts or portions thereof located completely inside the *building thermal envelope*.

N1103.2.2 Sealing. All ducts, air handlers, filter boxes and building cavities used as ducts shall be sealed. Joints and seams shall comply with Section M1601.4.1 of the *International Residential Code*. Verification of compliance with this section shall be in accordance with either Section N1103.2.2.1 or Section N1103.2.2.2.

CITY INFORMATION: E



SCALE = 1/8" = 1'



SCALE = 1/8" = 1'

#	Item		Const. No.	HTM Htg.	HTM Clg.	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg
1	Name of Room					4281 COLE AVE			Living Room			Dining & Stairs			Kitchen & Brekfast			Family & Clos		
2	Running Ft. Exposed Wall					288			40			24			30			31		
3	Room Dimensions Ft.					2214			189			206			230			246		
4	Ceiling Ht. Ft.		Directions Room Faces						9			9			9			9		
	TYPE OF EXPOSURE		Const. No.	Htg.	Clg.	Area or Length	Hrg	Clg	Area or Length	Hrg	Clg	Area or Length	Hrg	Clg	Area or Length	Hrg	Clg	Area or Length	Hrg	Clg
5	Gross Exposed Walls & Partitions	a				2,446			360			216			270			279		
		b																		
		c																		
		d																		
6	Windows & Glass Door Htg.	a	3-D	18.1		227	4,109								39	706		48	869	
		b																		
		c																		
		d																		
7	Windows & Glass Doors Clg.	North			16.0	90		1,440	30		480									
		E & W			45.0	65		2,925	15		675									
		South			25.0	117		2,925							39		975	48		1,200
		NE & NW			33.0															
		SE & SW			46.0															
		SHADE			16.0															
8	Other doors		11-C	23.5	11.1	40	940	444	20	470	222									
9	Net Exposed Walls & Partitions	a	12-I	2.8	1.9	2,134	5,975	4,055	295	826	561	216	605	410	231	647	439	231	647	439
		b																		
		c																		
		d																		
10	Ceilings	a	18-F	1.8	1.3	1,220	2,196	1,586												
		b																		
11	Floors	a	19-D	1.3					189	246		206	268		230	299		246	320	
		b	23-D	46.5																
12	Infiltration HTM			49.9	8.8	267	13,329	2,346	20	998	176				39	1,947	343	48	2,398	422
13	Sub total Btuh Loss = 6+8+9+10+11+12						26,549			2,540			873			3,599			4,232	
14	Duct Btuh Loss			10.0%			2,655			254			87			360			423	
15	Total Btuh Loss = 13+14						29,204			2,794			960			3,958			4,655	
16	People @ 230 & Appliances 1800							2,950									1,800			
17	Sensible Btuh Gain = 7+8+9+10+11+12+16							18,670			2,113			410			3,557			2,061
18	Duct Btuh Gain				10.0%			1,867			211			41			356			206
19	Total Sensible Gain							20,536			2,325			451			3,912			2,267
	Infiltration CFM			Latent Gain		125		4,067	11		371	12		404	14		451	15		483
	Latent from People							1,000												
	Total Latent Load							5,067			371			404			451			483
	Design CFM							853			90			29			145			92
	Total System Load							25,605			2,695			856			4,364			2,749
	Selected Capacity			27,500		Actual CFM		917			96			31			156			98

Lav & Entrance						Bed 4 & Clos			Hall Stairs, Lau & Clos			Bath			Bed 3 & Clos		
17						33			7			5			27		
70						214			180			68			182		
9			14			8			8			8			8		
Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg
153						264			56			40			216		
						30	543		6	109					30	543	
						30		480							30		480
									6		270						
20	470	222															
133	372	253				234	655	445	50	140	95	40	112	76	186	521	353
						214	385	278	180	324	234	68	122	88	129	232	168
70	91																
20	998	176				30	1,498	264	6	300	53				30	1,468	264
	1,932						3,061			872			234			2,794	
	193						308			87			23			279	
	2,125						3,369			959			258			3,073	
								230									230
		650						1,696			652			164			1,495
		65						170			65			16			149
		715						1,866			717			181			1,644
4		137				11		373	10		314	4		119	10		317
								200									200
		137						573			314			119			517
		28						81			34			10			72
		853						2,439			1,031			299			2,162
		31						87			37			11			77

Bed 2 & Clos			Mstr Bath			Mstr Bedroom & Clos		
13			22			39		
129			133			367		
8			8			8		
Area or Length	BTUH		Area or Length	BTUH		Area or Length	BTUH	
	Hrg	Clg		Hrg	Clg		Hrg	Clg
104			176			312		
30	543		14	253		30	543	
30		1,350	14		630			
						30		750
74	207	141	162	454	308	282	790	536
129	232	168	133	239	173	367	661	477
30	1,498	264	14	699	123	30	1,498	264
	2,480			1,545			3,491	
	246			165			349	
	2,728			1,810			3,640	
		230						460
		2,152			1,234			2,486
		215			123			249
		2,367			1,357			2,735
7		225	7		232	20		640
		200						400
		425			232			1,040
		93			53			126
		2,792			1,589			3,775
		100			57			135

AHRI CERTIFIED

Certificate of Product Ratings

AHRI Certified Reference Number: 8358271 **Date: 3/16/2017**

Product: Split System: Heat Pump with Remote Outdoor Unit-Air-Source

Outdoor Unit Model Number: GSZ130301A*

Indoor Unit Model Number: ARUF30B14A*

Manufacturer: GOODMAN MANUFACTURING CO., LP.

Trade/Brand name: GOODMAN; JANITROL; AMANA DISTINCTIONS; EVERREST; ONE HOUR AIR CONDITIONING AND HEATING; ENERGI AIR

Series name: GSZ13

Manufacturer responsible for the rating of this system combination is GOODMAN MANUFACTURING CO., LP.

Rated as follows in accordance with AHRI Standard 210/240-2008 for Unitary Air-Conditioning and Air-Source Heat Pump Equipment and subject to verification of rating accuracy by AHRI-sponsored, independent, third party testing:

Cooling Capacity (Btuh):	27200	TOTAL
EER Rating (Cooling):	11.00	
SEER Rating (Cooling):	13.00	
Heating Capacity(Btuh) @ 47 F:	27000	TOTAL
Region IV HSPF Rating (Heating):	8.00	
Heating Capacity(Btuh) @ 17 F:	16500	

* Ratings followed by an asterisk (*) indicate a voluntary rerate of previously published data, unless accompanied with a WAS, which indicates an involuntary rerate.

CERTIFICATE NO.: 131341628052233091

CITY INFORMATION: F

F

ecovative
APPLIED BUILDING SCIENCE

August 31, 2020
4281 Cole Ave, Suffolk VA
Client: City of Suffolk

Building Envelope Analysis

The blower door test had an air leakage result of approximately 6.13 ACH@50Pa (1,949 CFM@50Pa). Current new construction building code requires an air leakage rate of 5.0 ACH@50pa or less (1,588 CFM@50 for this home). While this home was not required to follow these standards when it was originally constructed, it indicates that the building envelope has more air leakage compared to others of the same size that are following these standards. Air leakage was found around unsealed plumbing and electrical penetrations in the sheetrock at ceilings and exterior walls, as well as various wall/floor transitions on exterior walls. There are several recessed can lights which are not sealed to the sheetrock throughout the home.

The fundamental principles of air infiltration are due to an event known as the "stack effect" which can have a significant impact on heat loss in the winter or heat gain in the summer. In this case, warm humid outside air can infiltrate into the home bringing in additional moisture as the air conditioning causes the cooler air to sink to the lower areas of the home where it escapes to the outside.

There was discoloration found around some of the supply grills throughout the home. Supply boots (and the return box) were not sealed to the sheetrock. The gap between supply boots and sheetrock are a source of duct leakage as well as air leakage through the building envelope. If certain sections of the home are under negative pressure, air leakage from the interstitial spaces between floors or from the unconditioned attic can infiltrate through the gaps around the supply boots, causing particulates to form the discoloration that was discovered around the supply boots.

The blown-in fiberglass insulation in the attic is not in full contact with the ceiling sheetrock in several areas, most notably underneath large sections of the ductwork. This can cause warm air to enter the space between the ceiling sheetrock and ductwork where they may become condensing surfaces if either the sheetrock or ductwork reach below the dew point. The attic insulation should be in full contact with the sheetrock across the entire ceiling plane.

www.ecovativeenergy.com

Tel 757.655.3261 info@ecovativeenergy.com Fax 757.963.1443

Crawlspace Analysis

The home is built on a vented crawlspace. There is a vapor barrier on the ground, but it is not sealed at seams, penetrations or around the perimeter where it meets the foundation walls or inner structural piers. Additional moisture in the ground can move through the openings in the vapor barrier where it can eventually migrate into the home, causing increased levels of humidity.

The insulation in the floor joists are paper-faced fiberglass batts. There was a consistent layer of mold found on the paper-face of all the insulation that was inspected as well as the underside of the subfloor which is in contact with the paper-face side of the insulation. The finished floor is VCT tiling in all rooms of the first floor, which may have low permeable layers that are slowing down the moisture transmission through the floor assembly. This may be causing the moisture to become trapped between the insulation and the sub-floor, causing the mold growth that was observed.

Exterior Grading Analysis

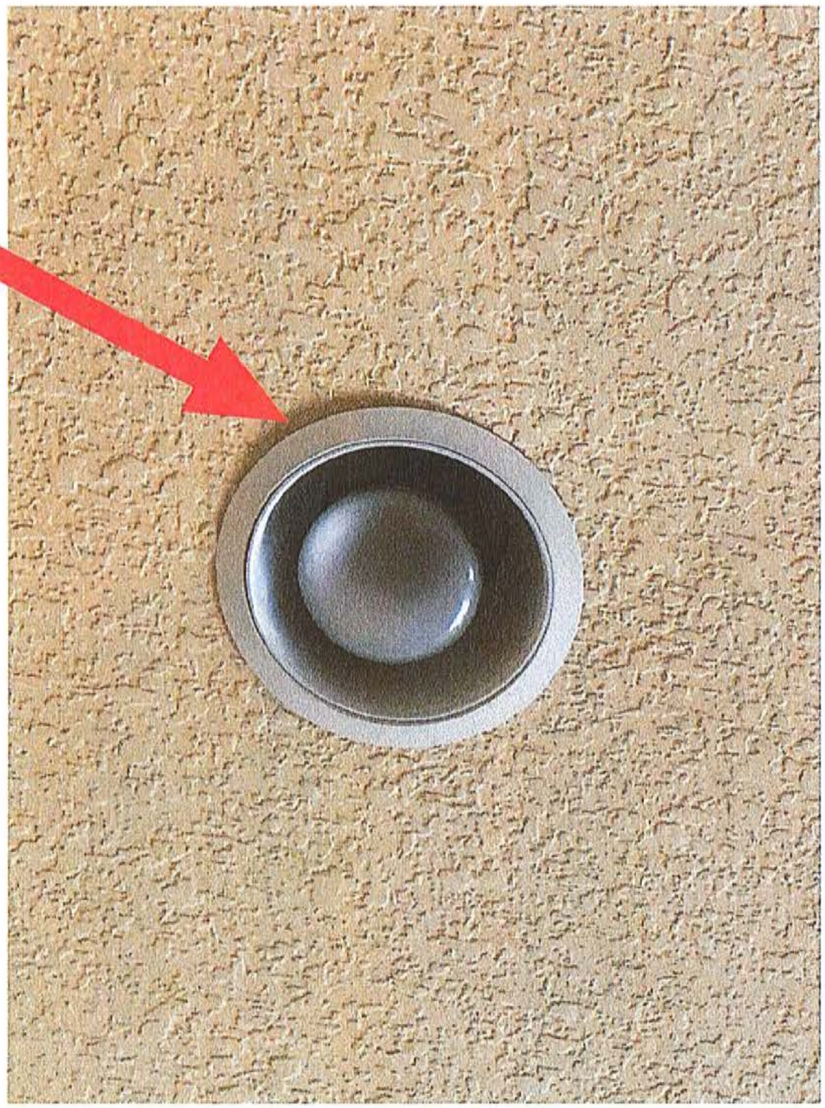
The home has several areas with neutral grading and some areas at a slight negative slope back towards the home. There are no gutters/downspouts to control bulk water management and no evidence of a curtain drainage system around the perimeter foundation walls. Without a bulk water management system coupled with ineffective exterior grading, water can pool around the perimeter foundation walls where it can migrate into the crawlspace through capillary action and eventually into the home.

Additional HVAC Analysis

The thermostat was set to 67°F when entering the home. Relative humidity increases as sensible temperatures decrease. Therefore, the colder the home is set to, the higher the relative humidity will be. This also brings vulnerable surfaces such as the ceiling under the attic closer to dew point temperatures where mold can potentially form.

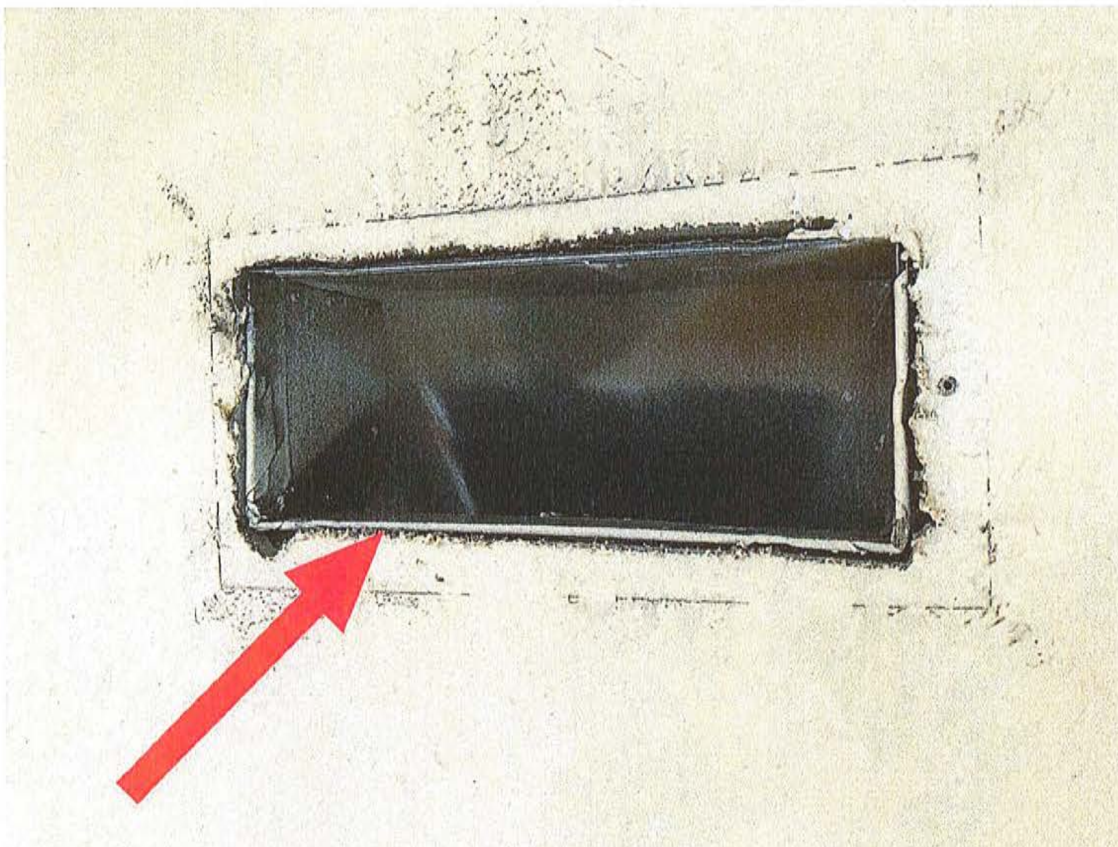
The condensate line also discharges directly onto the perimeter foundation wall behind the outdoor condenser unit. The moisture which is being removed by the HVAC system then re-enters the home through capillary action into the crawlspace where it can migrate back into the home.

Observation 1: There are several recessed can lights which are not sealed to the sheetrock throughout the home.



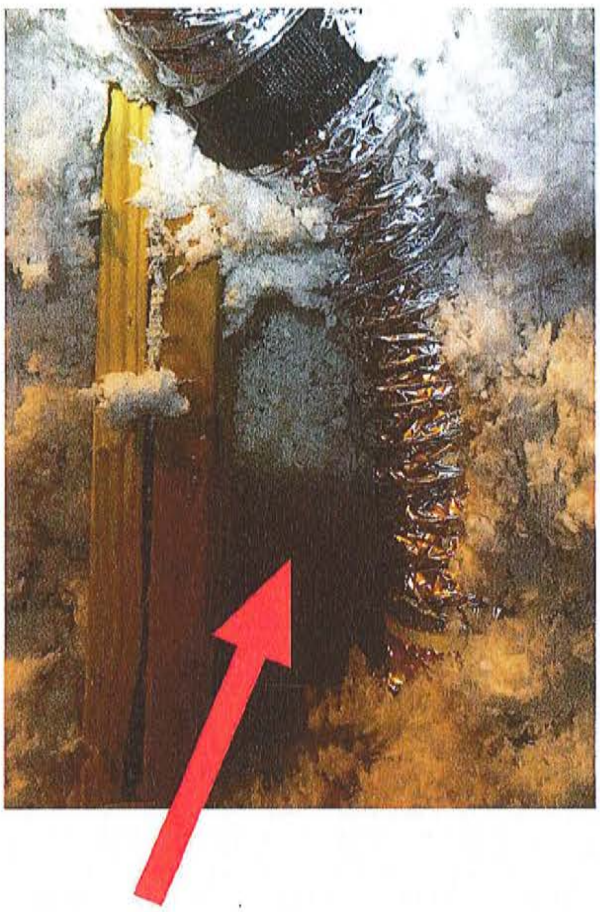
Observation 2: There was discoloration found around some of the supply grills throughout the home.

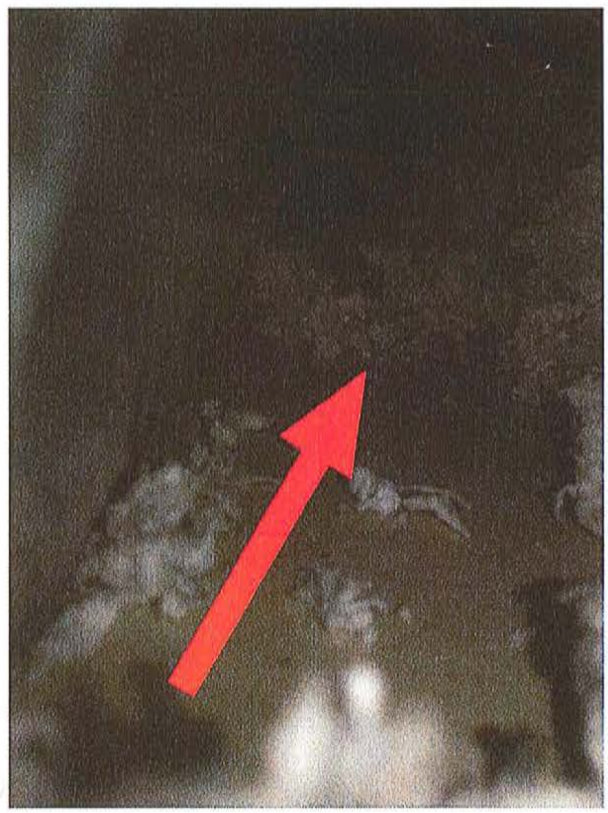
Observation 3: Supply boots (and the return box) were not sealed to the sheetrock. The gap between supply boots and sheetrock are a source of duct leakage as well as air leakage through the building envelope.



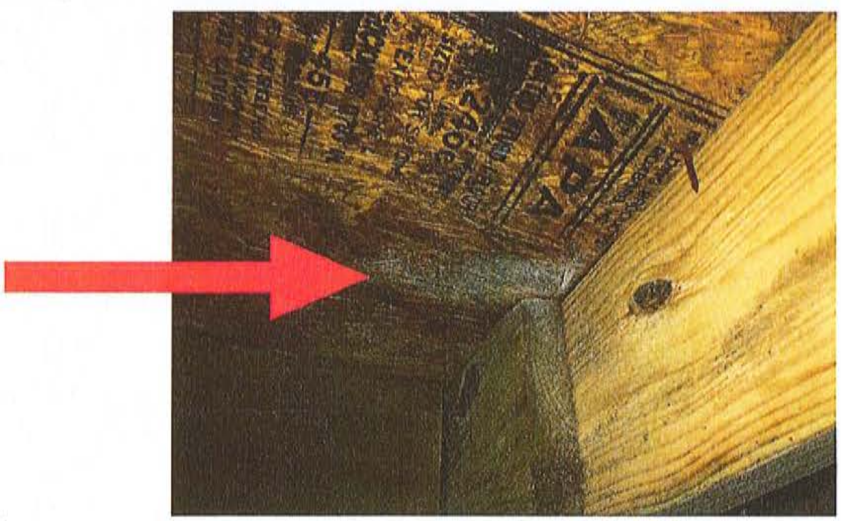
Tel 757.655.3261 info@ecovativeenergy.com Fax 757.963.1443

Observation 4: The blown-in fiberglass insulation in the attic is not in full contact with the ceiling sheetrock in several areas, most notably underneath large sections of the ductwork.





Observation 5: There was a consistent layer of mold found on the paper-face of all the insulation that was inspected as well as the underside of the subfloor which is in contact with the paper-face side of the insulation.



Observation 6: The home has several areas with neutral grading and some areas at a slight negative slope back towards the home.

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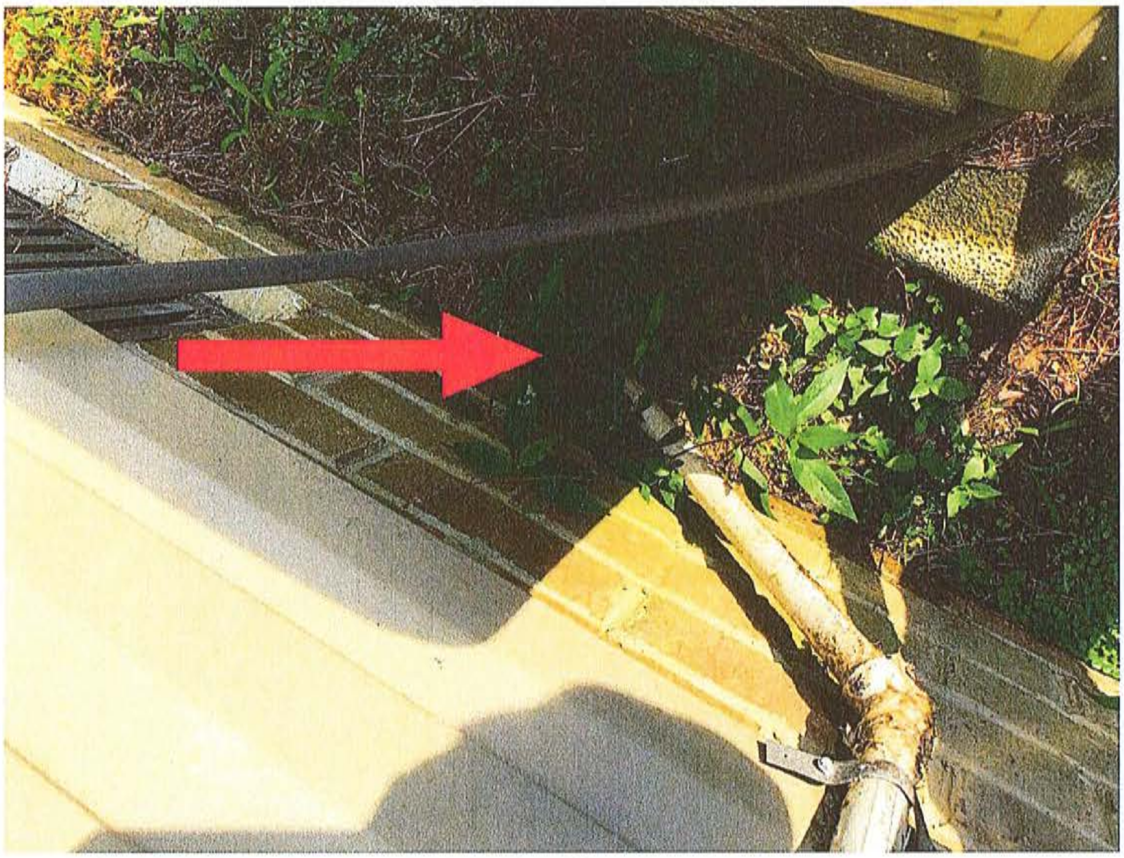
Tel 757.655.3261 info@ecovativeenergy.com Fax 757.963.1443

Observation 7: There are no gutters/downspouts to control bulk water management and no evidence of a curtain drainage system around the perimeter foundation walls.

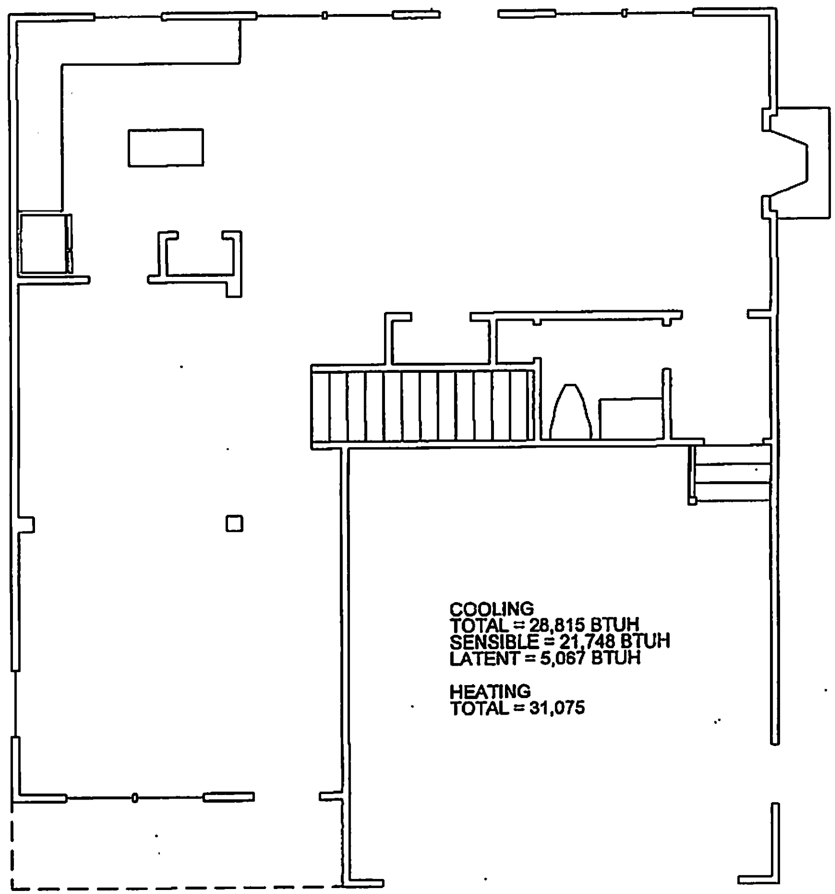
Observation 8: The thermostat was set to 67°F when entering the home. Relative humidity increases as sensible temperatures decrease. Therefore, the colder the home is set to, the higher the relative humidity will be.

Observation 9: The condensate line also discharges directly onto the perimeter foundation wall behind the outdoor condenser unit.



CITY INFORMATION: G

G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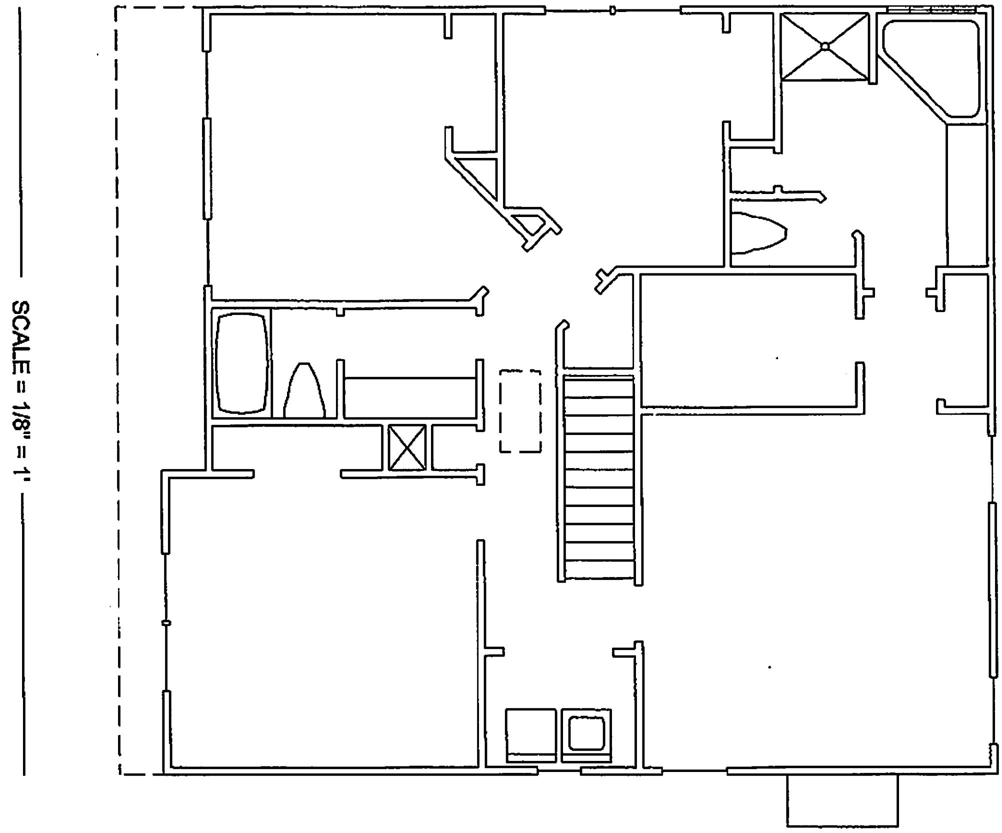
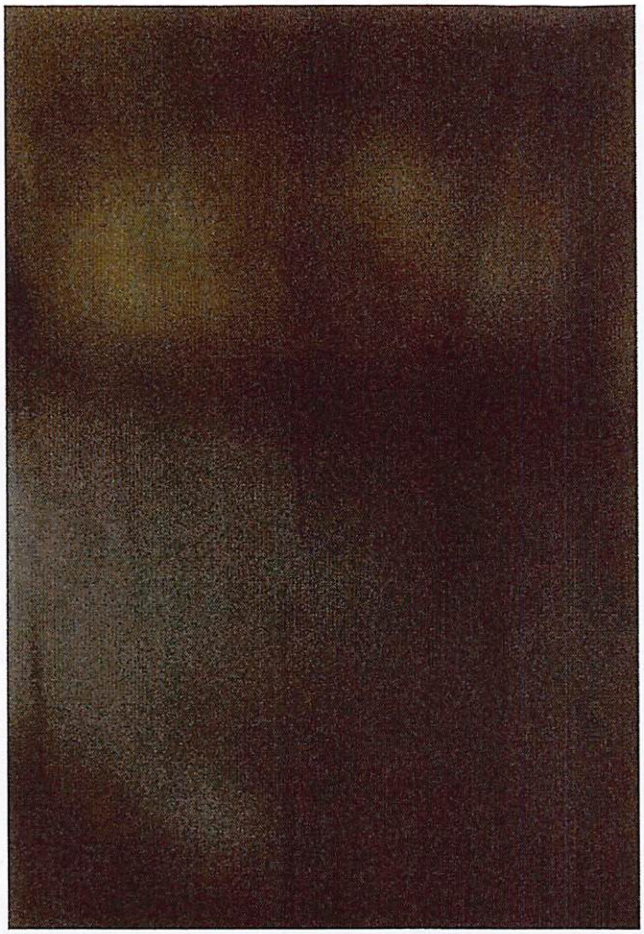
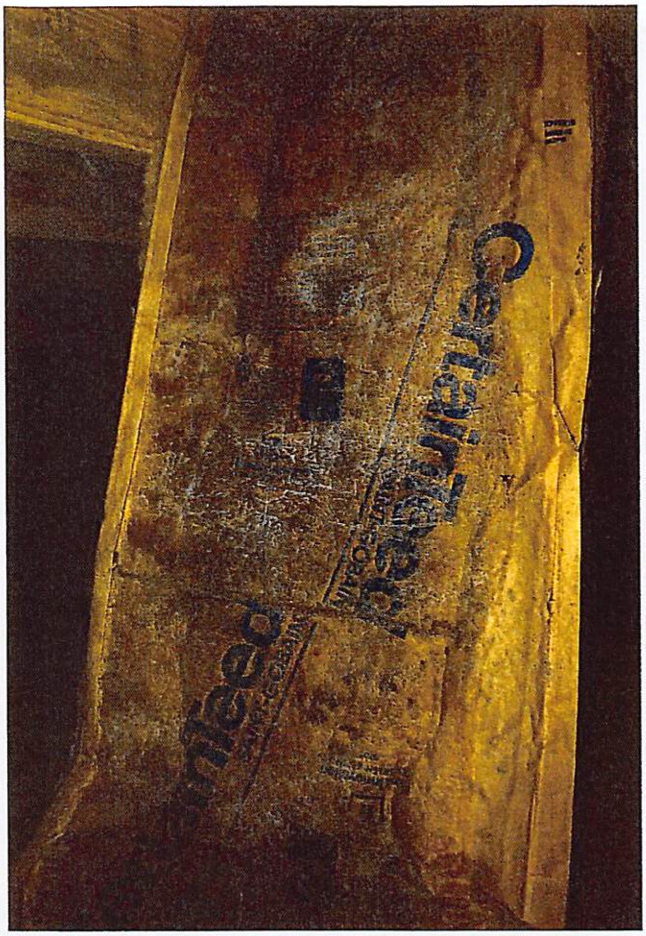
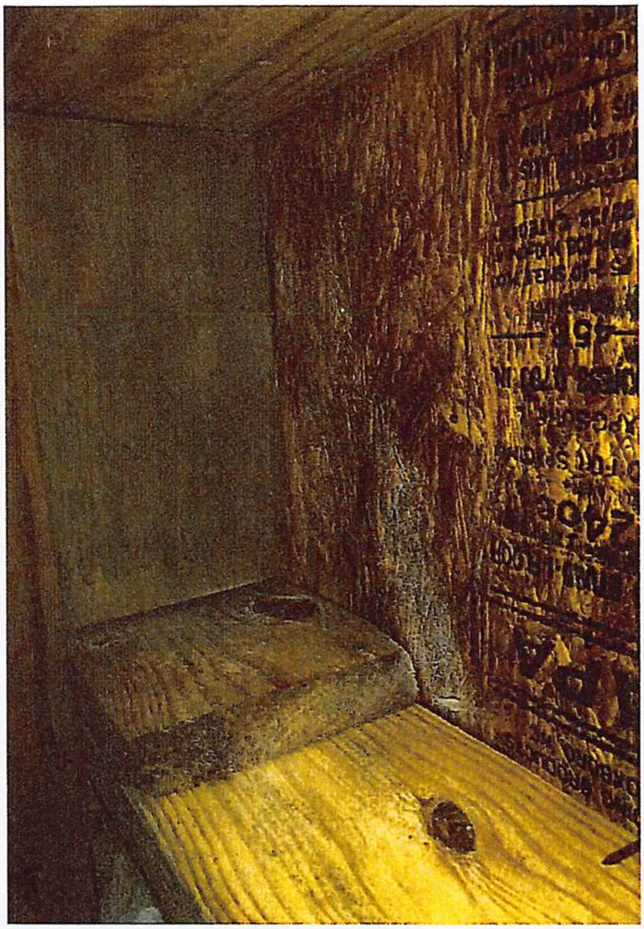
TOTAL = 28,815 BTUH
SENSIBLE = 21,748 BTUH
LATENT = 5,067 BTUH
HEATING
TOTAL = 31,075

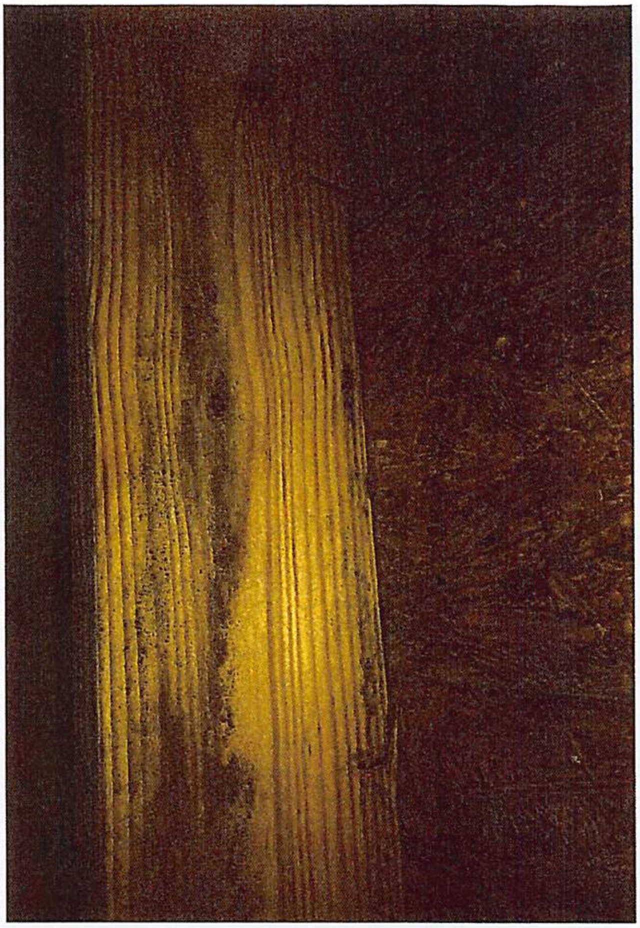
SCALE = 1/8" = 1'

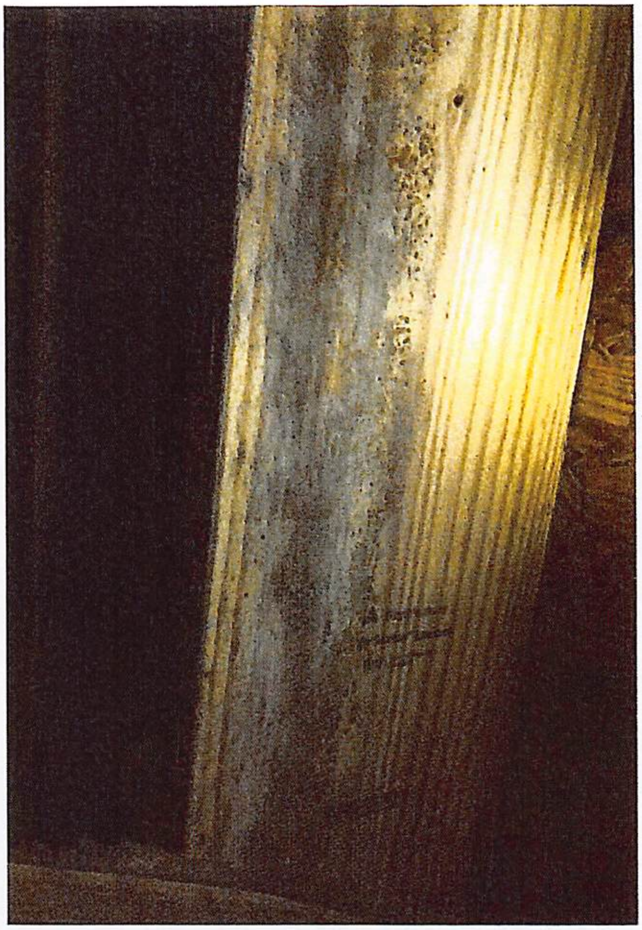

SCALE = 1/8" = 1'

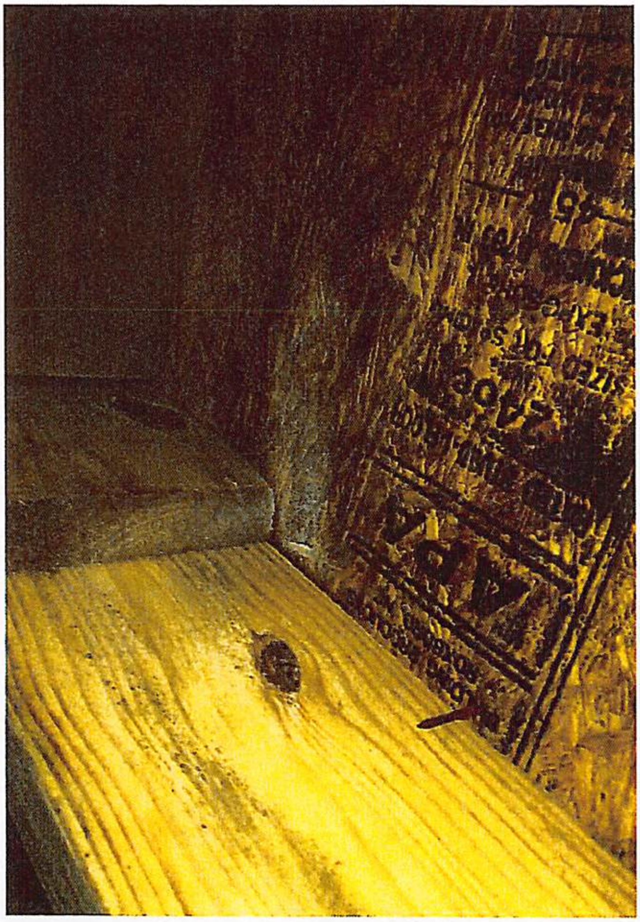


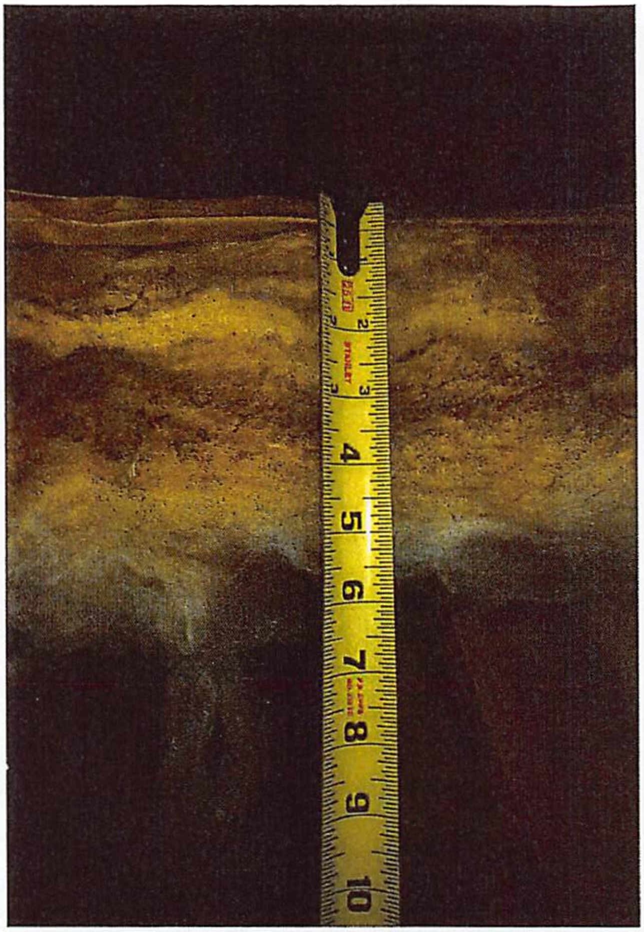

CertainTeed

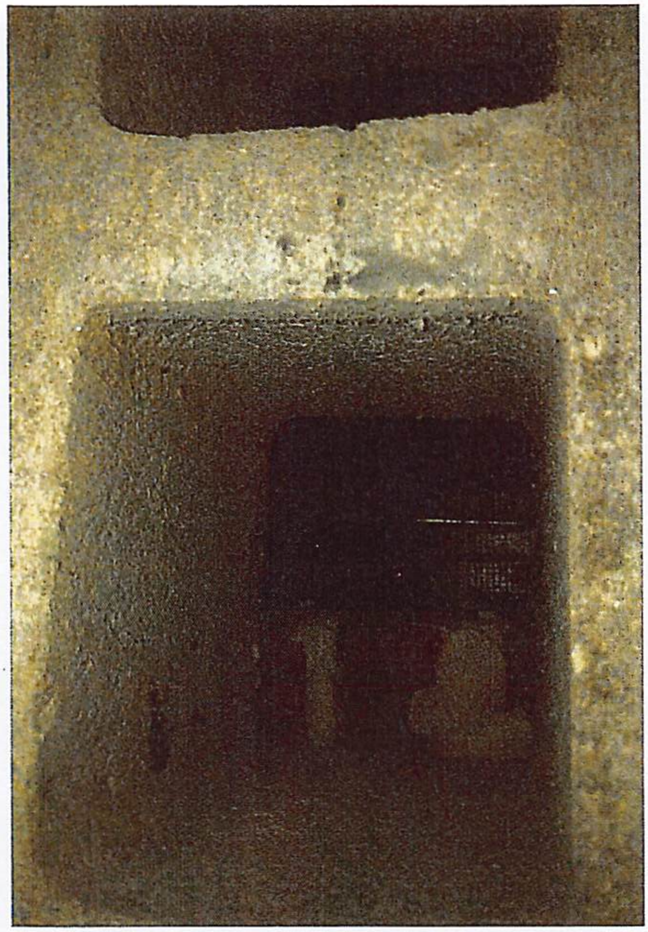




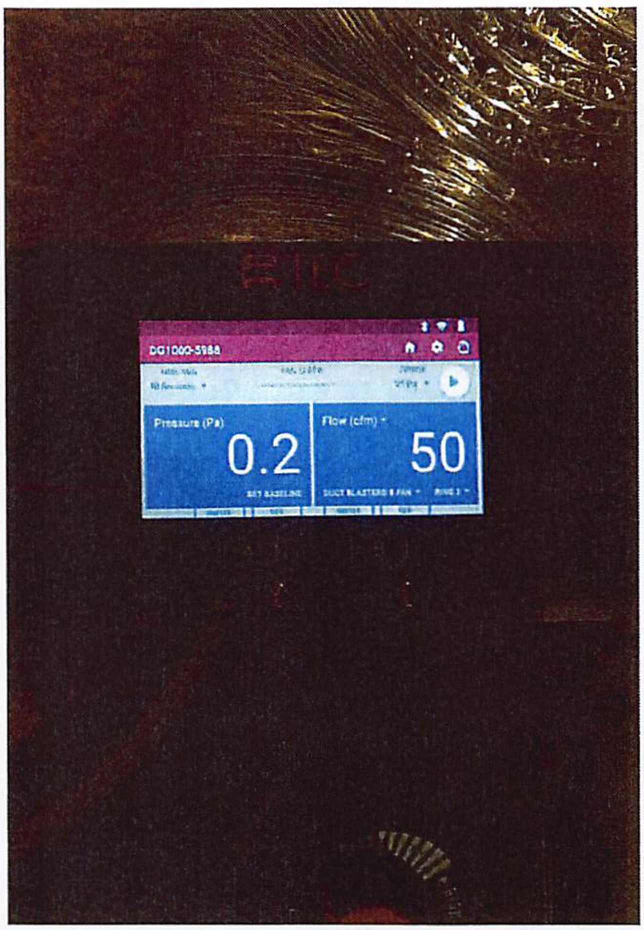









DG1000-5988
TIME AVG
10 Seconds
FAN SPEED
CRUISE
25Pa
Pressure (Pa)
25.8
SET BASELINE
INPUT
REF
Flow@25 (cfm)
64
DUCT BLASTER® B FAN
RING 3
INPUT
REF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0.2
Flow (cfm)
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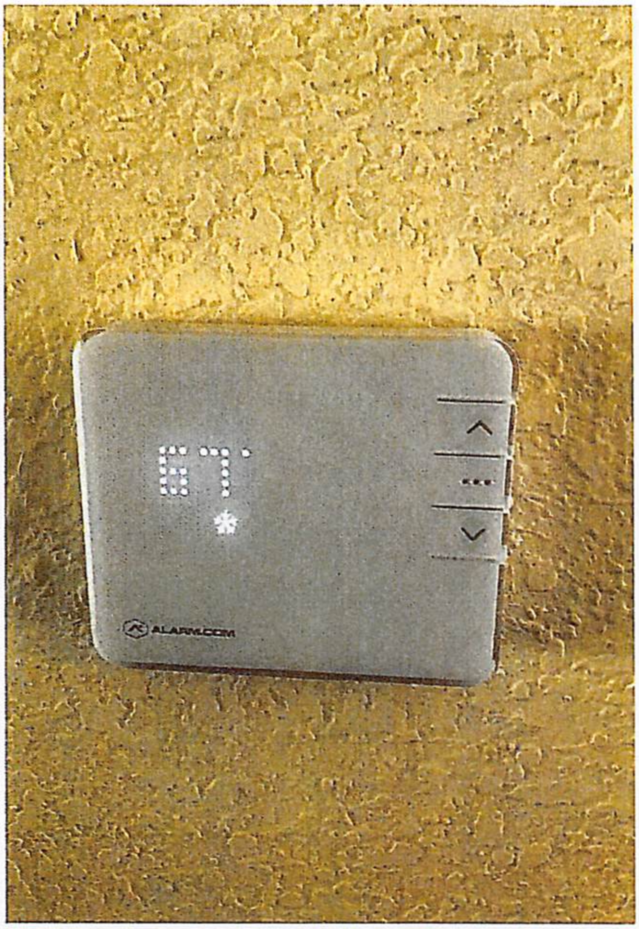
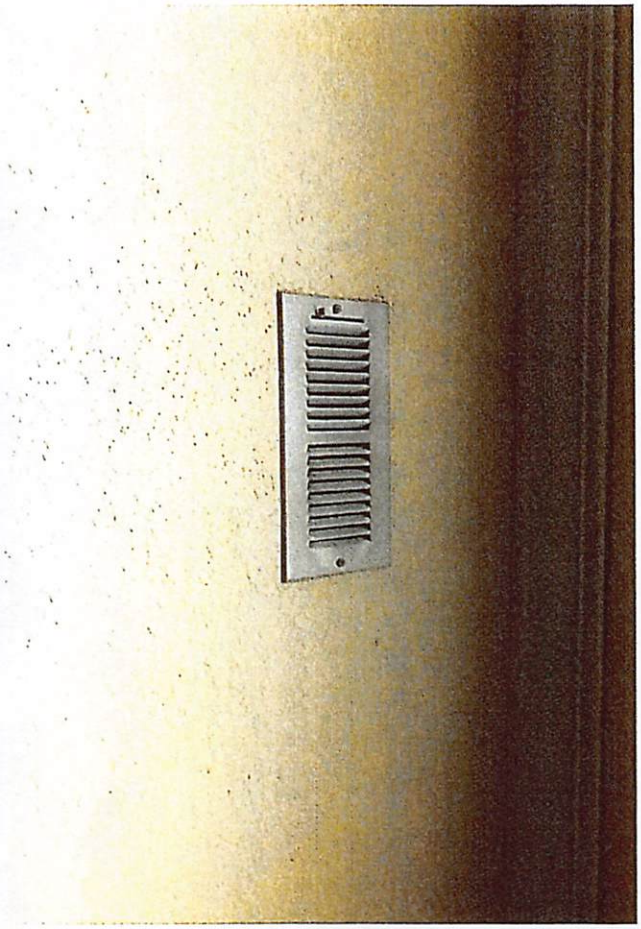
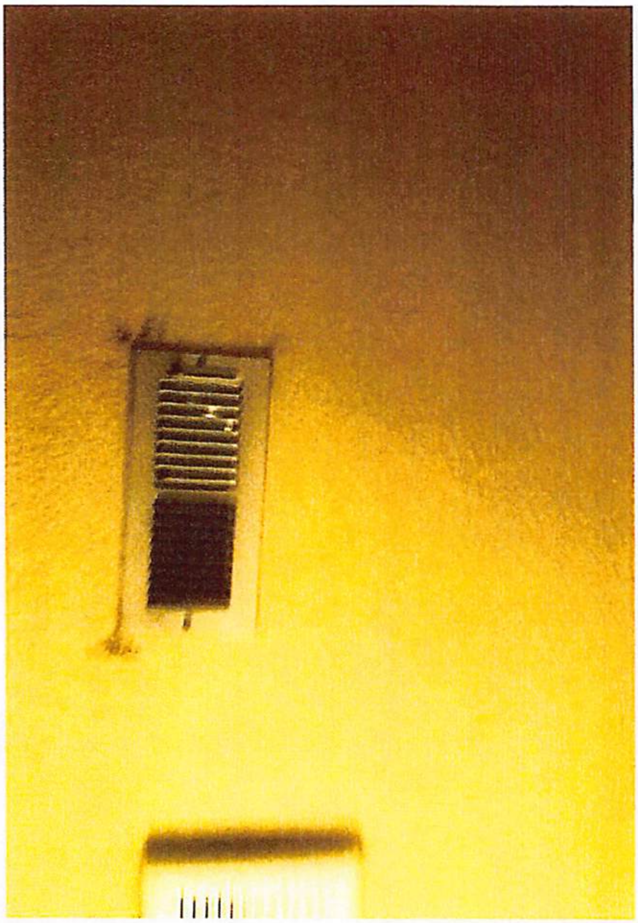
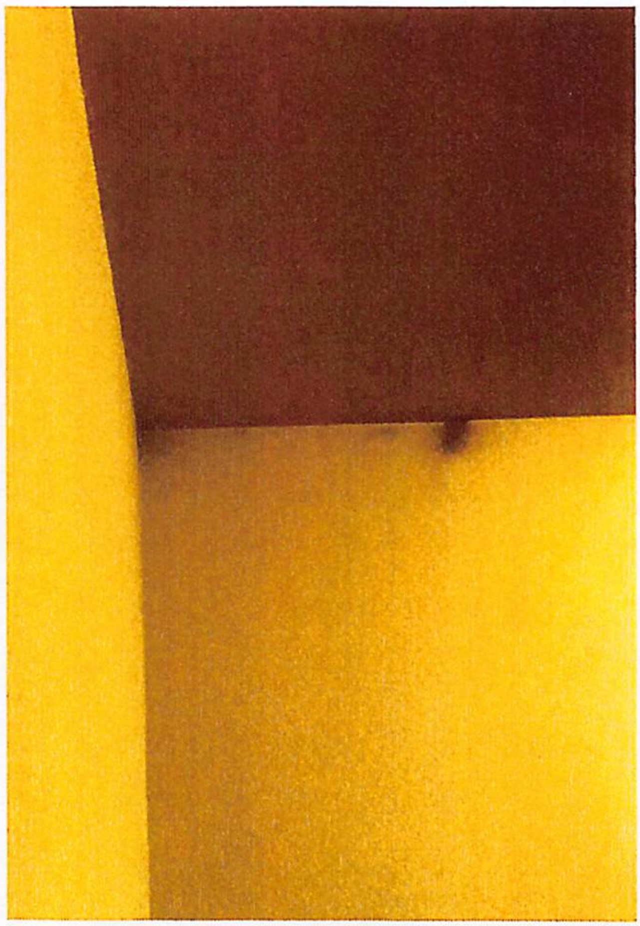
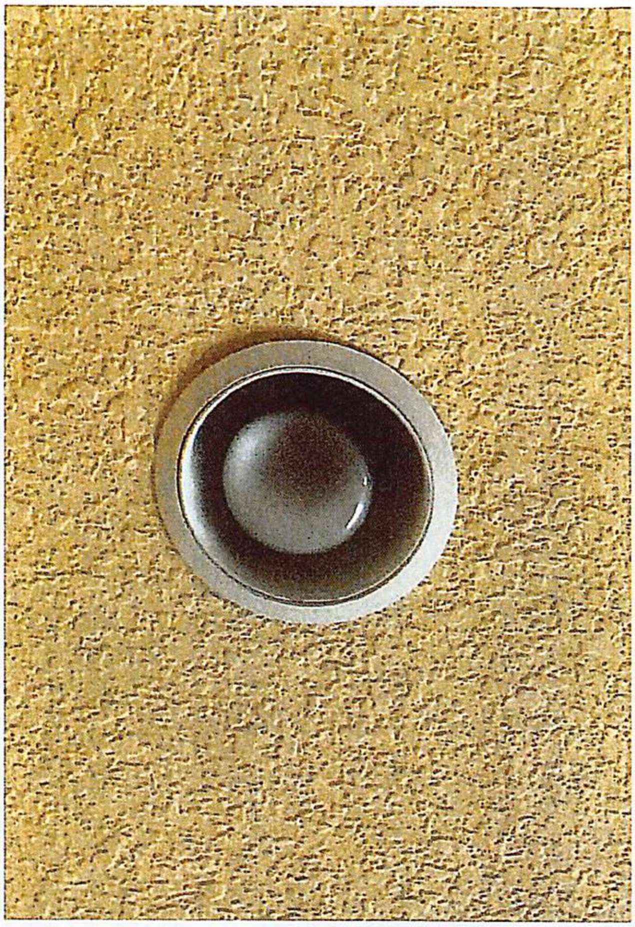
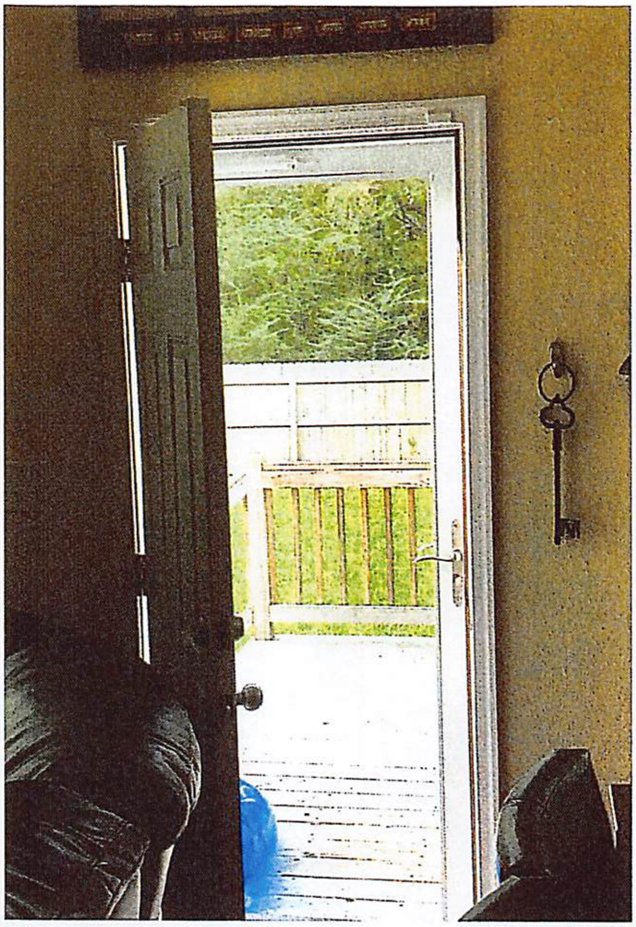
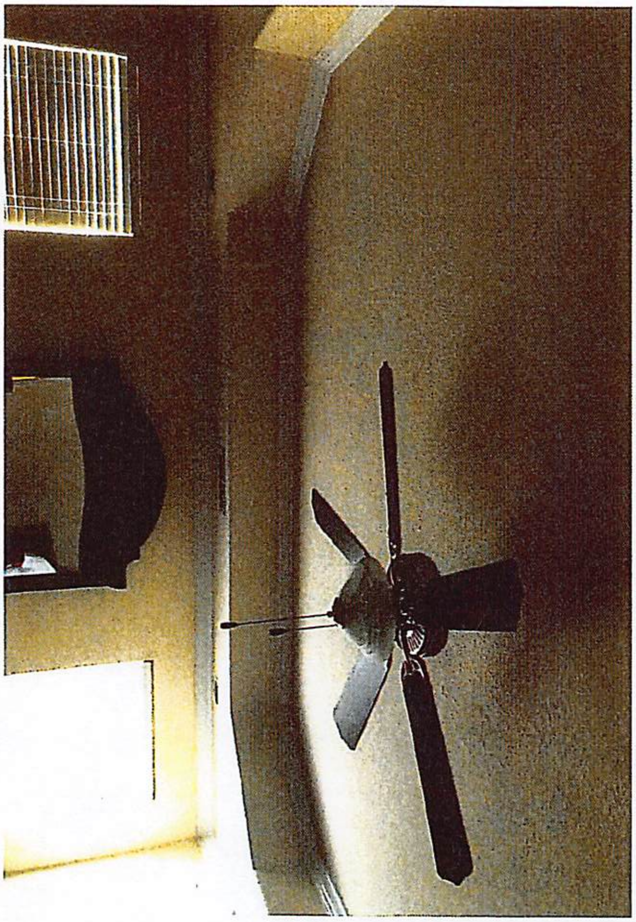
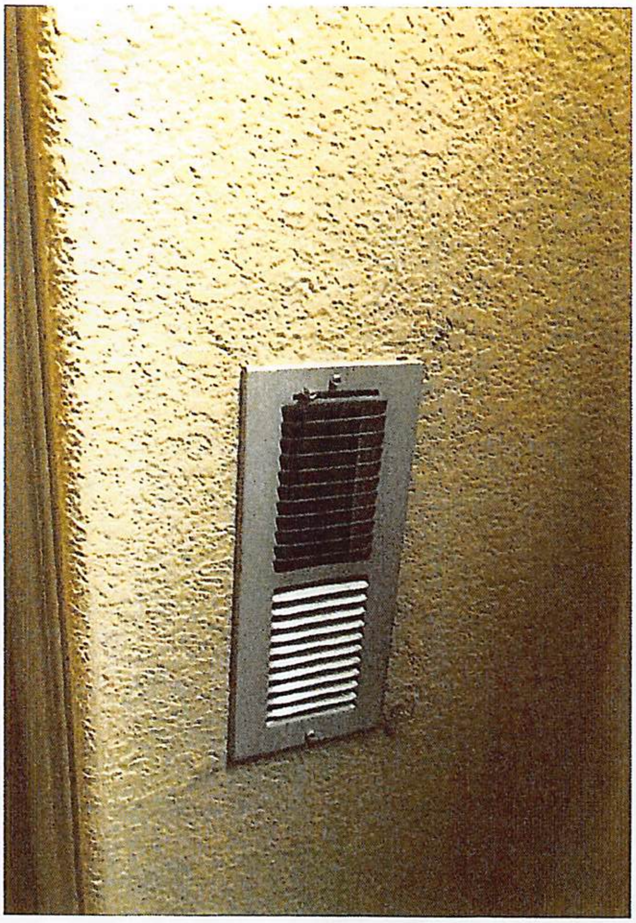
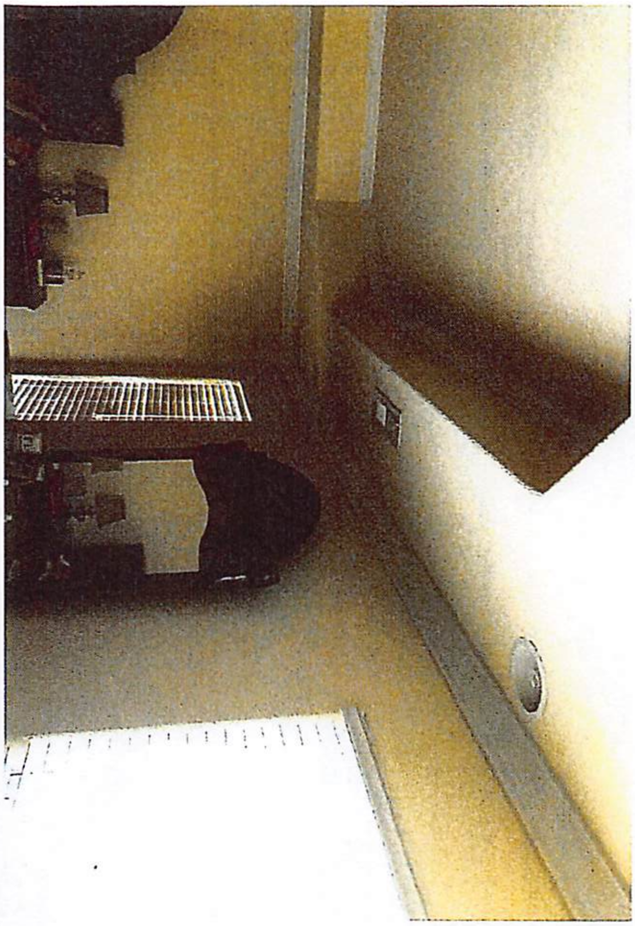

67°
ALARM.COM




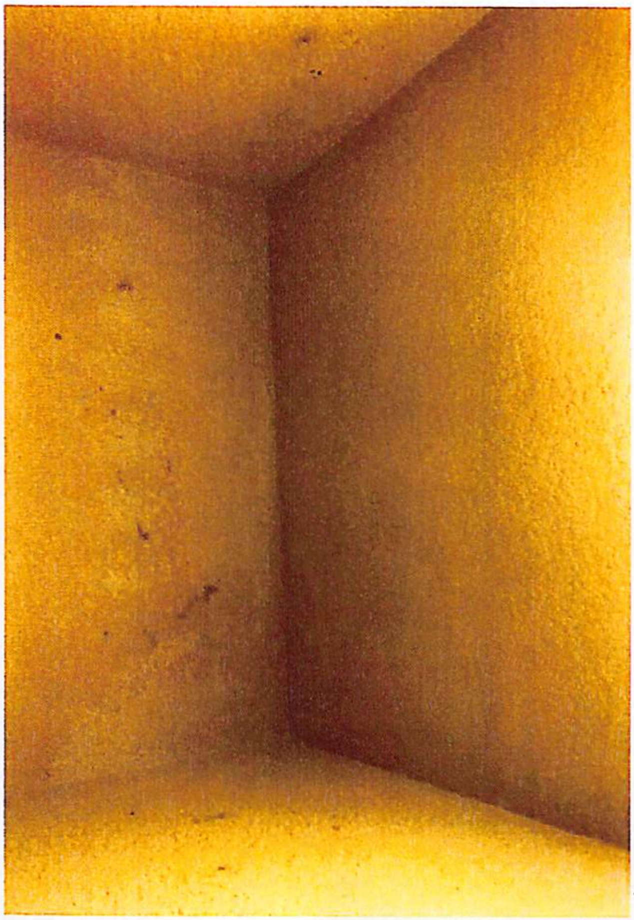


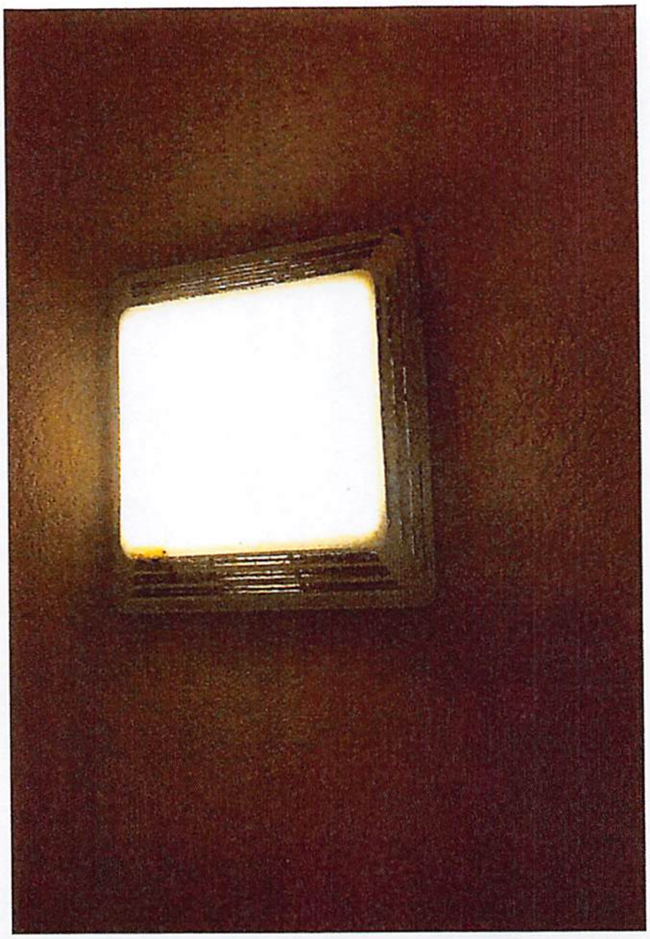


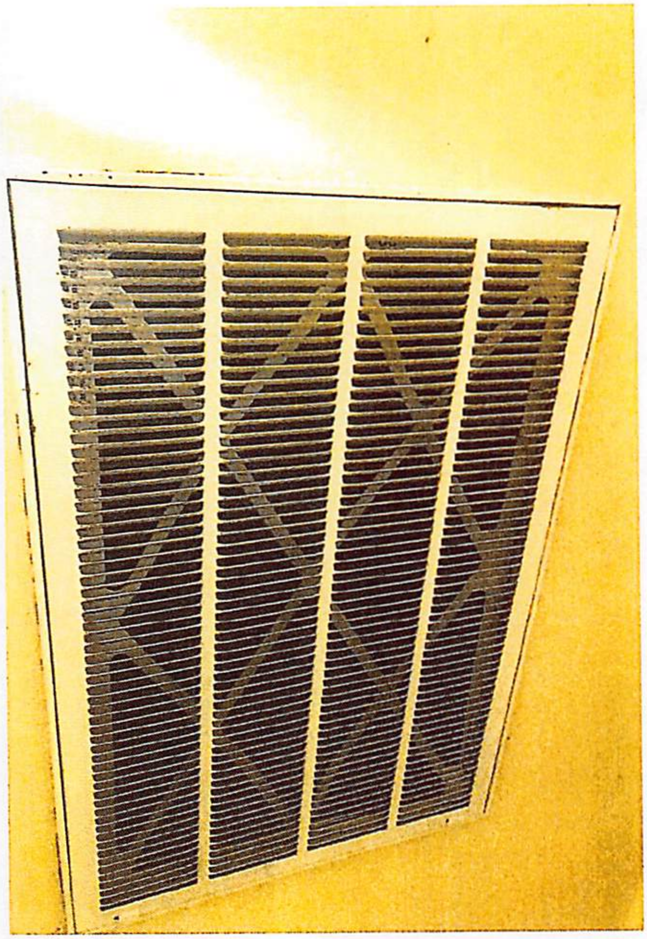


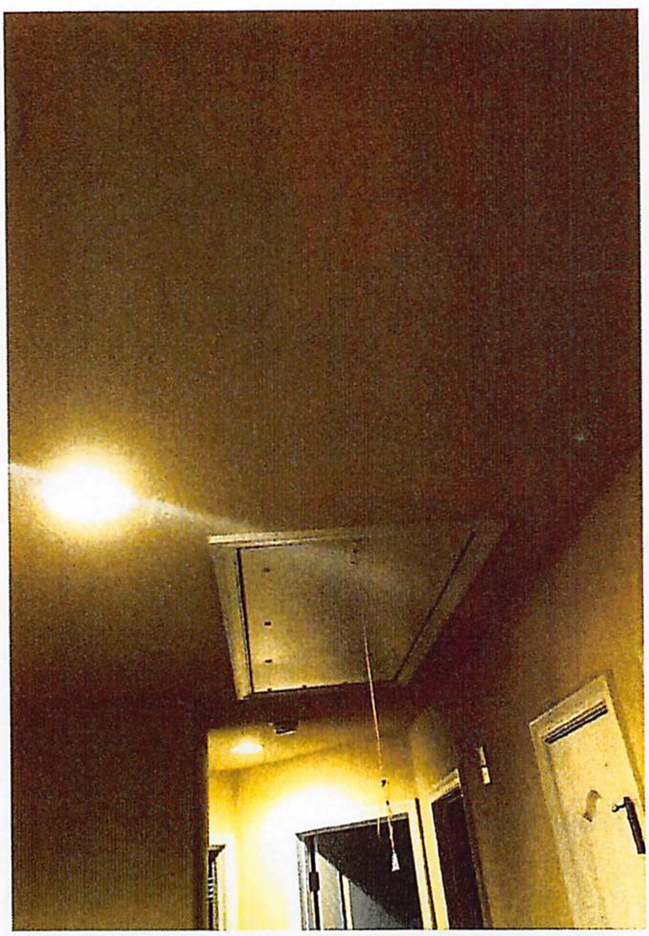


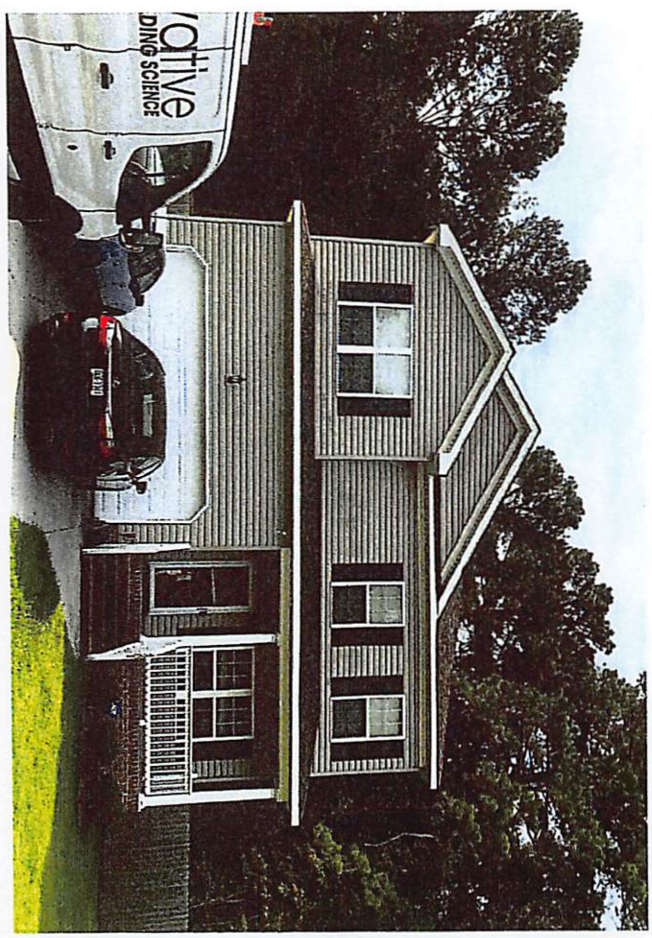



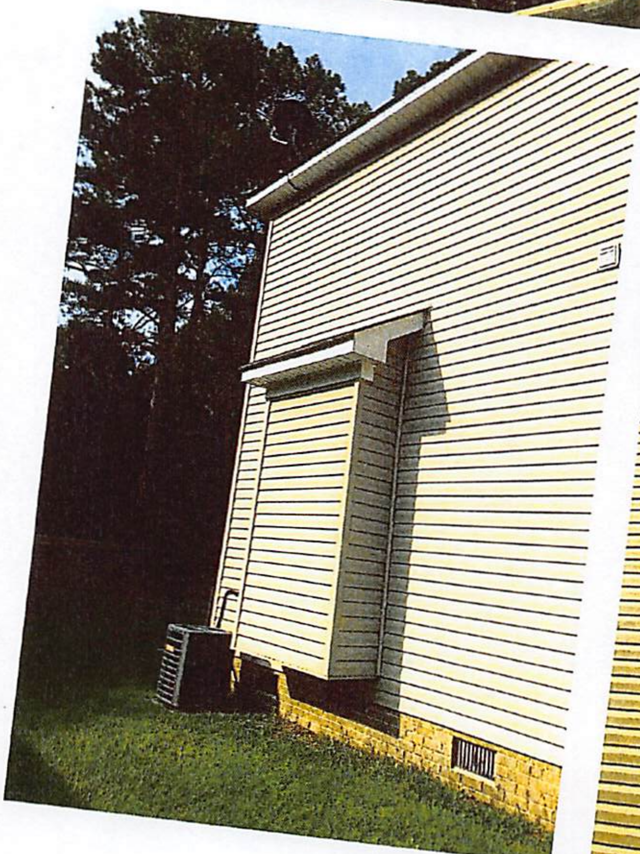




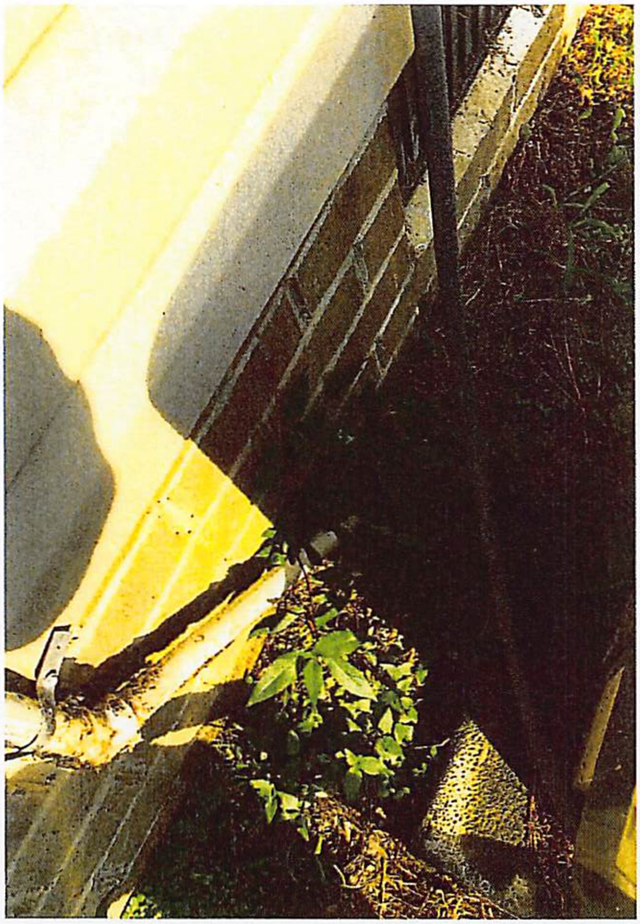


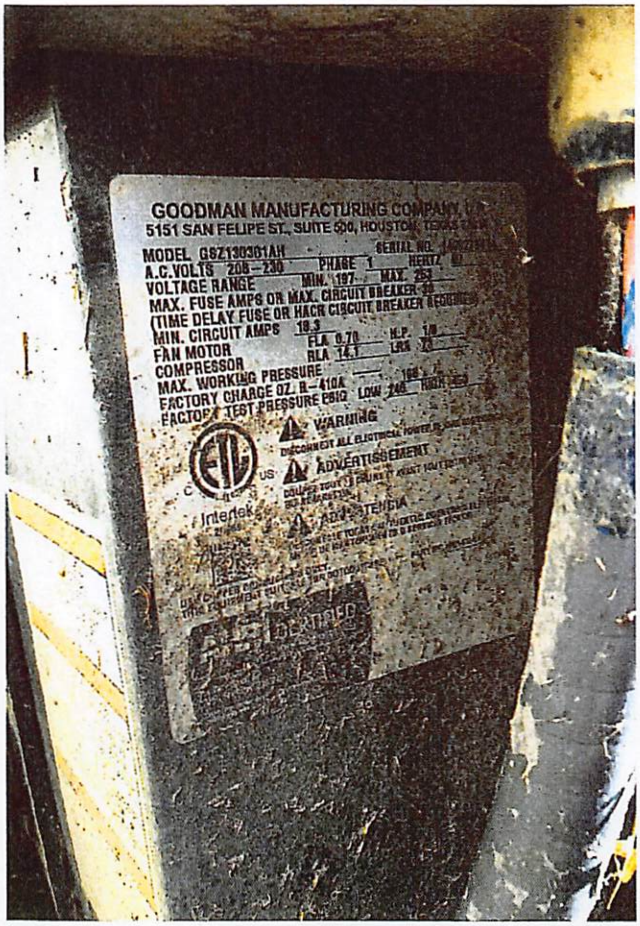


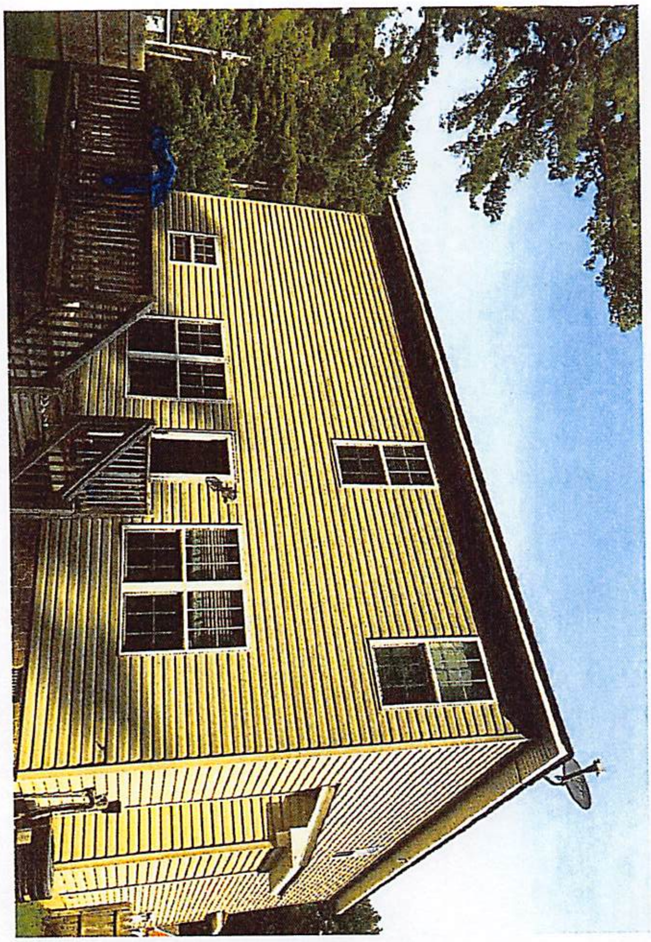
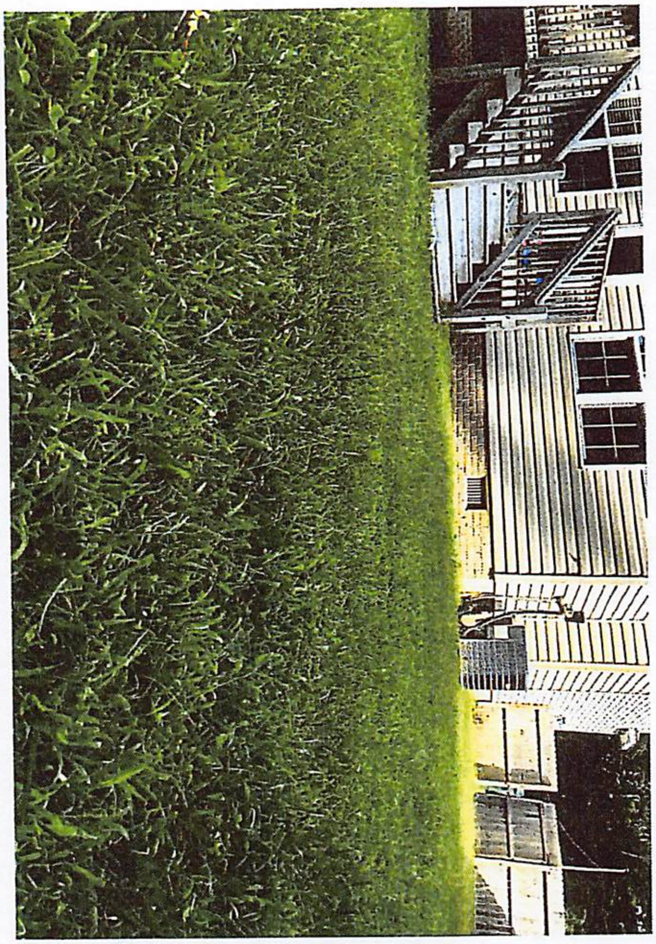
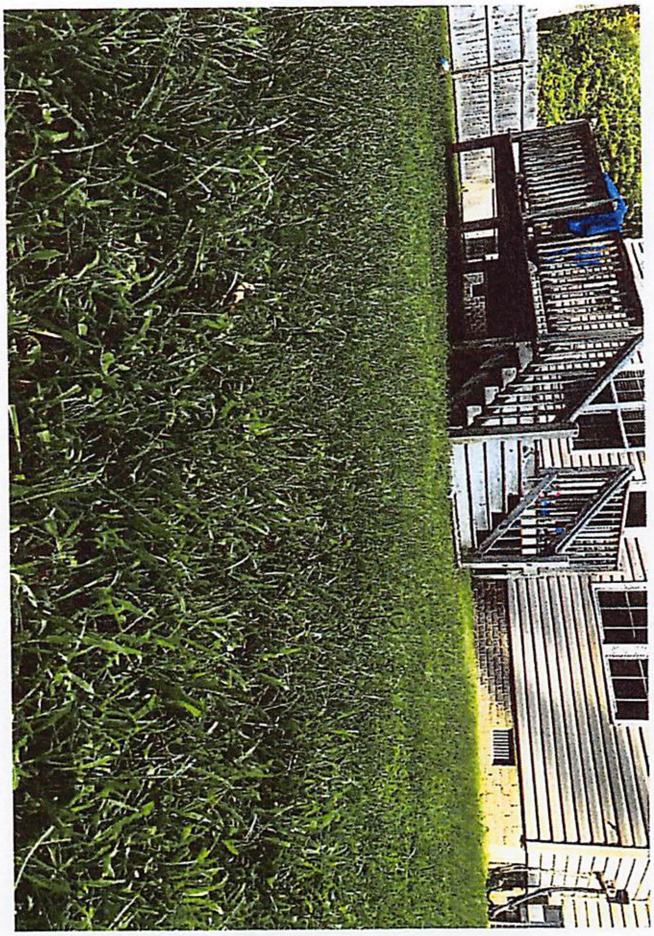
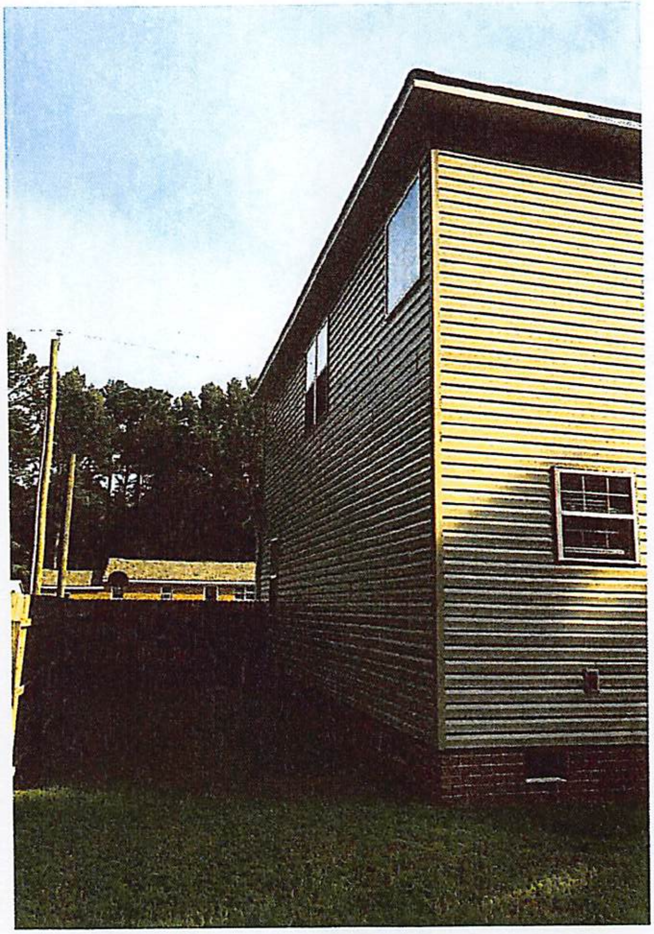


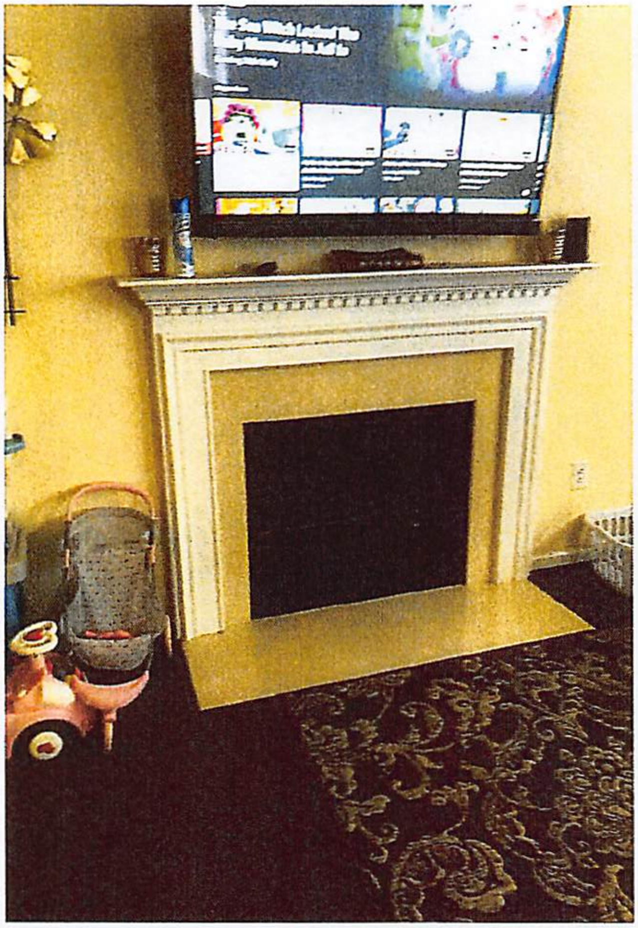


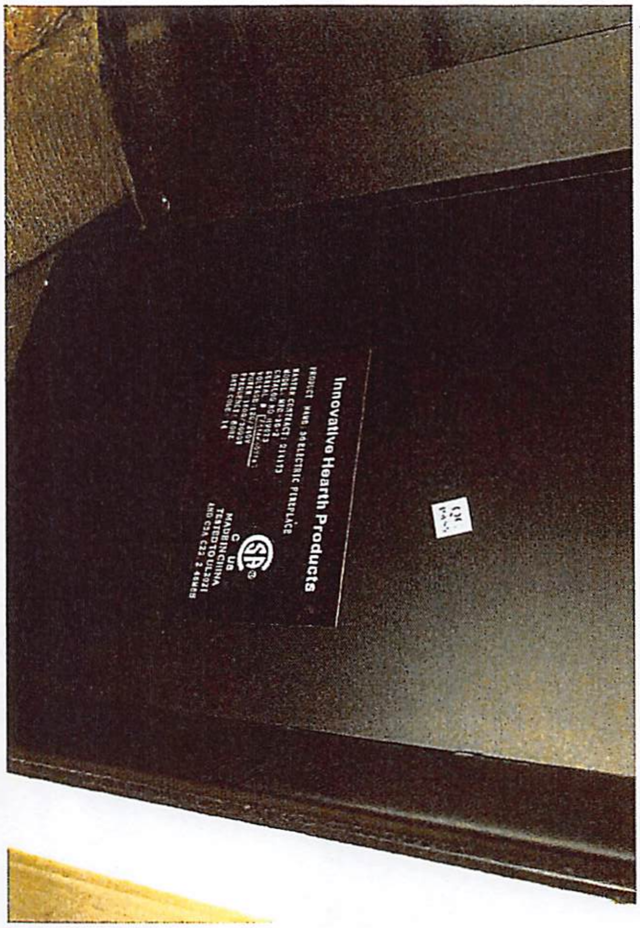

13.0
Seasonal Energy Efficiency Ratio
Heating Seasonal Performance Factor
7.8



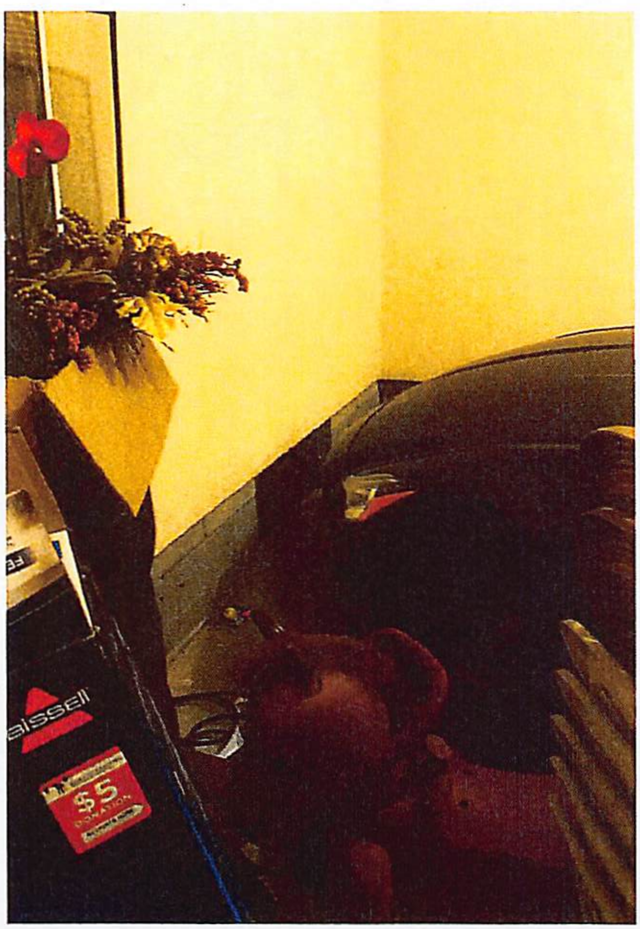

GOODMAN MANUFACTURING COMPANY
5151 SAN FELIPE ST., SUITE 500, HOUSTON
MODEL GSZ130301AH
SERIAL NO.
A.C.VOLTS 208-230
PHASE 1
HERTZ
VOLTAGE RANGE
MIN. 197
MAX. 253
MAX. FUSE AMPS OR MAX. CIRCUIT BREAKER
(TIME DELAY FUSE OR HACR CIRCUIT BREAKER
MIN. CIRCUIT AMPS 18.3
FLA 0.70
H.P.
FAN MOTOR
RLA 14.1
LRA
COMPRESSOR
MAX. WORKING PRESSURE
FACTORY CHARGE OZ. R-410A
FACTORY TEST PRESSURE PSIG
LOW 246
WARNING
ADVERTISSEMENT
US
Intertek

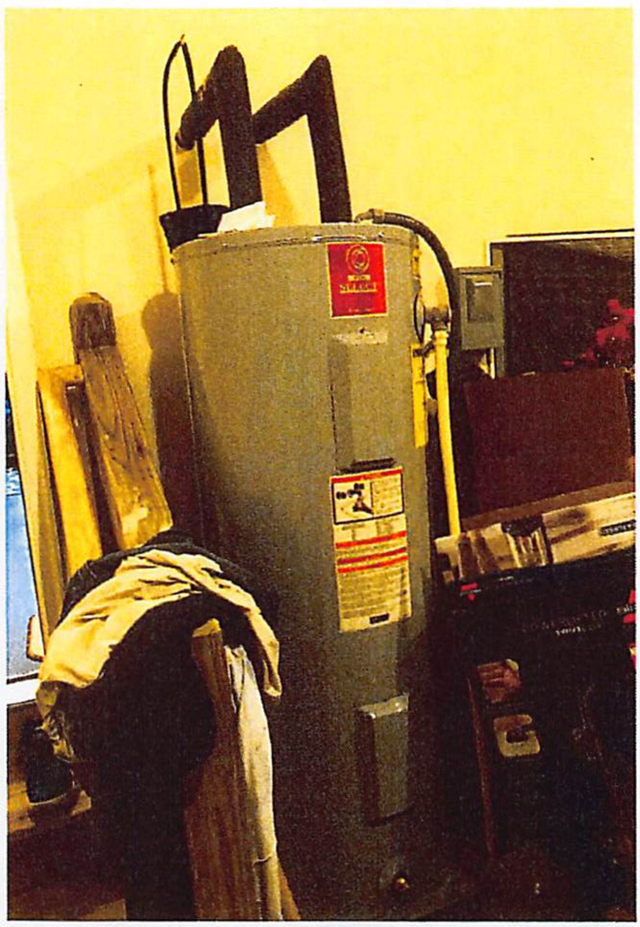


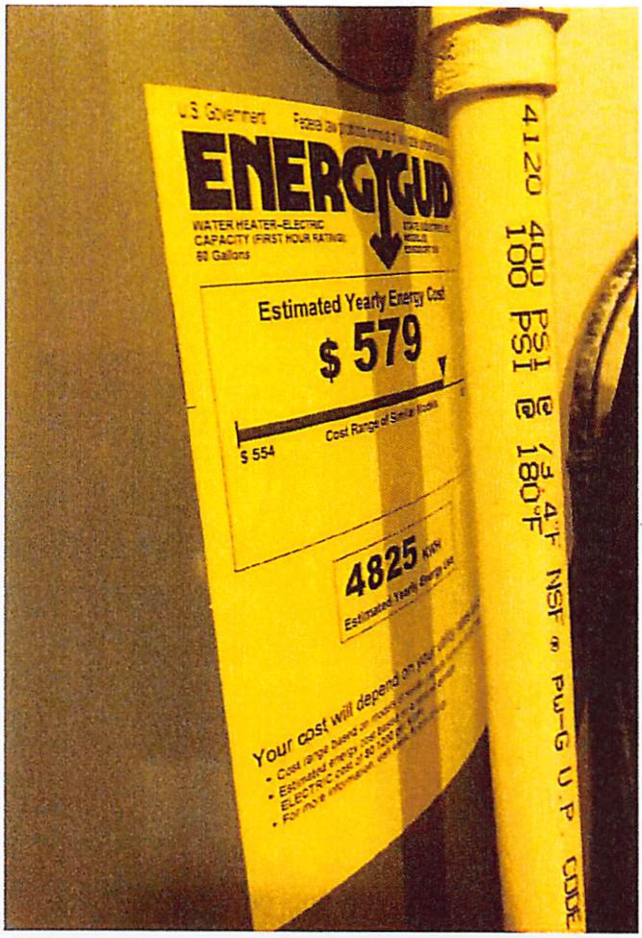


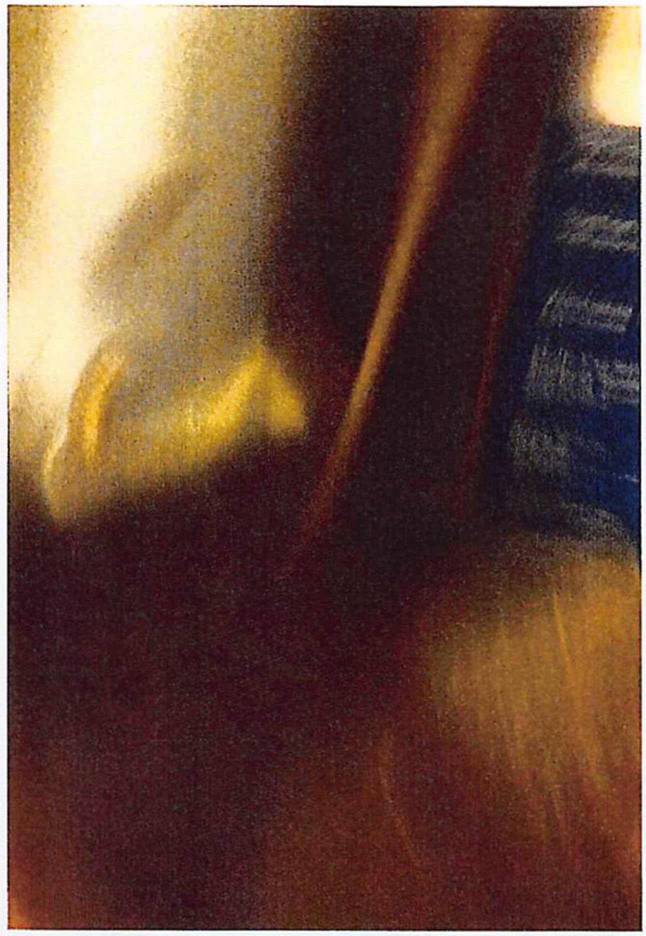
Innovative Hearth Products

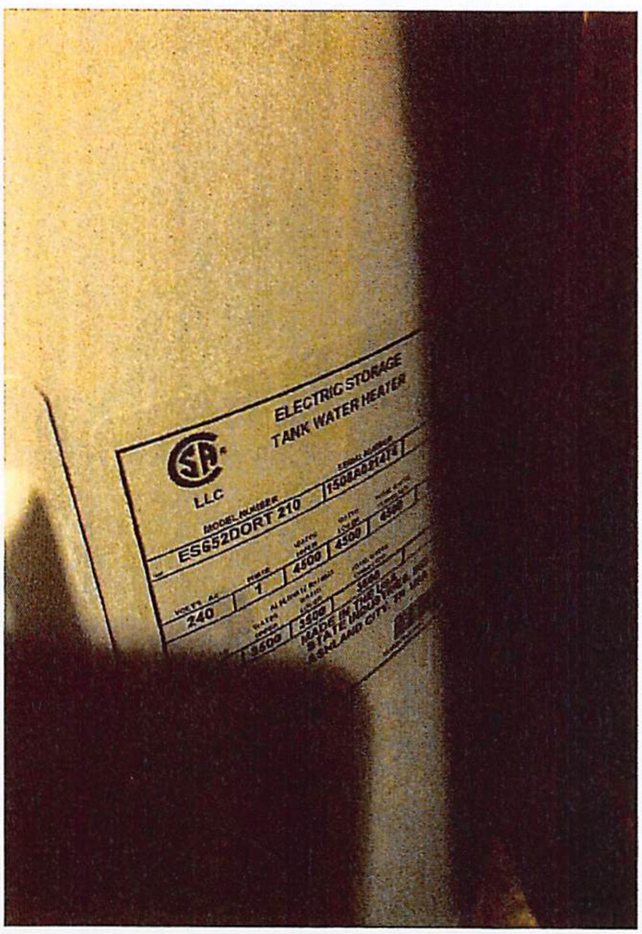


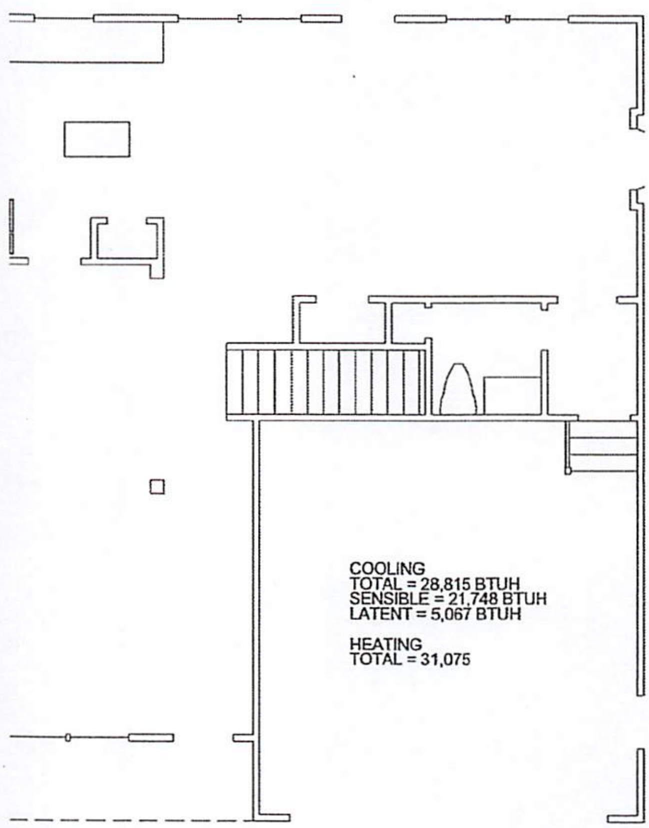
BISSELL
$5
DONATION

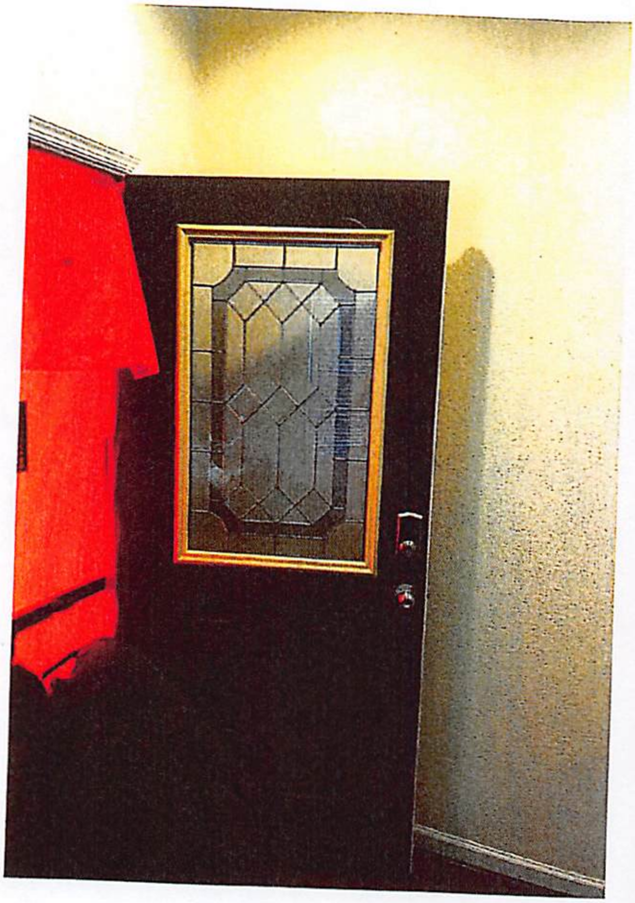
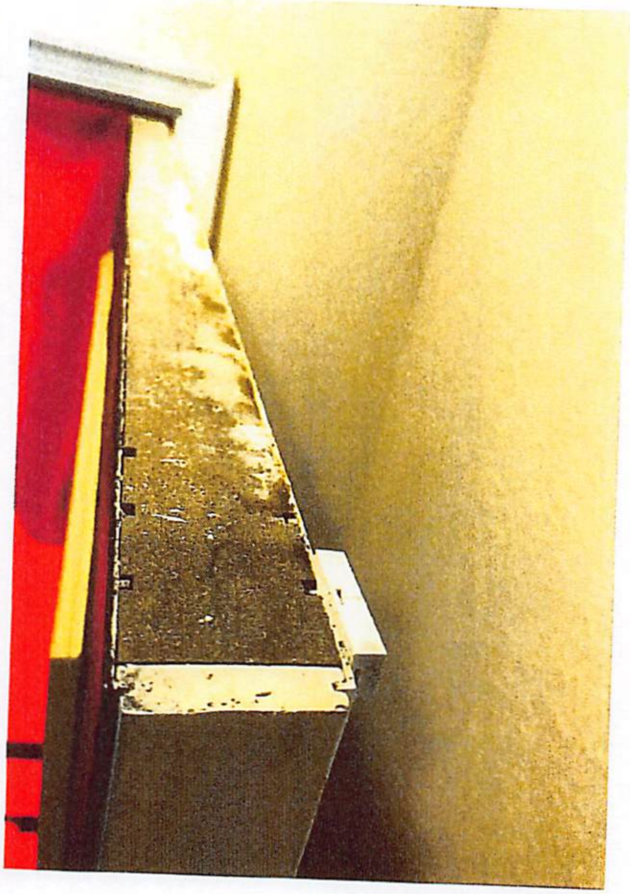
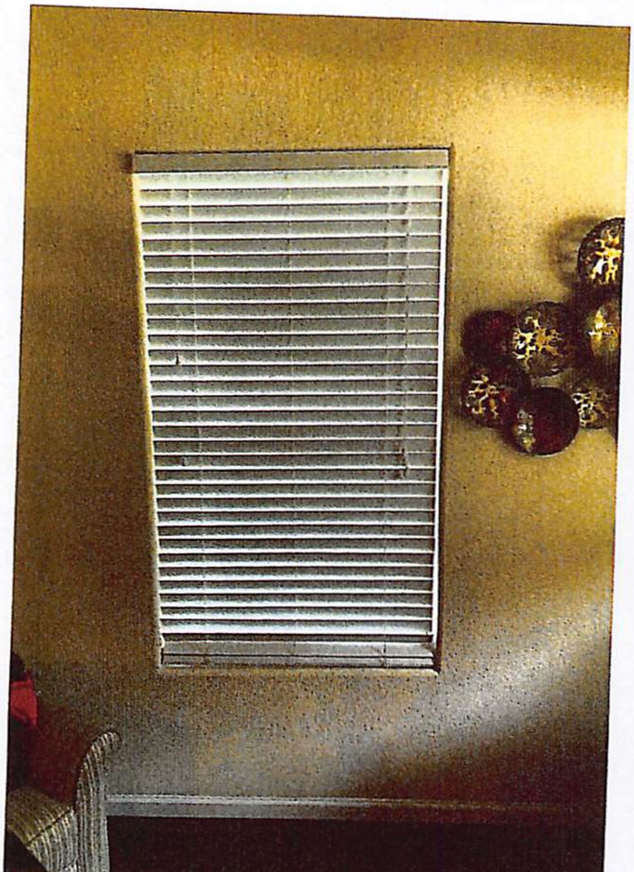
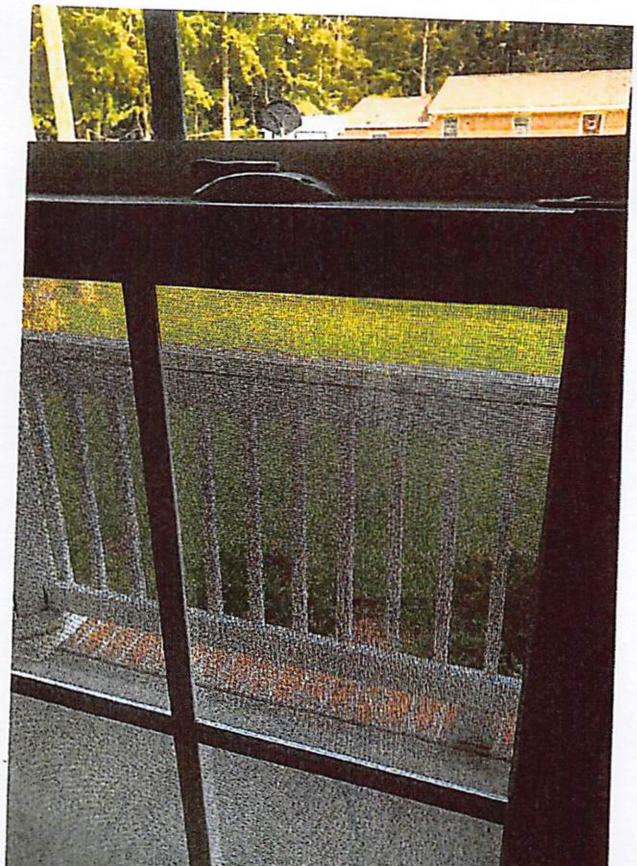


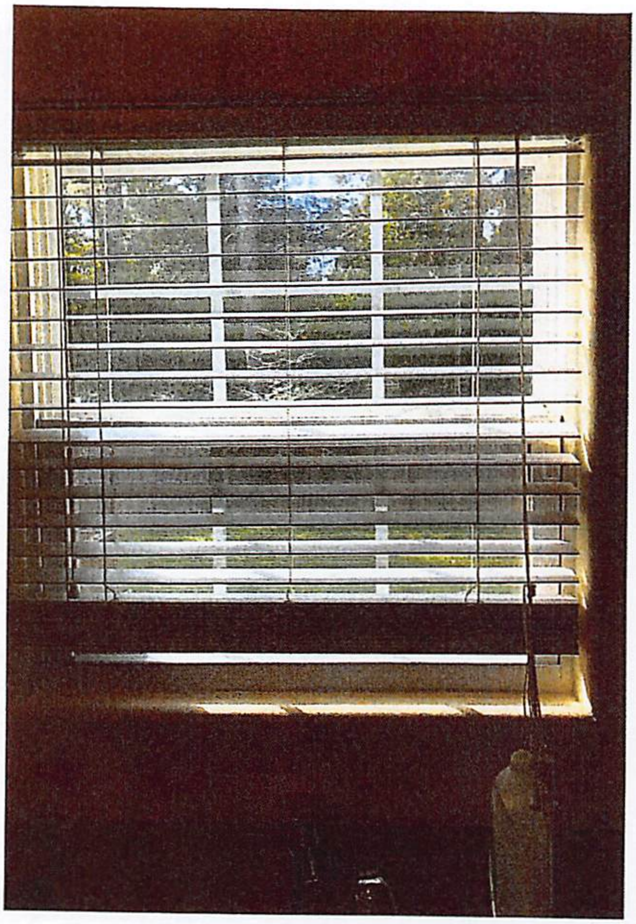

U.S. Government
WATER HEATER–ELECTRIC
CAPACITY (FIRST HOUR RATING)
60 Gallons
Estimated Yearly Energy Cost
$ 579
$ 554
Cost Range of Similar Models
4825 KWH
Estimated Yearly Energy Use
Your cost will depend on your utility rates
4120 400 PSI @ 73.4°F NSF ® PW-G U.P. CODE
100 PSI @ 180°F

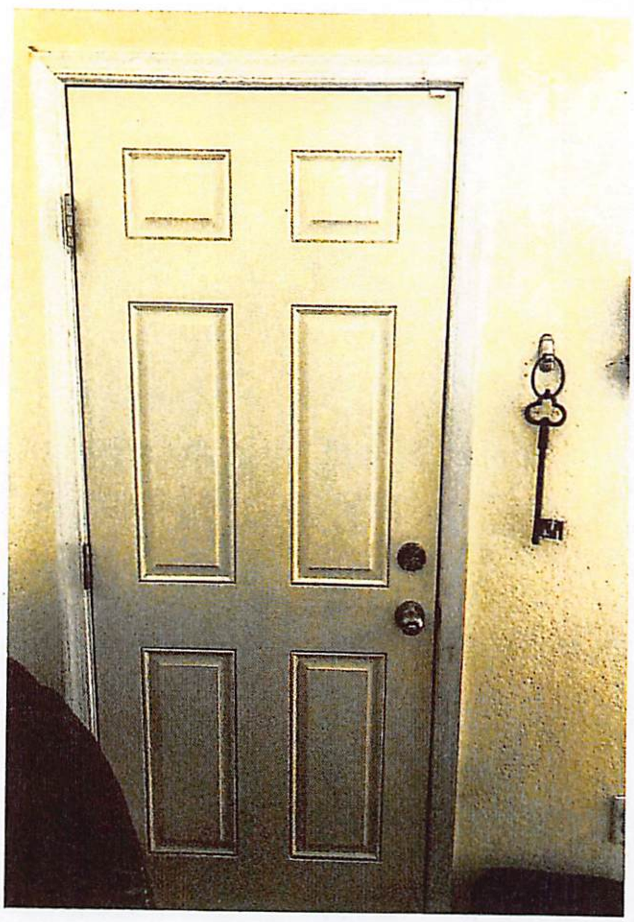


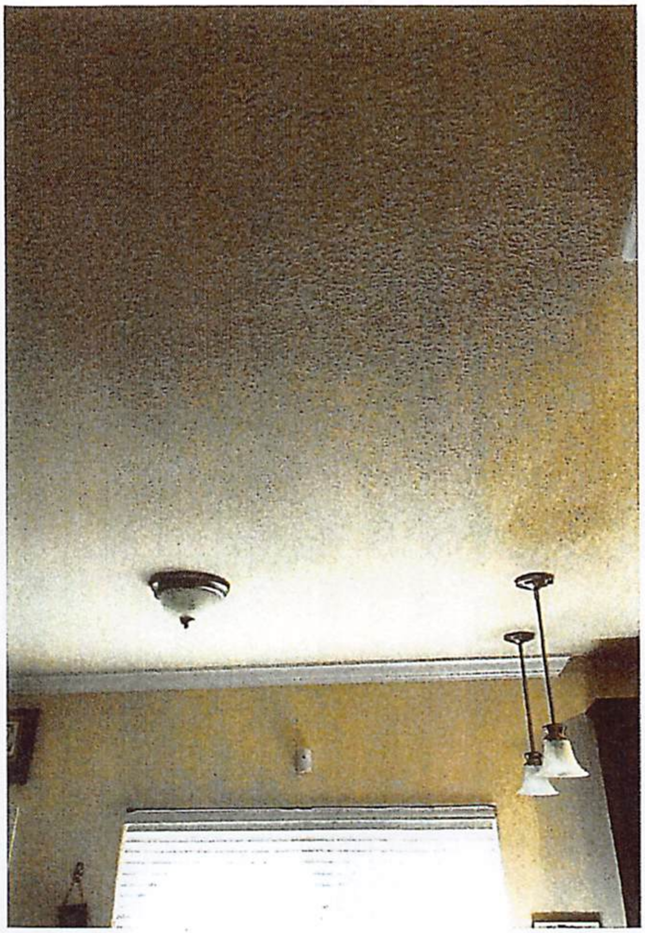

ELECTRIC STORAGE
TANK WATER HEATER
LLC
ES652DORT 210
240
4500

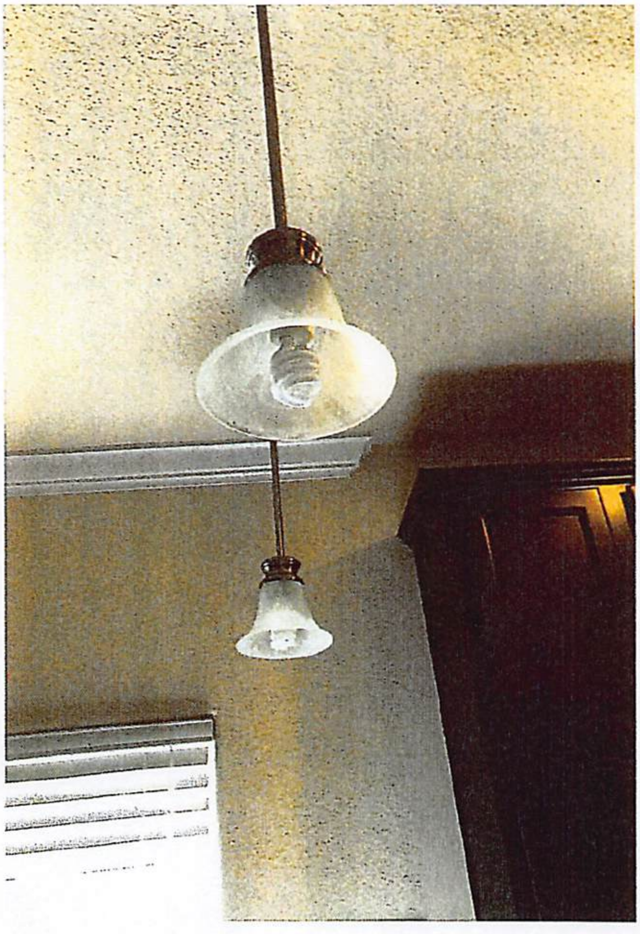

COOLING
TOTAL = 28,815 BTUH
SENSIBLE = 21,748 BTUH
LATENT = 5,067 BTUH
HEATING
TOTAL = 31,075

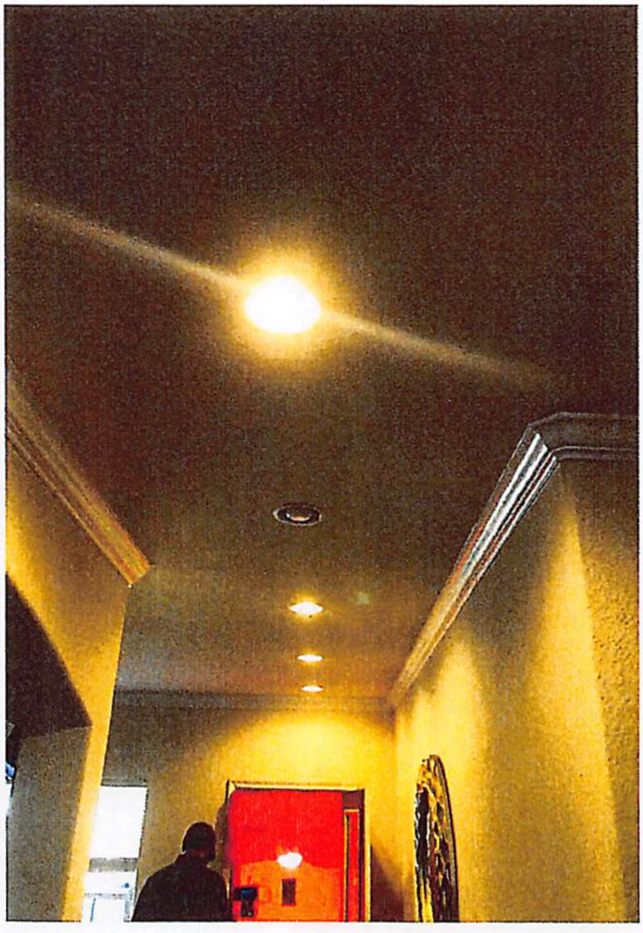





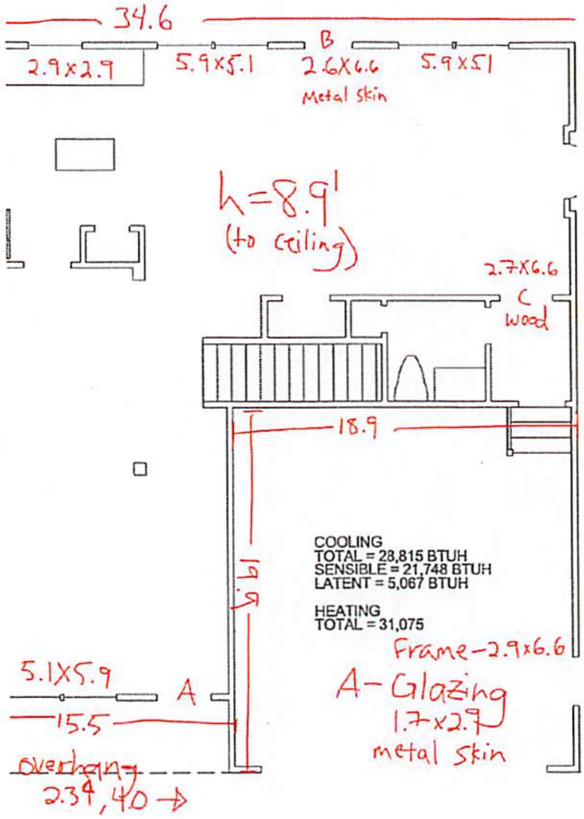




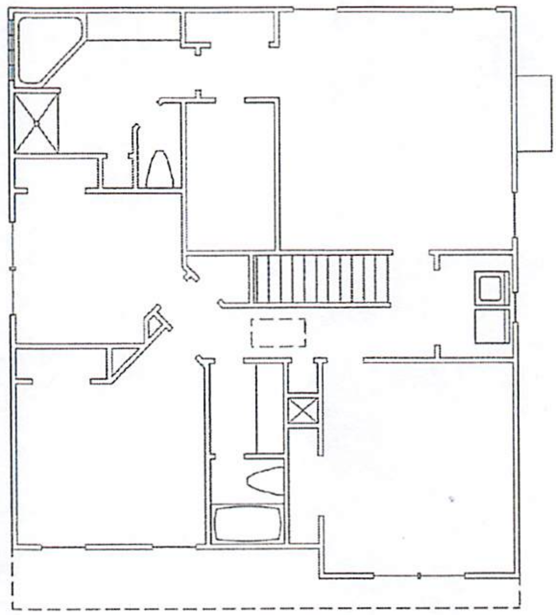




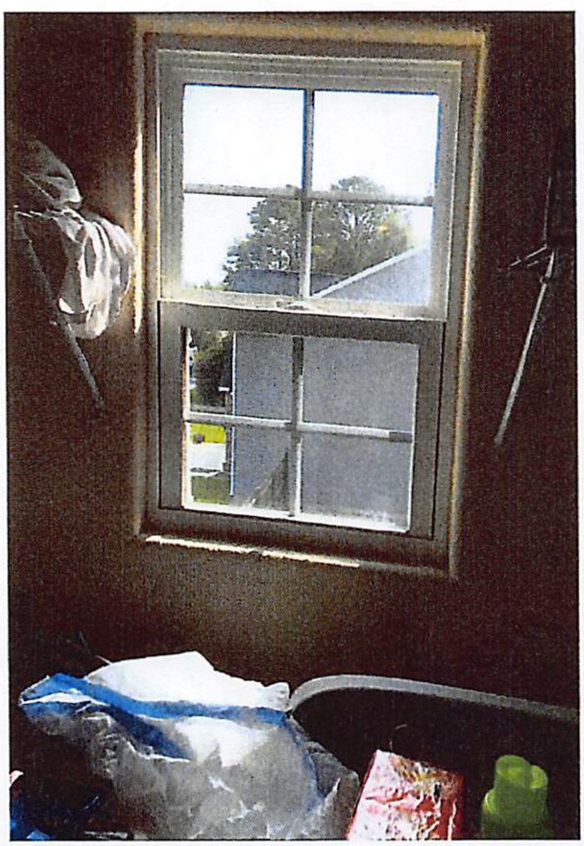


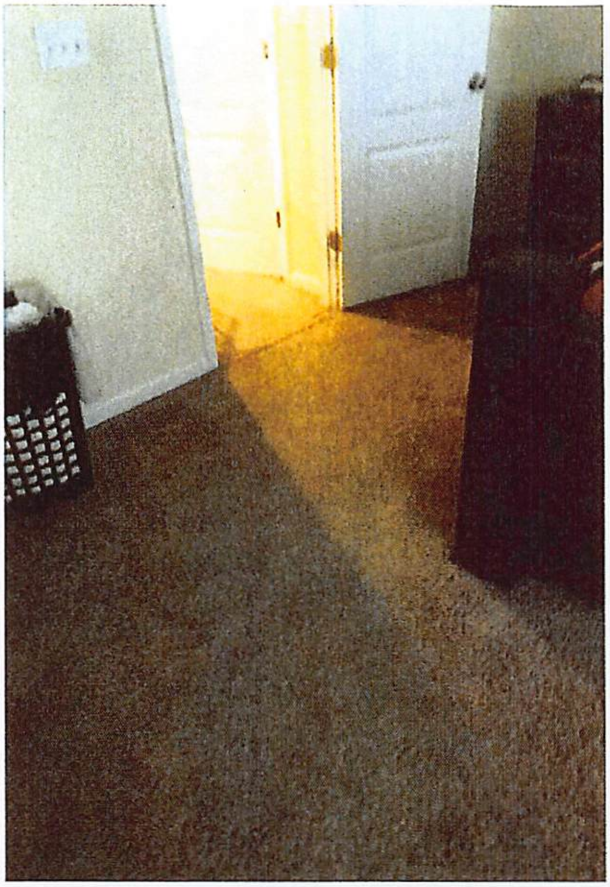


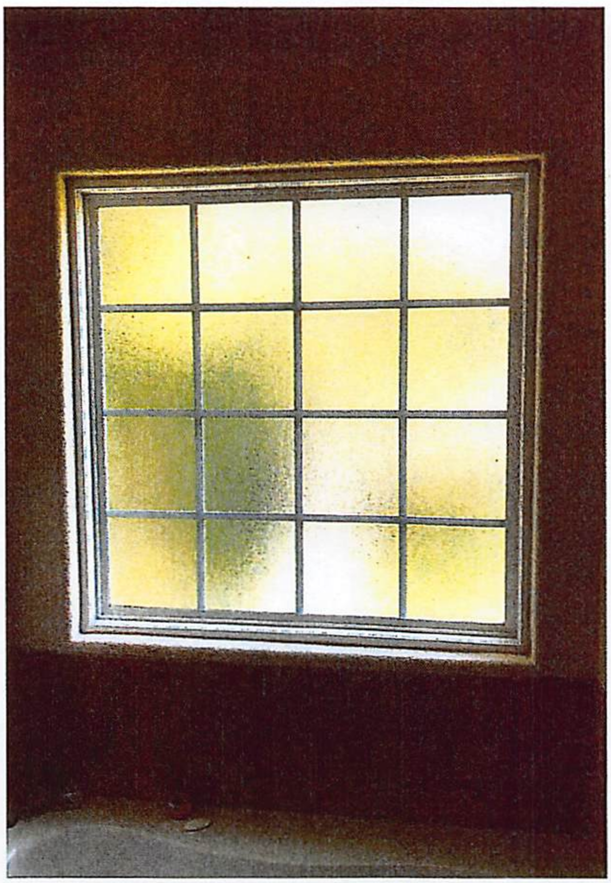
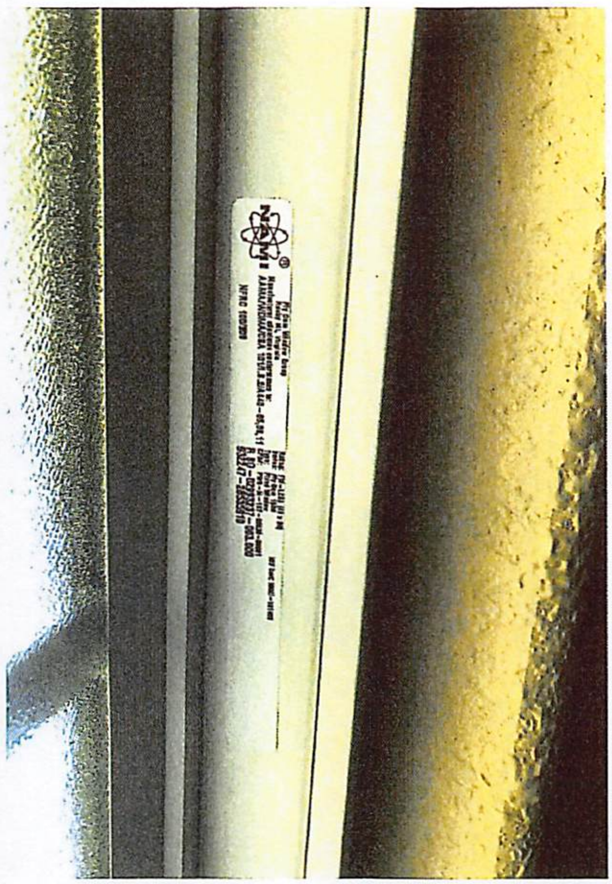
34.6
B
2.9x2.9
5.9x5.1
2.6X6.6
5.9x51
Metal skin
h=8.9'
(to ceiling)
2.7X6.6
C
wood
18.9
COOLING
TOTAL = 28,815 BTUH
SENSIBLE = 21,748 BTUH
LATENT = 5,067 BTUH
HEATING
TOTAL = 31,075
Frame-2.9x6.6
5.1X5.9
A
15.5
A-Glazing
1.7x2.9
metal skin
overhang
2.34,40

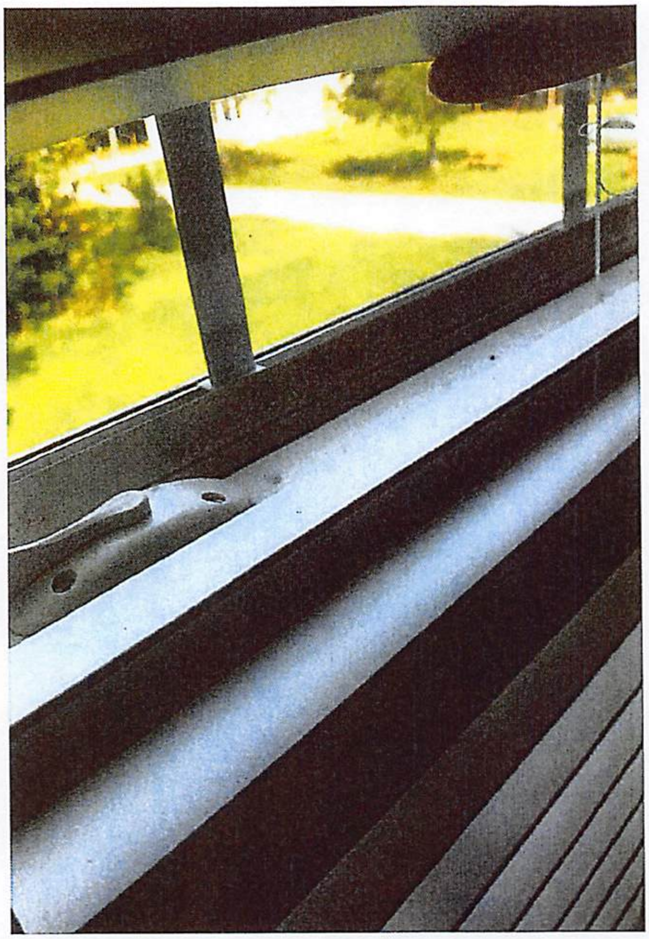


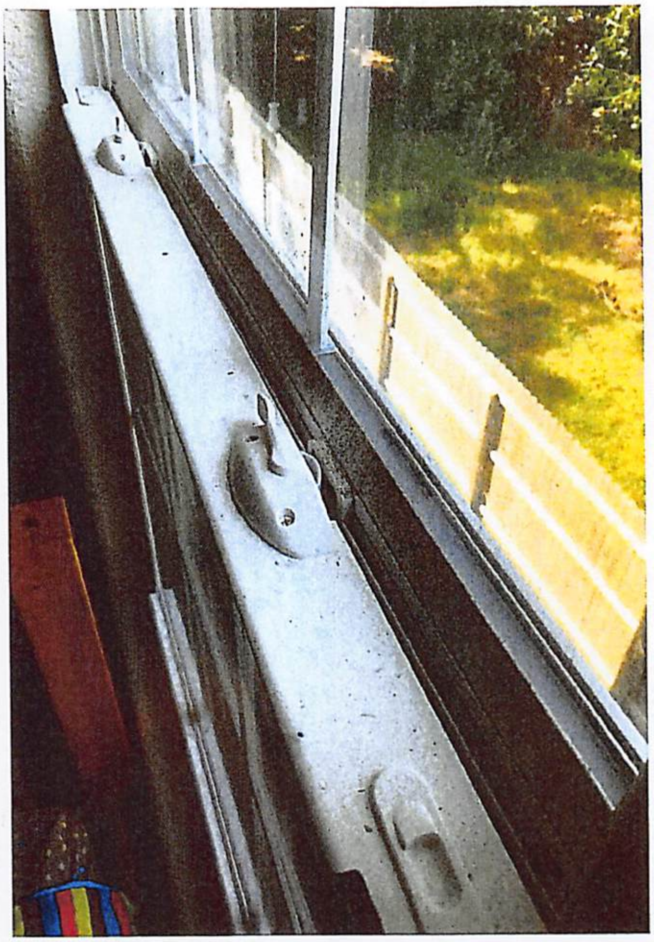
SCALE = 1/8" = 1'

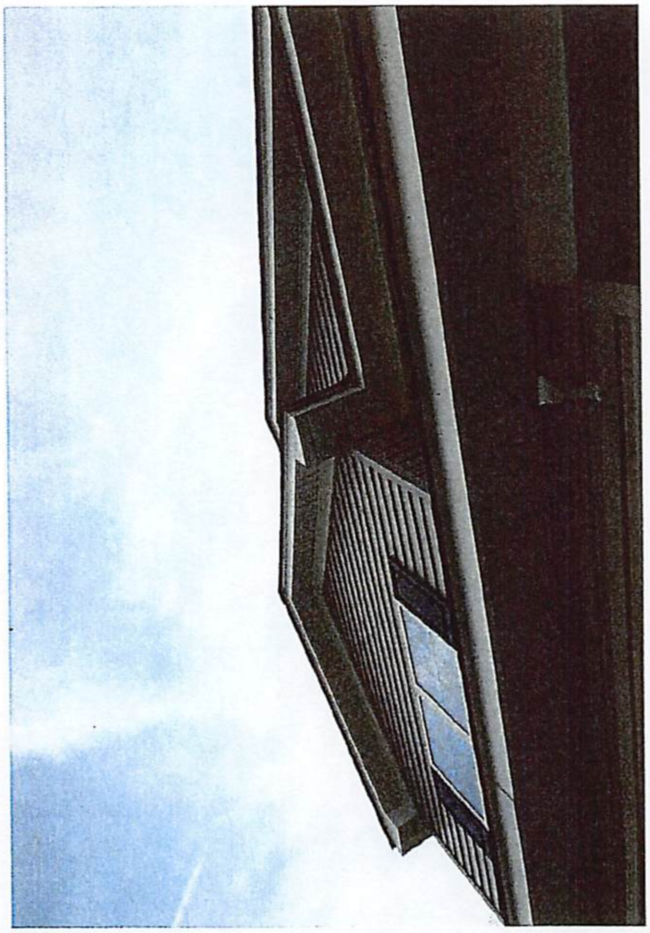


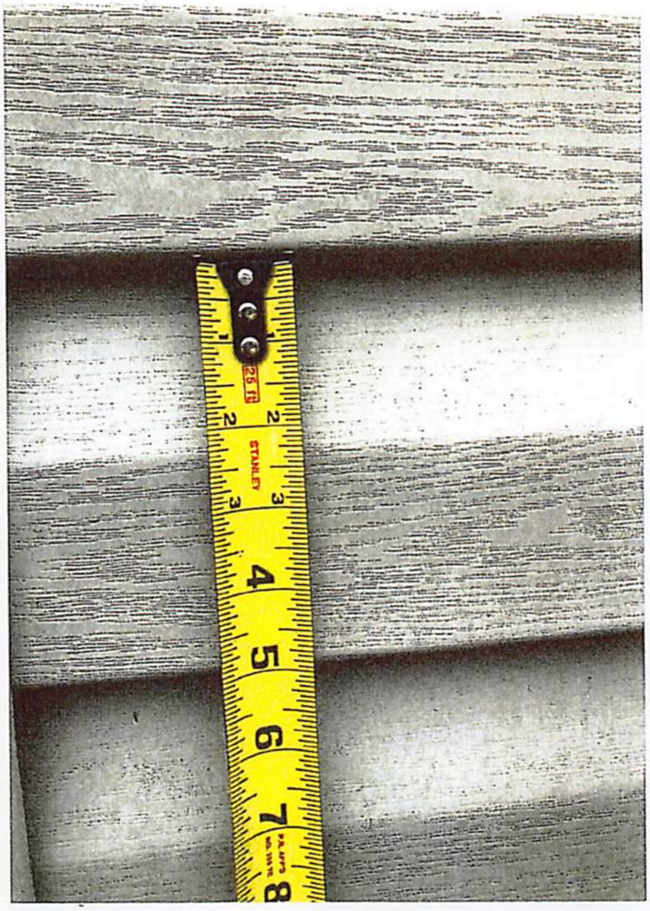


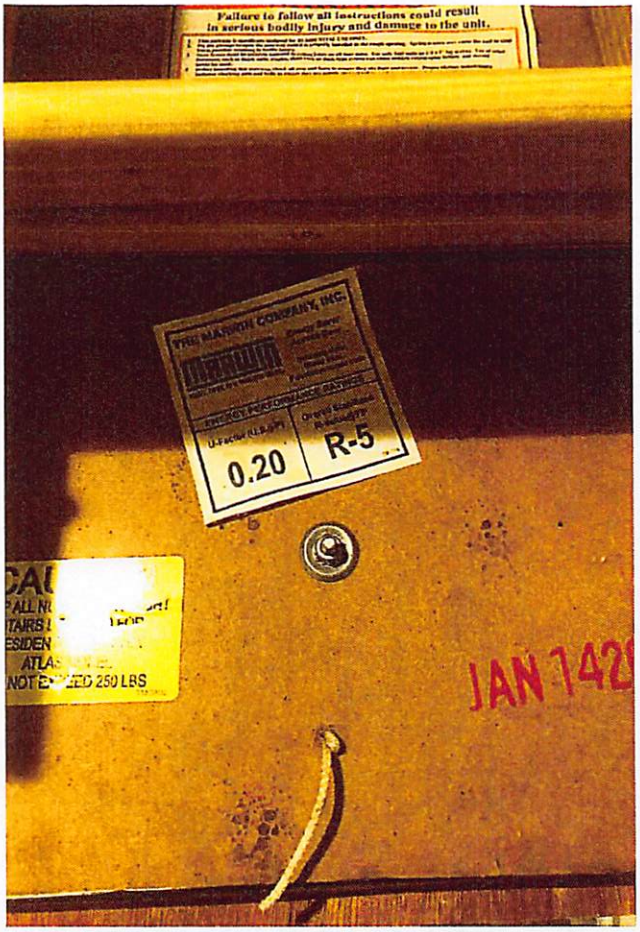



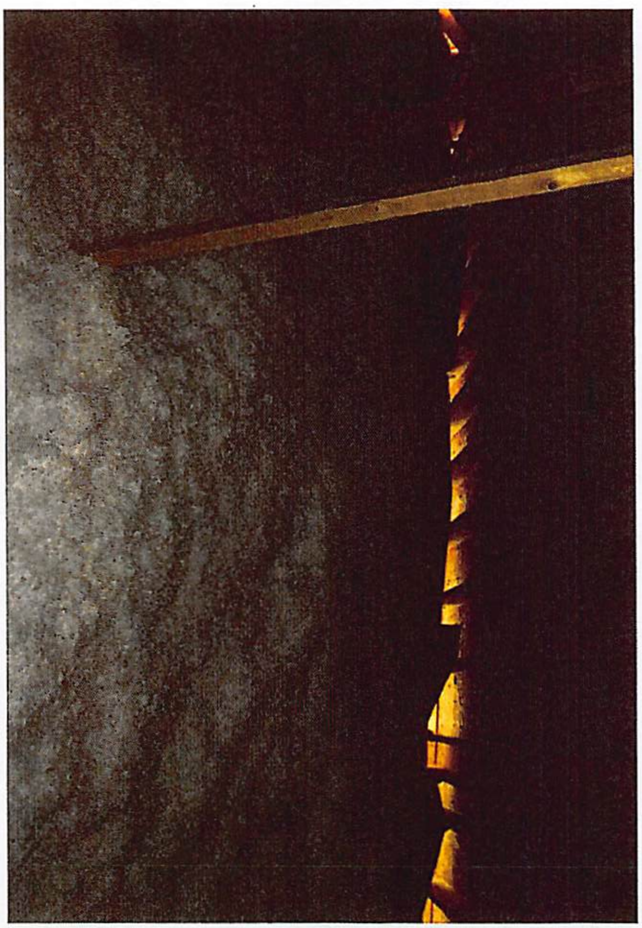
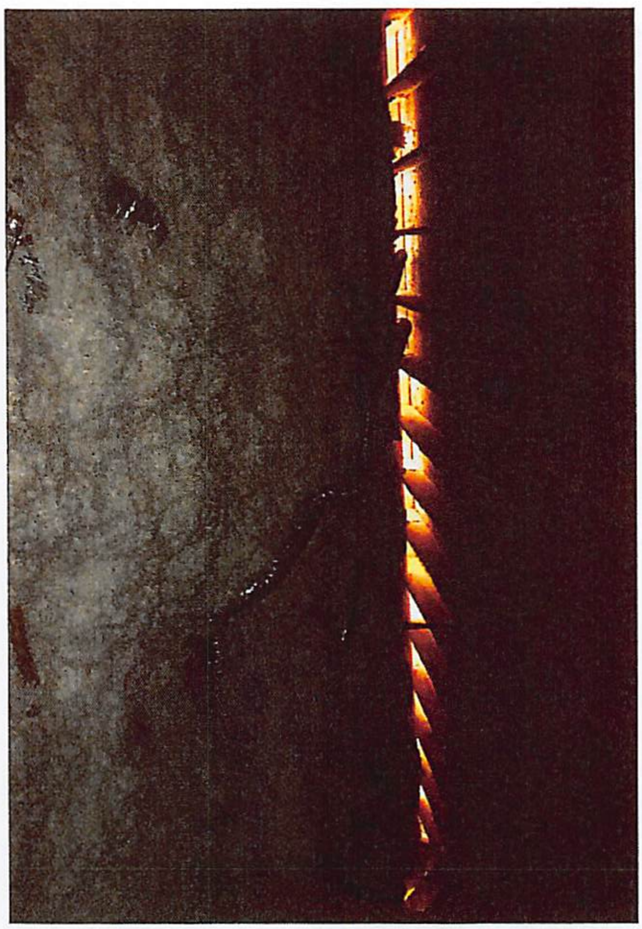


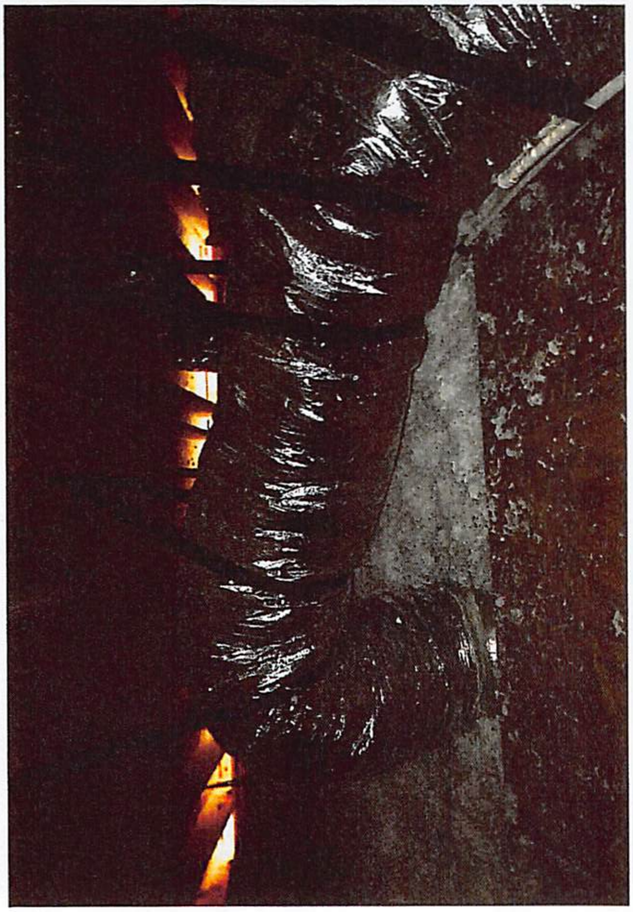
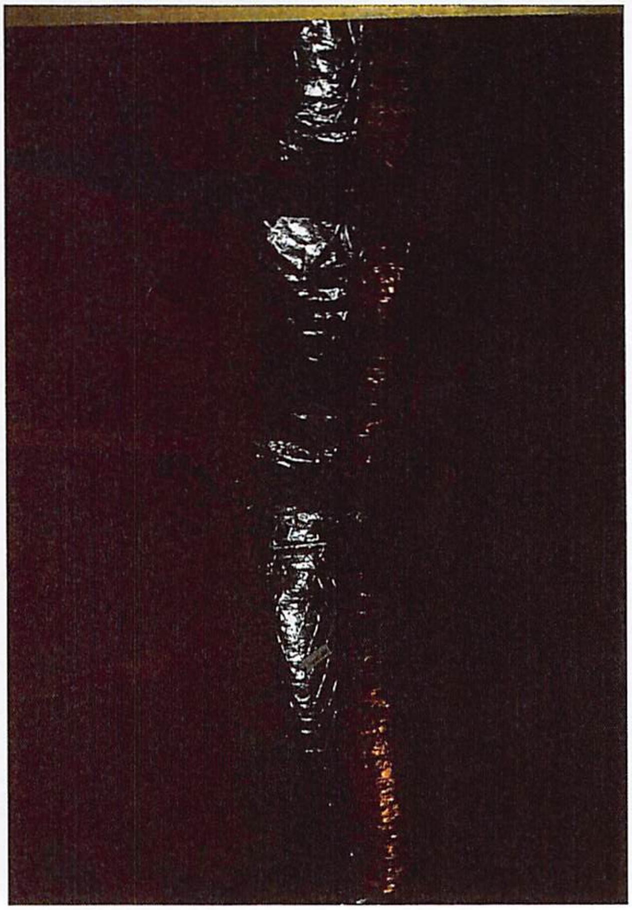


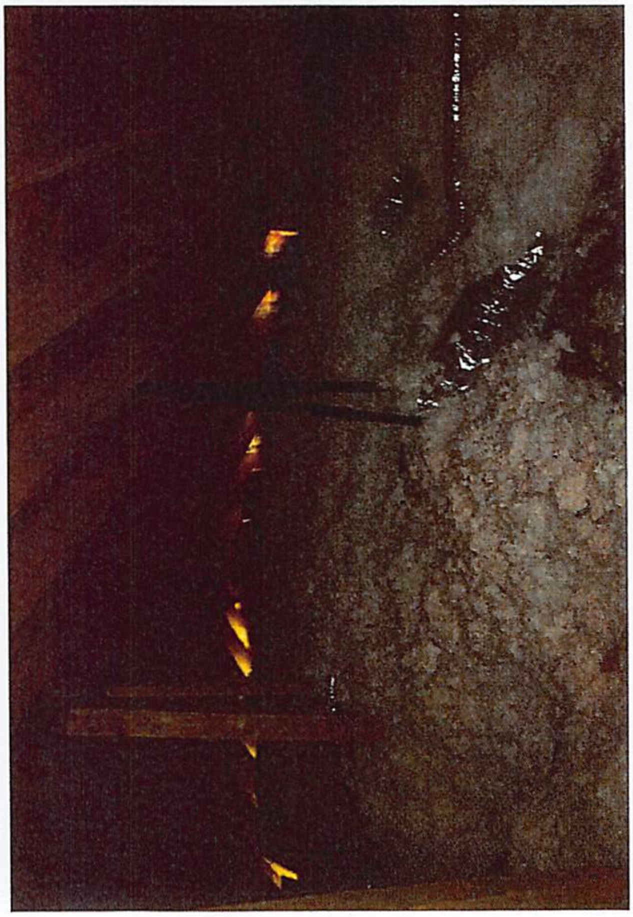


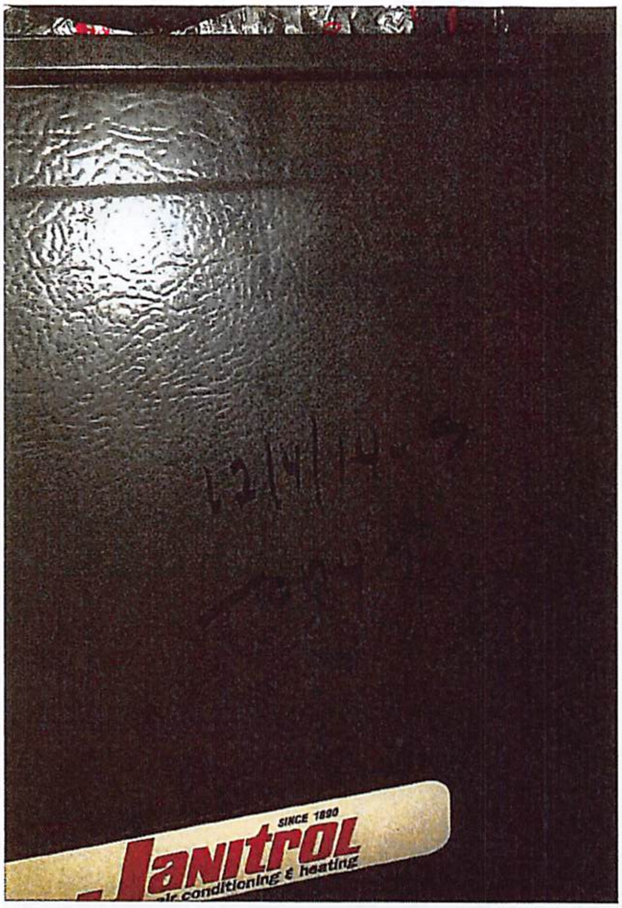


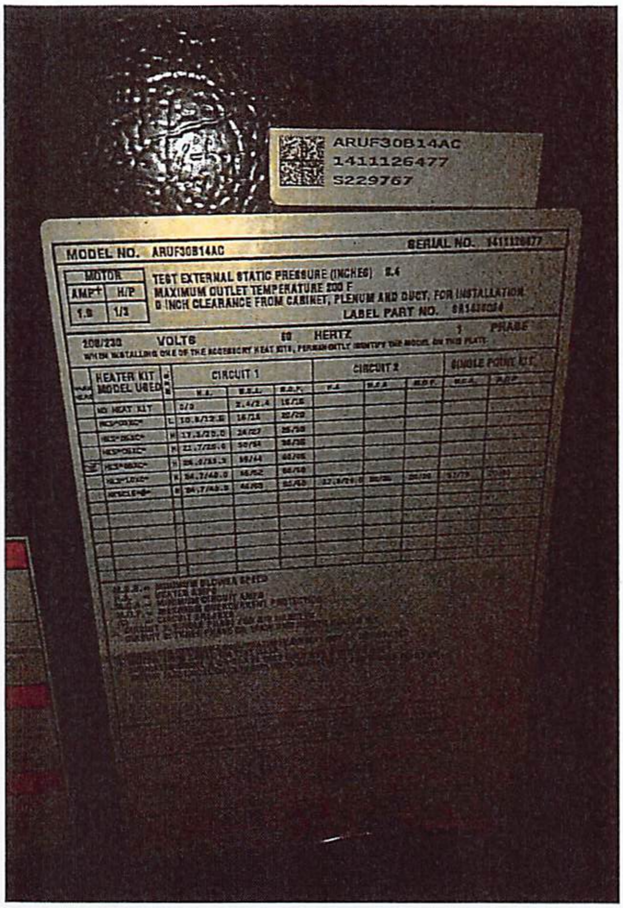

Failure to follow all instructions could result
in serious bodily injury and damage to the unit.
THE MARWIN COMPANY, INC.
0.20
R-5
NOT EXCEED 250 LBS
JAN 142

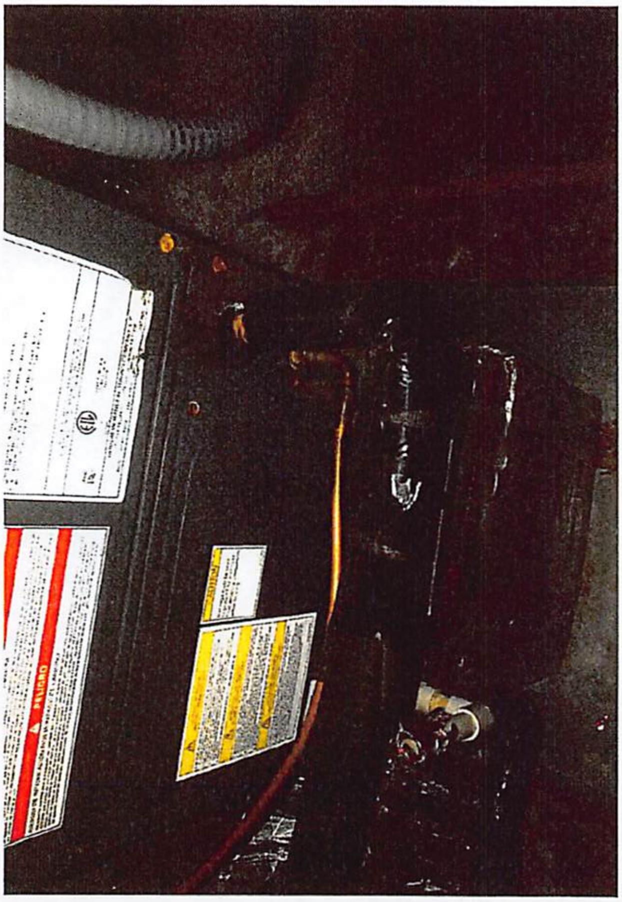
0.20
R-5
JAN 142015



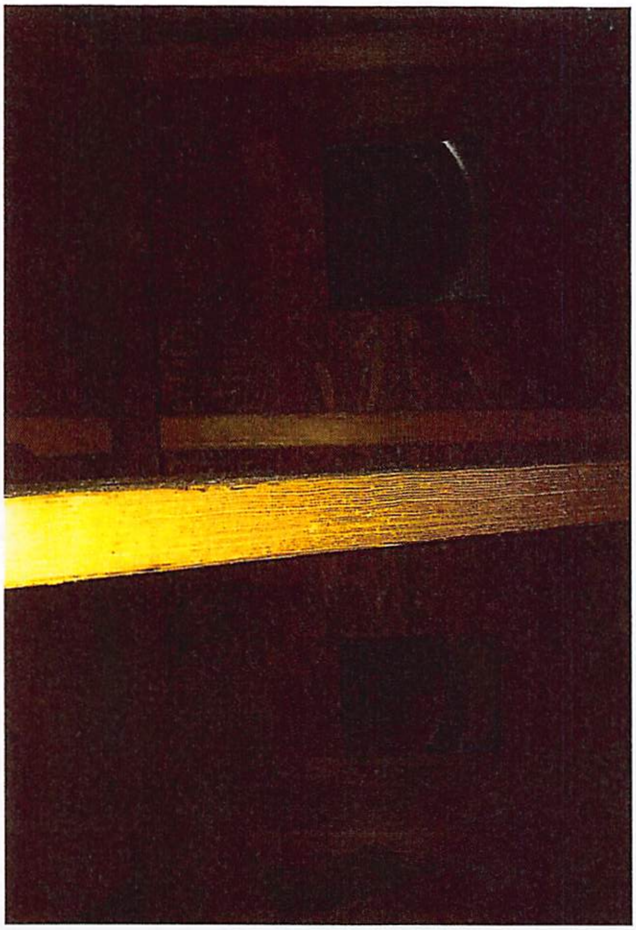



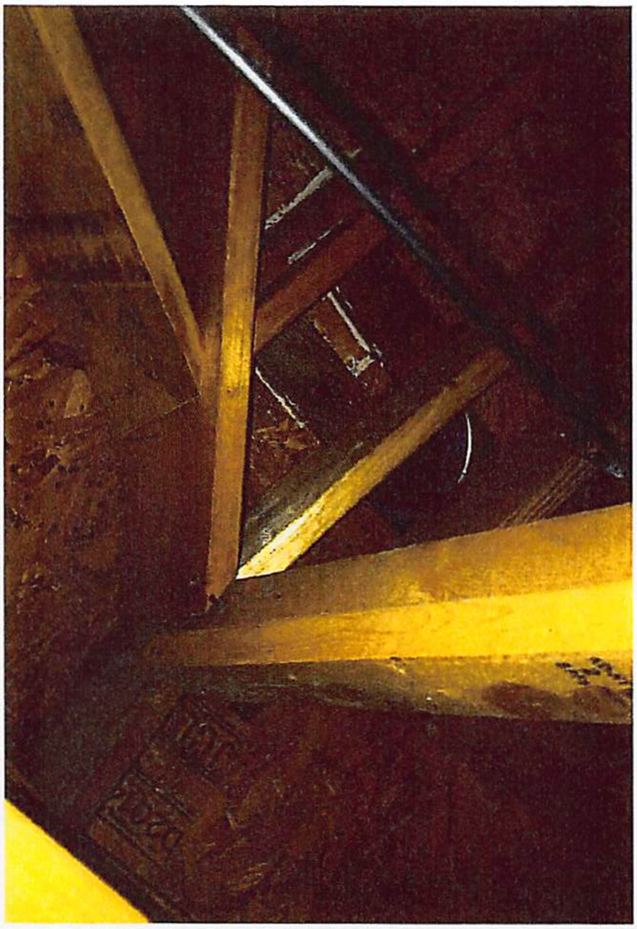


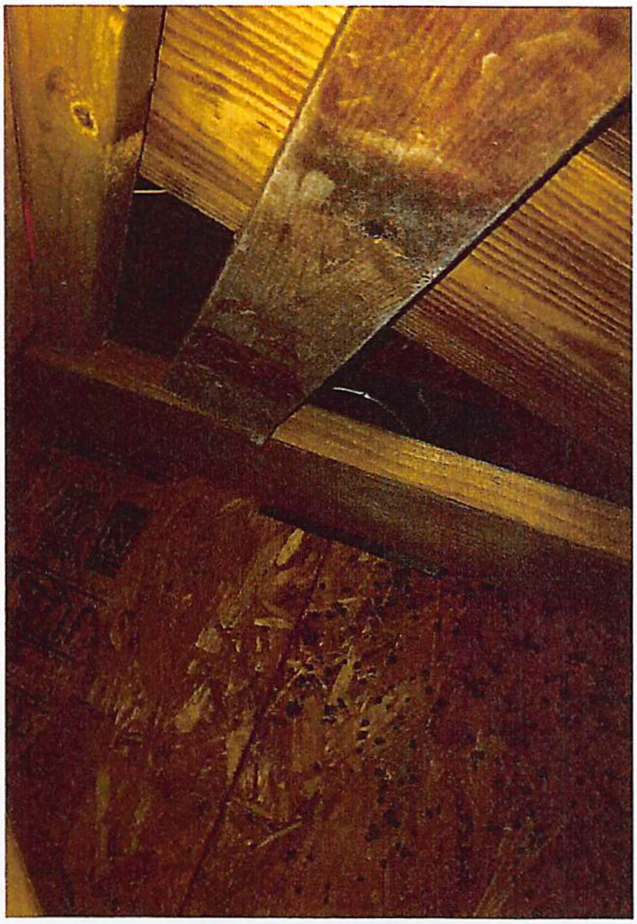

SINCE 1890
Janitrol
conditioning & heating


ARUF30B14AC
1411126477
S229767
MODEL NO. ARUF30B14AC
SERIAL NO.
MOTOR
AMP H/P
1/3
TEST EXTERNAL STATIC PRESSURE (INCHES)
MAXIMUM OUTLET TEMPERATURE 200 F
0 INCH CLEARANCE FROM CABINET, PLENUM AND DUCT, FOR INSTALLATION
LABEL PART NO.
208/230 VOLTS 60 HERTZ 1 PHASE
HEATER KIT MODEL USED
CIRCUIT 1
CIRCUIT 2
NO HEAT KIT

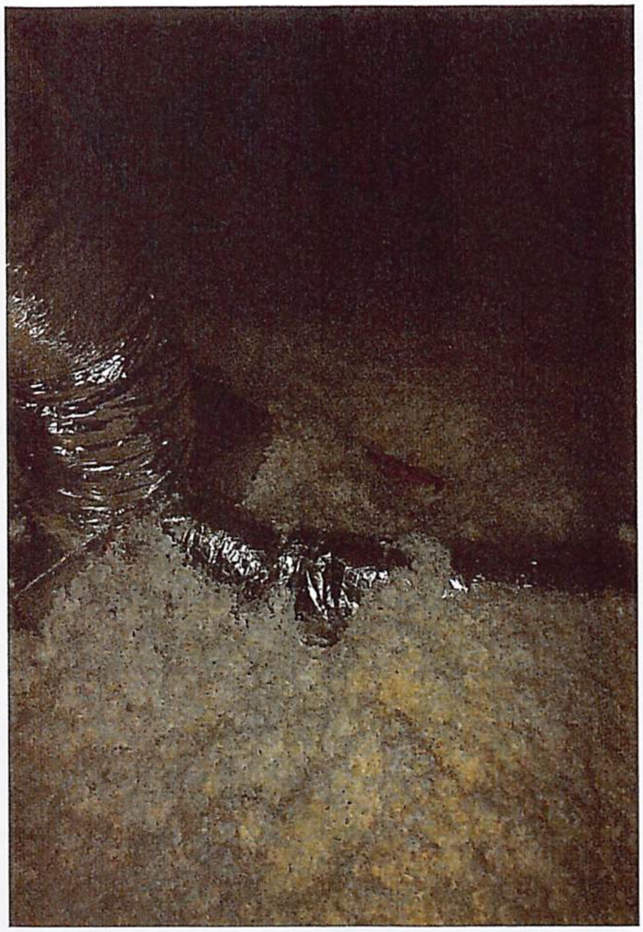


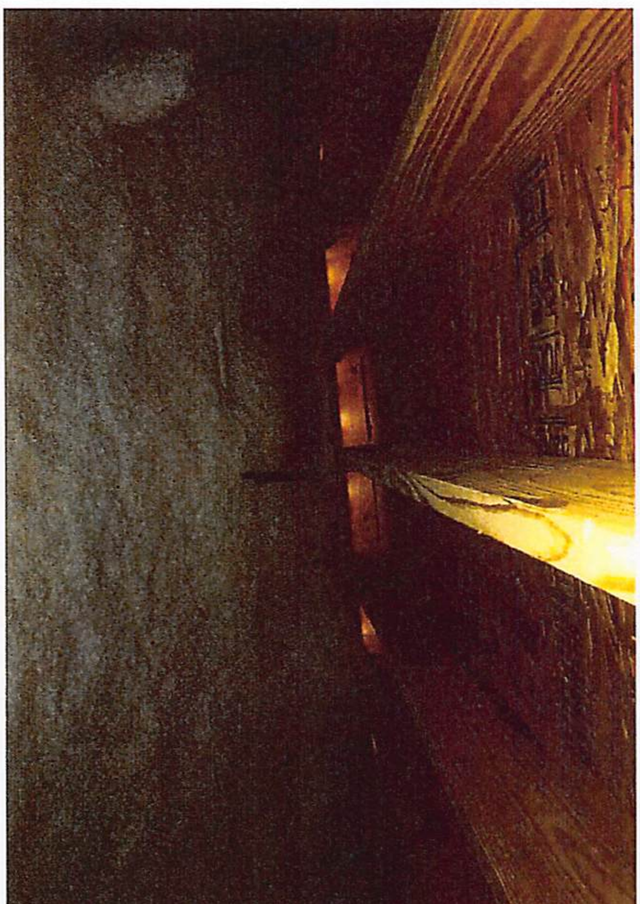


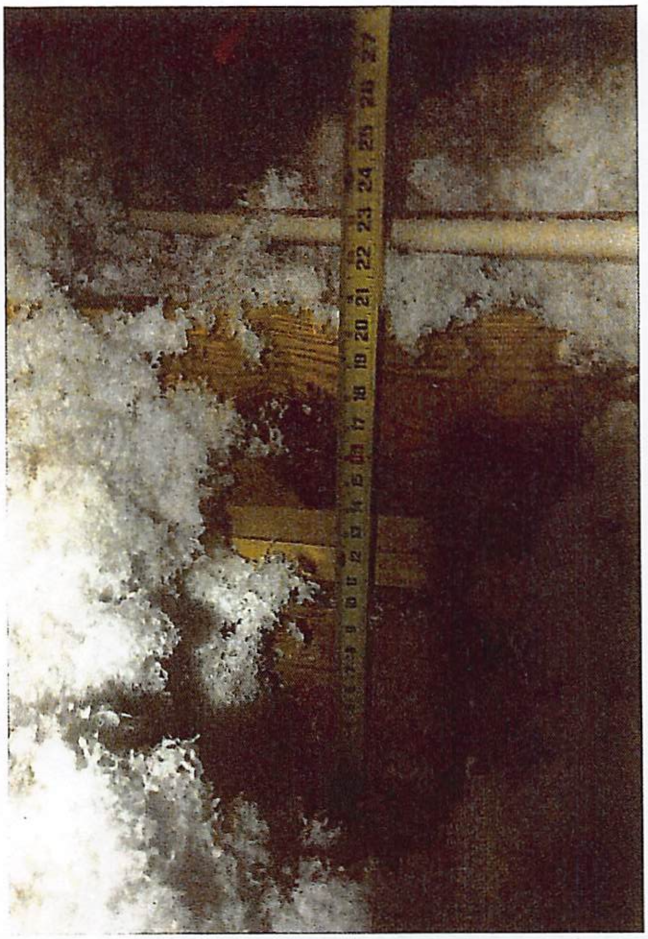


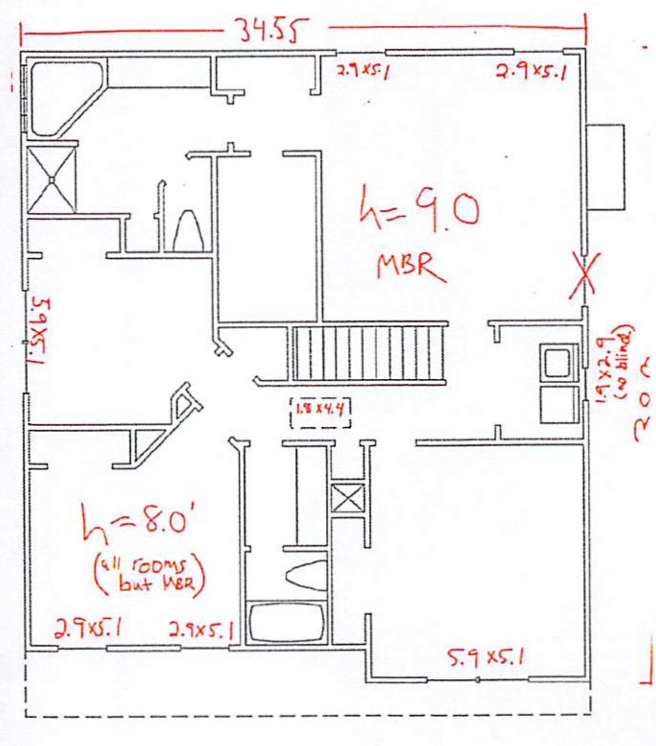



15 16 17 18 19 20



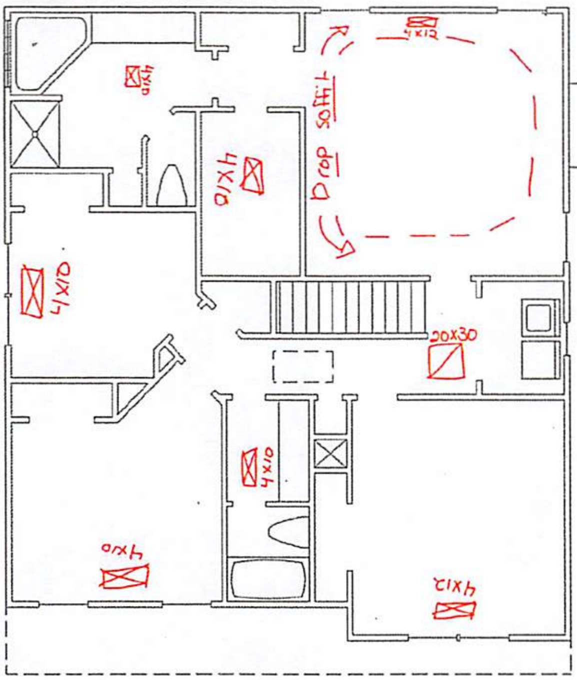




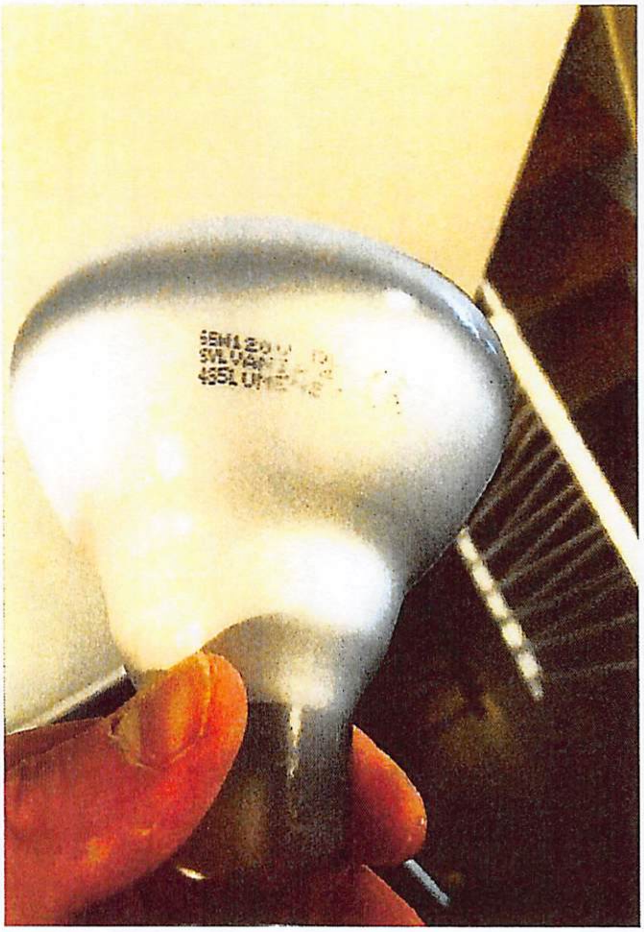


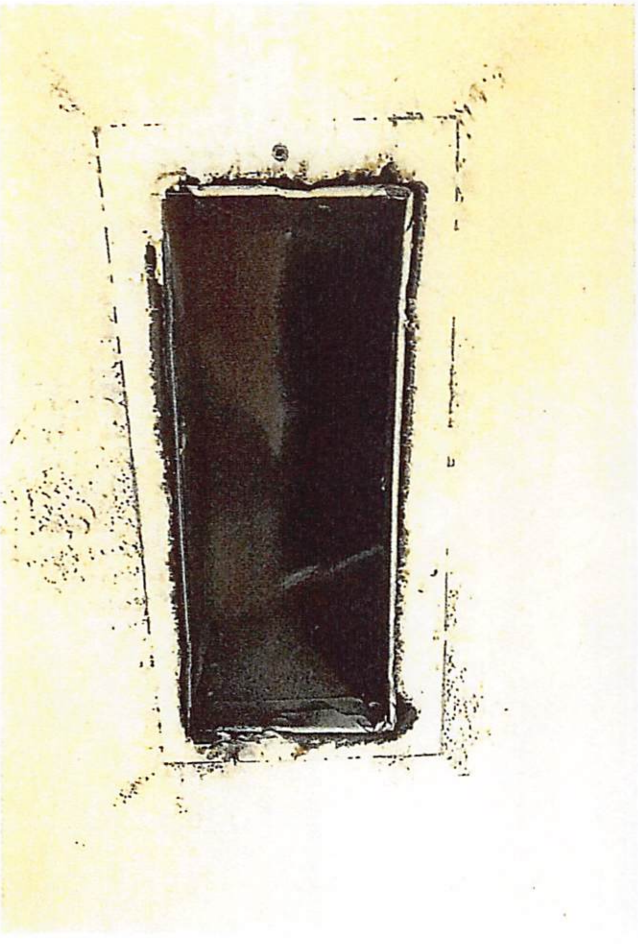
34.55
2.9x5.1
2.9x5.1
h=9.0
MBR
5.9x5.1
1.8x4.4
1.9x2.9 (no blind)
h=8.0'
(all rooms but MBR)
2.9x5.1
2.9x5.1
5.9x5.1

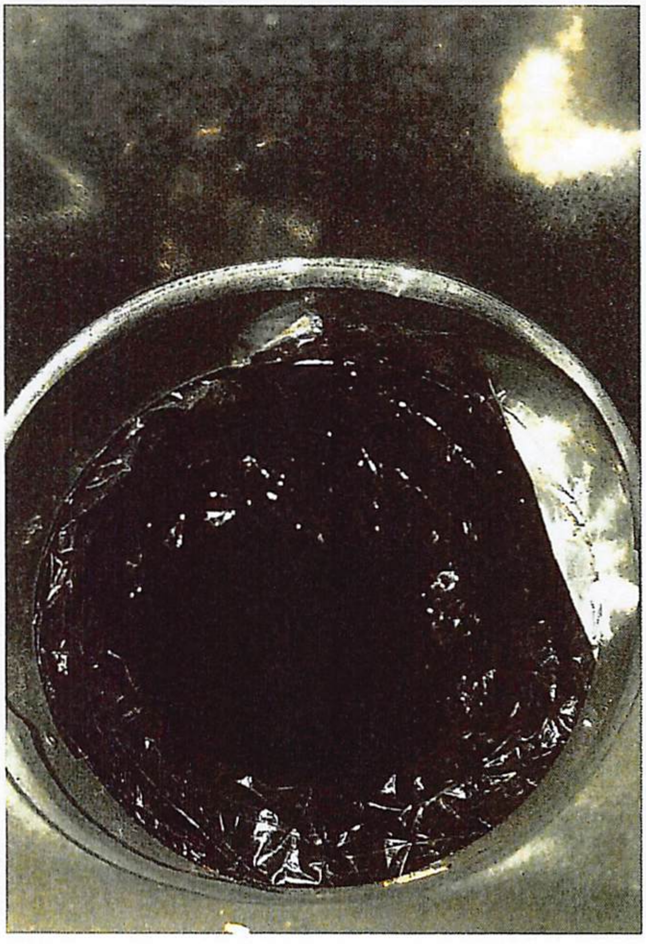
SCALE = 1/8" = 1'



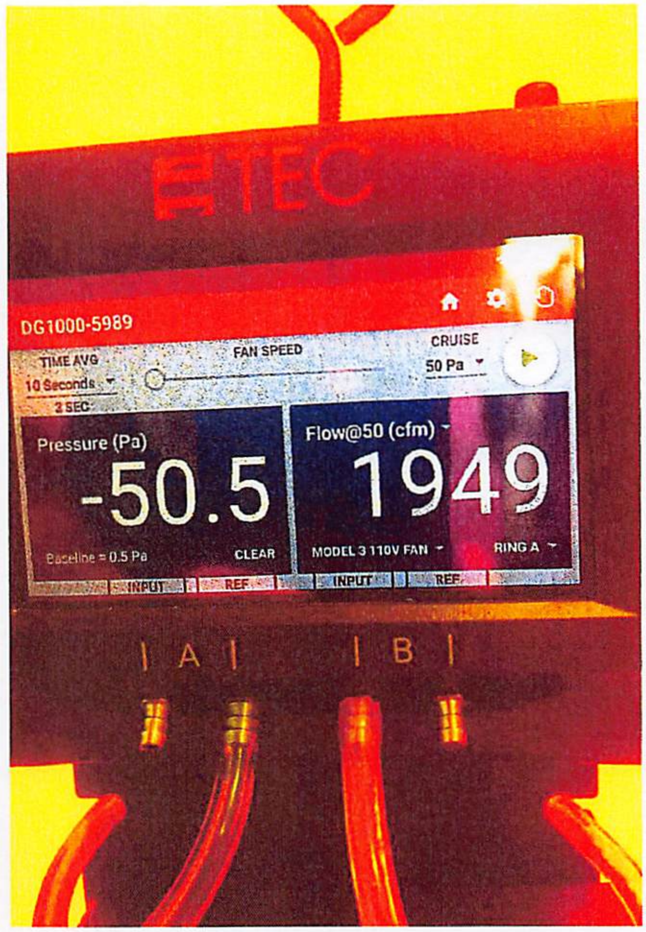
SCALE = 1/8" = 1'

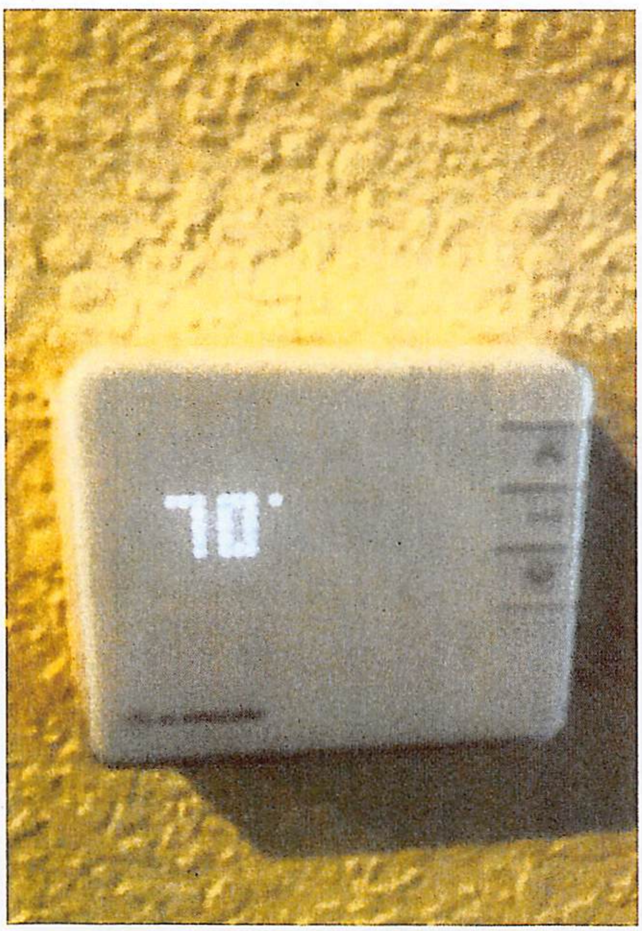


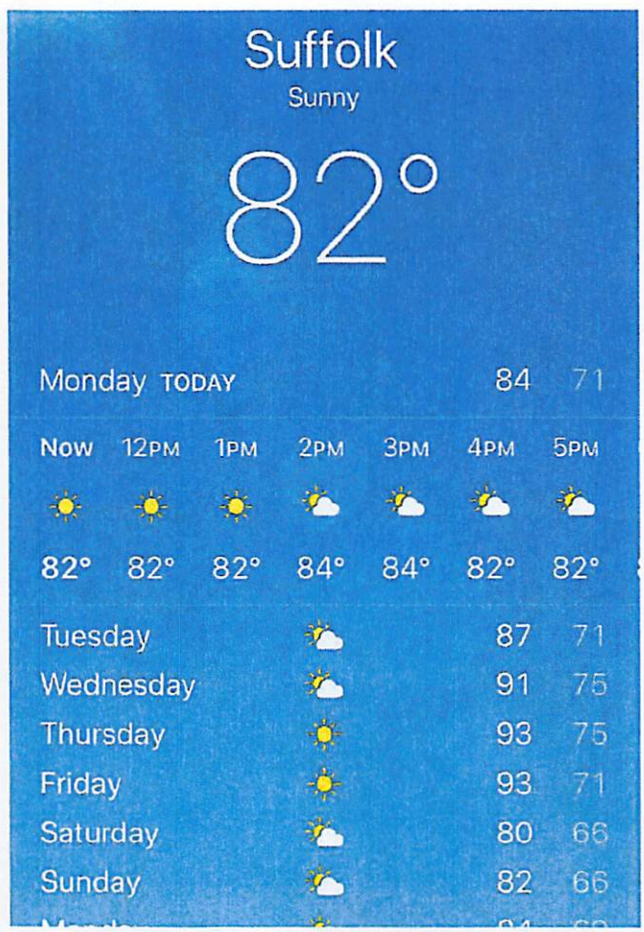


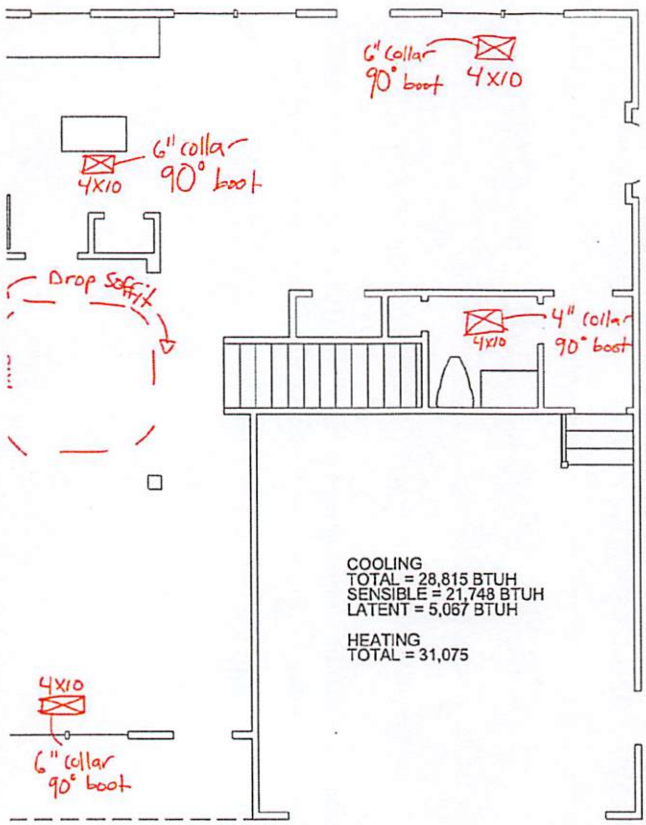


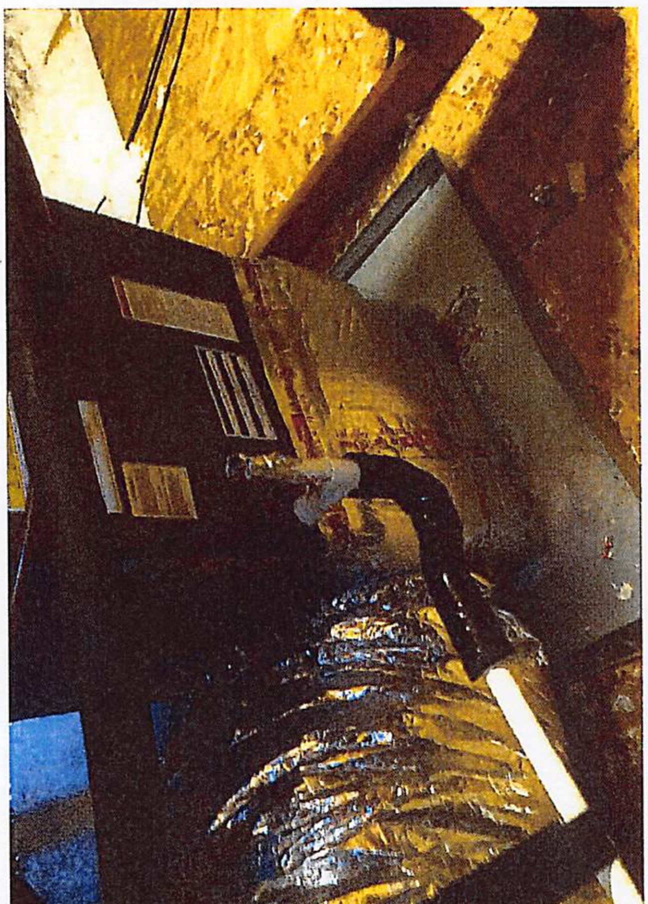

DG1000-5989
TIME AVG
FAN SPEED
1 Second
Pressure (Pa)
-0.3
Baseline = 0.5 Pa
CLEAR
INPUT
REF
A

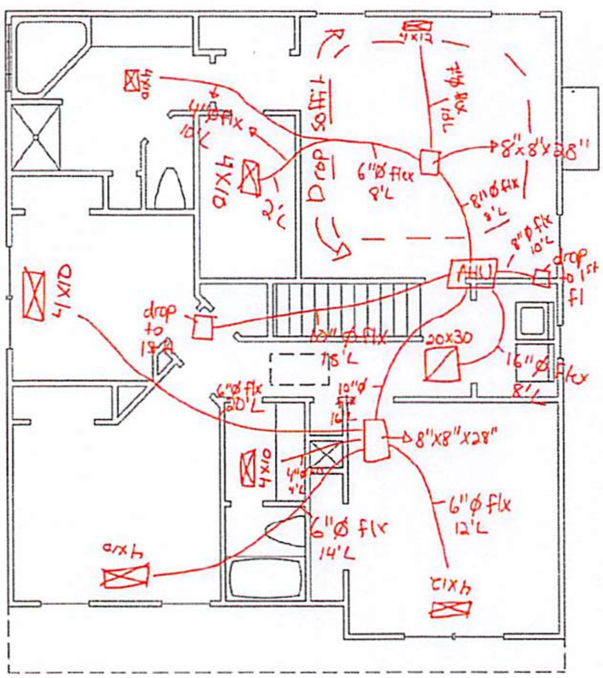

TEC
DG1000-5989
TIME AVG
10 Seconds
2 SEC
FAN SPEED
CRUISE
50 Pa
Pressure (Pa)
-50.5
Baseline = 0.5 Pa
CLEAR
Flow@50 (cfm)
1949
MODEL 3 110V FAN
RING A
INPUT
REF
INPUT
REF
A
B


70°

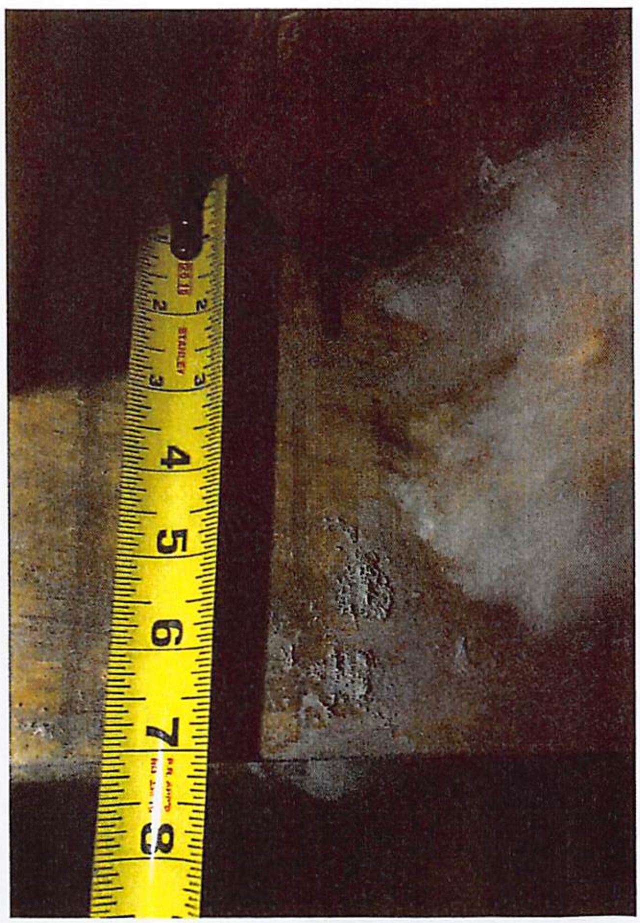

Suffolk
Sunny
82°
Monday TODAY 84 71
Now 12PM 1PM 2PM 3PM 4PM 5PM
82° 82° 82° 84° 84° 82° 82°
Tuesday 87 71
Wednesday 91 75
Thursday 93 75
Friday 93 71
Saturday 80 66
Sunday 82 66

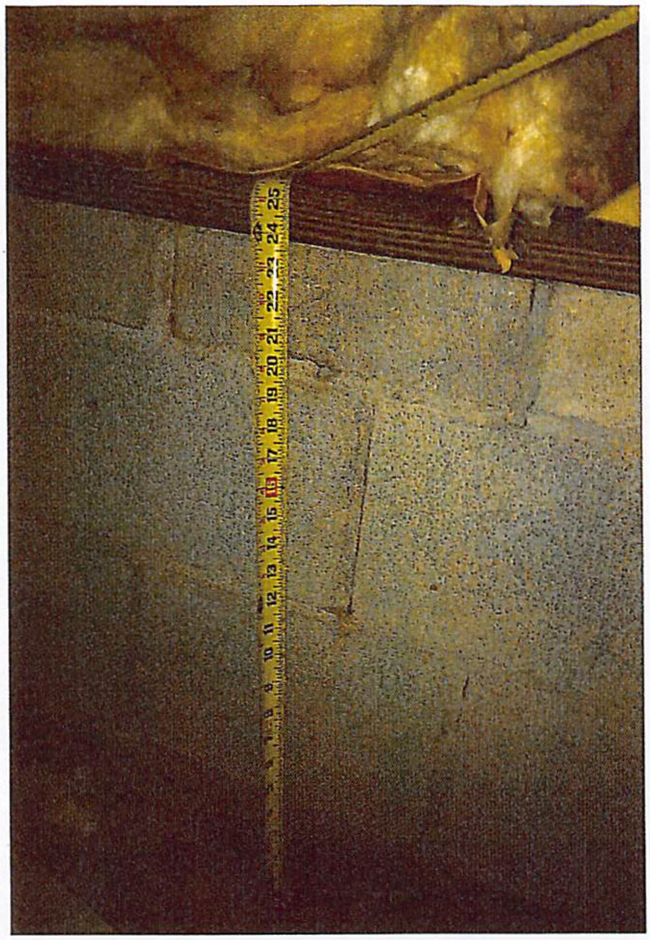

6" collar
90° boot
4x10
6" collar
90° boot
4x10
Drop Soffit
4" collar
90° boot
4x10
COOLING
TOTAL = 28,815 BTUH
SENSIBLE = 21,748 BTUH
LATENT = 5,067 BTUH
HEATING
TOTAL = 31,075
4x10
6" collar
90° boot




Drop soffit
AHU
drop to 1st fl
drop to 1st fl
20x30
16"Ø flx 8'L
8"x8"x28"
8"x8"x28"
6"Ø flx 8'L
6"Ø flx 12'L
6"Ø flx 14'L
6"Ø flx 20'L
10"Ø flx 15'L
4x10
4x12

SCALE = 1/8" = 1'





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Additional Documents
Submitted by the
City of Suffolk

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CITY OF SUFFOLK
Planning and Community Development
442 W Washinton St.
Suffolk VA 23434
(757)514-4150

Re: State Building Code Technical Review Board
"Appeal to the Review Board for Anthony Grant (Appeal No. 21-03)"

The City of Suffolk retained Ecovative Energy to perform an analysis of the "as-built" conditions of the single family dwelling located at 4281 Cole Avenue, Suffolk VA, 23435, for purposes of the Suffolk Local Board of Building Code Appeal's better reevaluation of the adequacy of the HVAC system. Carl Stevens of Trademark Mechanical provided HVAC load calculations, based off of the on-site evaluation data provided by Ecovative Energy, for confirmation purposes of adequate heating/cooling loads and equipment sizing. Accurate evaluation of the duct system would require destructive exploration removing interior gypsum ceilings to expose and map duct material, sizes, plenums, and their connections. Based on the available information, the Local Board of Building Code upheld the previous decision by vote and signed Resolution 01-2020.

4/23/2021

Michael Robinson, CBO
Building Official

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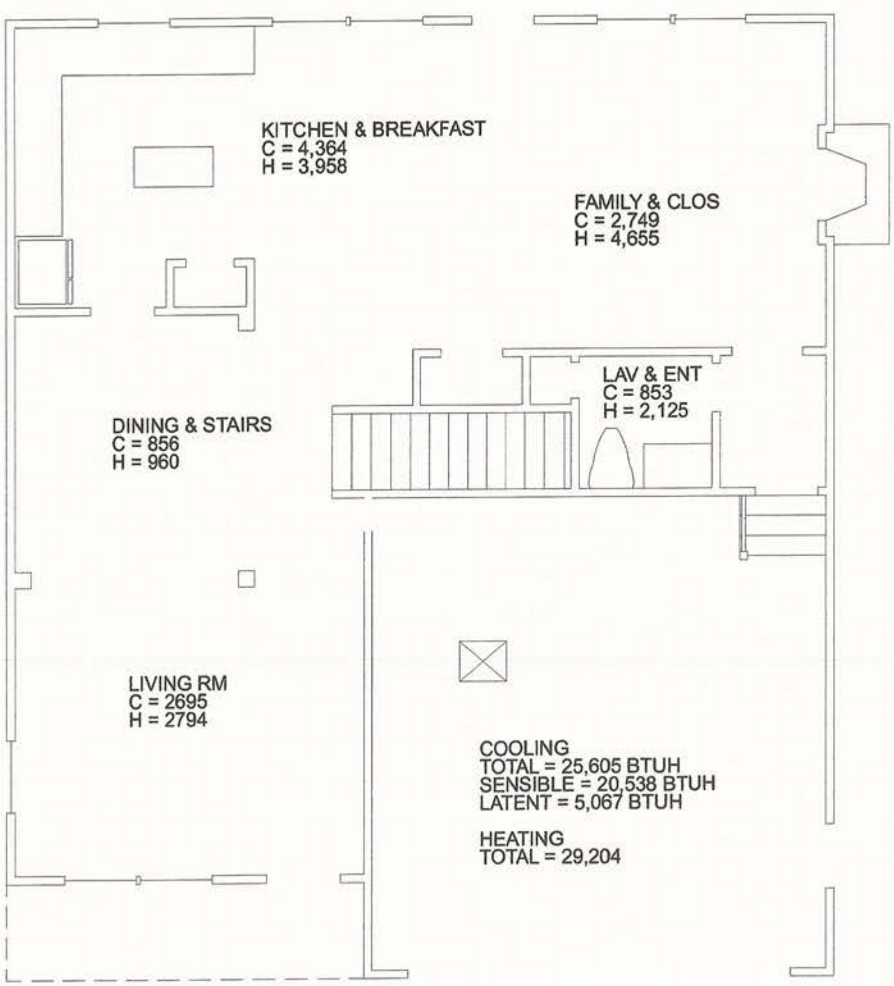
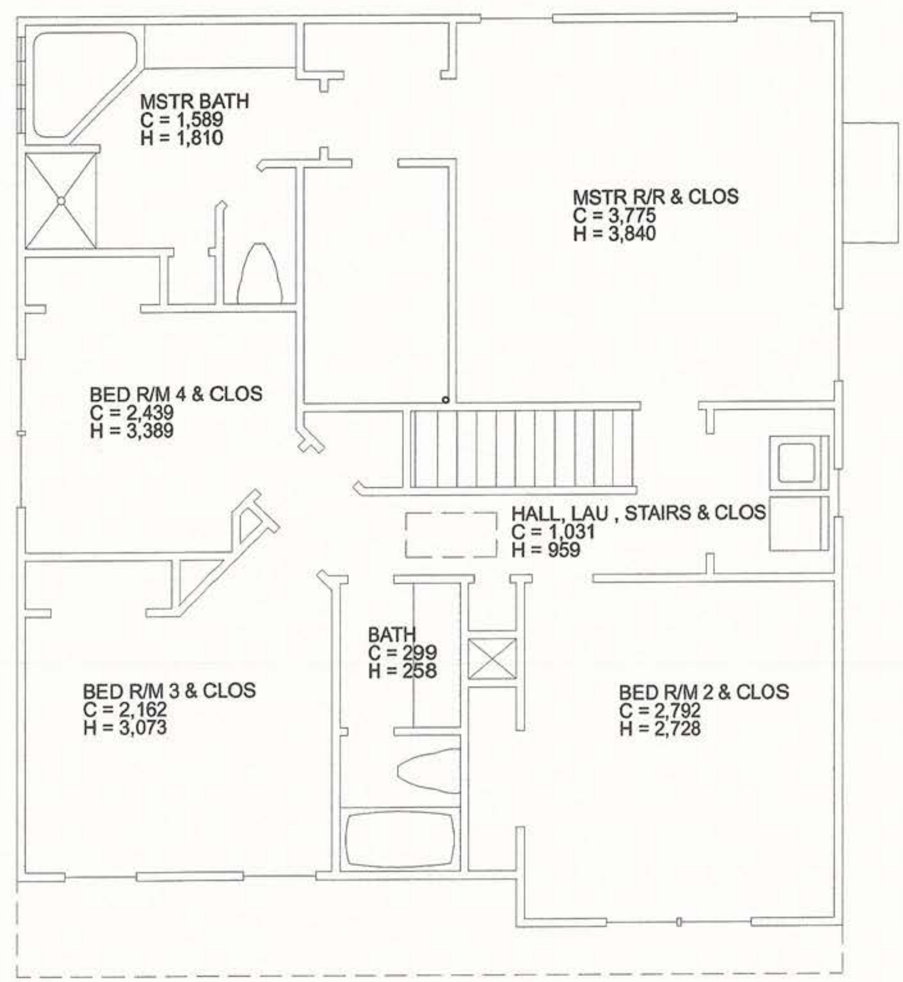
Addendum to the May 21, 2021 Agenda Package

Load calculations and analysis referenced in the final submittal by the City of Suffolk which is found on page 289 of the agenda package



SCALE = 1/8" = 1'



SCALE = 1/8" = 1'

1	Name of Room					**4281 COLE AVE**			Living Room			Dining & Stairs			Kitchen & Brekfast			Family & Clos		
2	Running Ft. Exposed Wall					288			40			24			30			31		
3	Room Dimensions Ft.					2214			189			206			230			246		
4	Ceiling Ht. Ft.		Directions Room Faces						9			9			9			9		
	TYPE OF EXPOSURE		Const. No.	HTM Htg.	HTM Clg.	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg
5	Gross	a				2,446			360			216			270			279		
	Exposed	b																		
	Walls &	c																		
	Partitions	d																		
6	Windows	a	3-D	18.1		227	4,109								39	706		48	869	
	& Glass	b																		
	Door Htg.	c																		
		d																		
7	Windows	North			16.0	90		1,440	30		480									
	& Glass	E & W			45.0	65		2,925	15		675									
	Doors Clg.	South			25.0	117		2,925							39		975	48		1,200
		NE & NW			33.0															
		SE & SW			46.0															
		SHADE			16.0															
8	Other doors		11-C	23.5	11.1	40	940	444	20	470	222									
9	Net	a	12-I	2.8	1.9	2,134	5,975	4,055	295	826	561	216	605	410	231	647	439	231	647	439
	Exposed	b																		
	Walls &	c																		
	Partitions	d																		
10	Ceilings	a	18-F	1.8	1.3	1,220	2,196	1,586												
		b																		
11	Floors	a	19-D	1.3					189	246		206	268		230	299		246	320	
		b	23-D	46.5																
12	Infiltration HTM			49.9	8.8	267	13,329	2,346	20	998	176				39	1,947	343	48	2,396	422
13	Sub total Btuh Loss = 6+8+9+10+11+12						26,549			2,540			873			3,599			4,232	
14	Duct Btuh Loss			10.0%			2,655			254			87			360			423	
15	Total Btuh Loss = 13+14						29,204			2,794			960			3,958			4,655	
16	People @ 230 & Appliances 1800							2,950									1,800			
17	Sensible Btuh Gain = 7+8+9+10+11+12+16							18,670			2,113			410			3,557			2,061
18	Duct Btuh Gain				10.0%			1,867			211			41			356			206
19	Total Sensible Gain							20,538			2,325			451			3,912			2,267
	Infiltration CFM			Latent Gain		125		4,067	11		371	12		404	14		451	15		483
	Latent from People							1,000												
	Total Latent Load							5,067			371			404			451			483
	Design CFM							853			90			29			145			92
	Total System Load							25,605			2,695			856			4,364			2,749
	Selected Capacity			27,500		Actual CFM		917			96			31			156			98

Lav & Entrance						Bed 4 & Clos			Hall Stairs, Lau & Clos			Bath			Bed 3 & Clos		
17						33			7			5			27		
70						214			180			68			182		
9			14			8			8			8			8		
Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg
153						264			56			40			216		
						30	543		6	109					30	543	
						30		480							30		480
									6		270						
20	470	222															
133	372	253				234	655	445	50	140	95	40	112	76	186	521	353
						214	385	278	180	324	234	68	122	88	129	232	168
70	91																
20	998	176				30	1,498	264	6	300	53				30	1,498	264
	1,932						3,081			872			234			2,794	
	193						308			87			23			279	
	2,125						3,389			959			258			3,073	
								230									230
		650						1,696			652			164			1,495
		65						170			65			16			149
		715						1,866			717			181			1,644
4		137				11		373	10		314	4		119	10		317
								200									200
		137						573			314			119			517
		28						81			34			10			72
		853						2,439			1,031			299			2,162
		31						87			37			11			77

Bed 2 & Clos			Mstr Bath			Mstr Bedroom & Clos		
13			22			39		
129			133			367		
8			8			8		
Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg
104			176			312		
30	543		14	253		30	543	
30		1,350	14		630			
						30		750
74	207	141	162	454	308	282	790	536
129	232	168	133	239	173	367	661	477
30	1,498	264	14	699	123	30	1,498	264
	2,480			1,645			3,491	
	248			165			349	
	2,728			1,810			3,840	
		230						460
		2,152			1,234			2,486
		215			123			249
		2,367			1,357			2,735
7		225	7		232	20		640
		200						400
		425			232			1,040
		93			53			126
		2,792			1,589			3,775
		100			57			135

ecovative
APPLIED BUILDING SCIENCE

August 31, 2020
4281 Cole Ave, Suffolk VA
Client: City of Suffolk

Exterior Notes:
-Siding is light beige vinyl with white trim
-Medium color brick veneer over crawlspace foundation walls
-Medium color asphalt shingles
-Front of home is facing N/NW
-Shading from trees on SW side of home

First Floor Notes:
-Thermostat centrally located at bottom of stairs. One system, one zone
-No return duct on first floor
-Flooring is all VCT on entire first floor
-Sits on top of vented crawlspace with vapor barrier
-Floor joist insulation is paper-faced fiberglass batt (5.5" thick - R-value lettering not visible due to mold and moisture stains on paper face of insulation batts)
-Foundation walls are 2' high from grade to bottom of framing
-Floor joists are 2x8 @16" OC
-Insulation on exterior walls confirmed as fiberglass batts, but thickness and face vs. un-faced is unknown

Second Floor Notes:
-All flooring is carpet except for Master bathroom which is tile
-Floor joists are 2x8 @ 16" OC
-Master BR has different ceiling height and drop soffit where only supply grill is located
-Insulation of floor joists for room over garage confirmed, but thickness unknown
-Insulation on exterior walls confirmed as fiberglass batts, but thickness and face vs. un-faced is unknown

Window Notes:
-All windows are double pane with <u>no</u> Low-E coating
-Bottom half have bug screens on outside of pane
-All windows have 45 deg. angle blinds (except windows noted on drawings without)
-All windows are vinyl frame and sash
-Front entry door only exterior door with glazing (noted on drawings)

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Attic Notes:
-Ceiling joists are 2x8 @ 16” OC
-Insulation is blown in loose-fill fiberglass @ 14-15” high (7-8” continuous R-value over studs)
-Attic pulldown stairs has R-5 foam board on door panel
-Attic is vented with soffits and static vents near ridge
-AHU located in attic

Ductwork Notes:
-All ductwork in attic is R-8 insulation and all flex duct except for plenum boxes off of AHU and transition boxes for some of the smaller supply branch lines (noted on drawings)
-Duct leakage is meeting 2015 code at 2.9% total leakage and 2.0% leakage to the outdoors, but boots/return box are not sealed to the sheetrock

Blower Door Test Result:
-1,949 CFM@50Pa = approximately 6.13 ACH@50Pa

Bathroom Ventilation Rates:
Downstairs half bath - 35 CFM
Upstairs hallway full bath - 28 CFM
Master bath - 22 CFM
Master toilet - 28 CFM

4281 Cole Avenue

Suffolk, Virginia

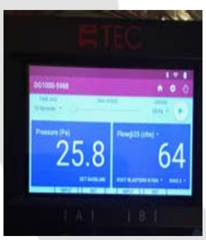
DUCT CHECK PRO

an ecovative APPLIED BUILDING SCIENCE exclusive service

All testing performed by Ecovative Energy is completed by Certified Third Party testing specialists who follow the ANSI/RESNET/ ICC 380-2016 Standard for Testing Airtightness of Building Enclosures, Airtightness of Heating and Cooling Air Distribution Systems, and Airflow of Mechanical Ventilation Systems.

Job Details		
Client Name	Client Phone Number	Client Email
City of Suffolk		
Square Footage Served	Air Handler Location	Duct System Location(s)
2227	Vented Attic	Vented Attic/Between Floors

TEST RESULTS		
System Identity	Pass or Does Not Pass	Standard Selected
Whole House	**PASS**	**2015 Virginia Building Code**
Date	Test results (cfm@25pa)	Maximum Allowed (cfm@25pa)
Aug 31, 2020	**64**	**89.1**



Testing Standards			
Select	Applicable Standard	Standard Criteria	Applied Standard (cfm@25pa)
☐	2012 Virginia Building Code	6%	NA
☑	2015 Virginia Building Code	4%	89.1
☐	2015 Va Building Code -AHU	3%	NA
☐	EarthCraft Va	Varies	NA
☐	ENERGYSTAR Homes (V3R8)	4%	NA

Testing Details			
Test #	Total Duct Leakage (% of sq. ft.)	Tested LTO (cfm@25pa)	Outdoor Duct Leakage (% of sq. ft.)
1	2.9%	50	2%
# Of Returns	Positive or Negative Test	Test Equipment Location	Test Probe Location
1	Positive	Central Return	Hallway Bathroom Supply

This test is guaranteed to be accurate by : Jeffrey Sadler
RESNET CERTIFICATION RATER ID #4828461

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ENVELOPE CHECK PRO

an ecovative energy exclusive service

Property Address: 4281 Cole Avenue, Suffolk VA **Date:** 8/31/2020

Year of Construction: 2016 **Approximate Square Feet:** 2,227

Bedrooms: 4 **Bathrooms:** 3 **Floors:** 2

ENVELOPE INFILTRATION AND AIR QUALITY

Approximate Volume (cubic feet):

19,063

Fan Flow at 50 pa (cfm):

1949

Air Change Rate at 50 pa:

6.13

Standard	**Air Change Rate @ 50 pa**
IECC 2012	< 5
Earthcraft VA	< 5
ENERGY STAR	< 4
PassivHaus	< 0.6

Natural Air Changes Per Hour:

0.38

ASHRAE 62.2 Whole Building Ventilation Rate (cfm):

53.3

TEST OUT READING

Your Ecovative Expert: Jeffrey Sadler
RESNET CERTIFICATION RATER
ID:4828461

ecovative
APPLIED BUILDING SCIENCE

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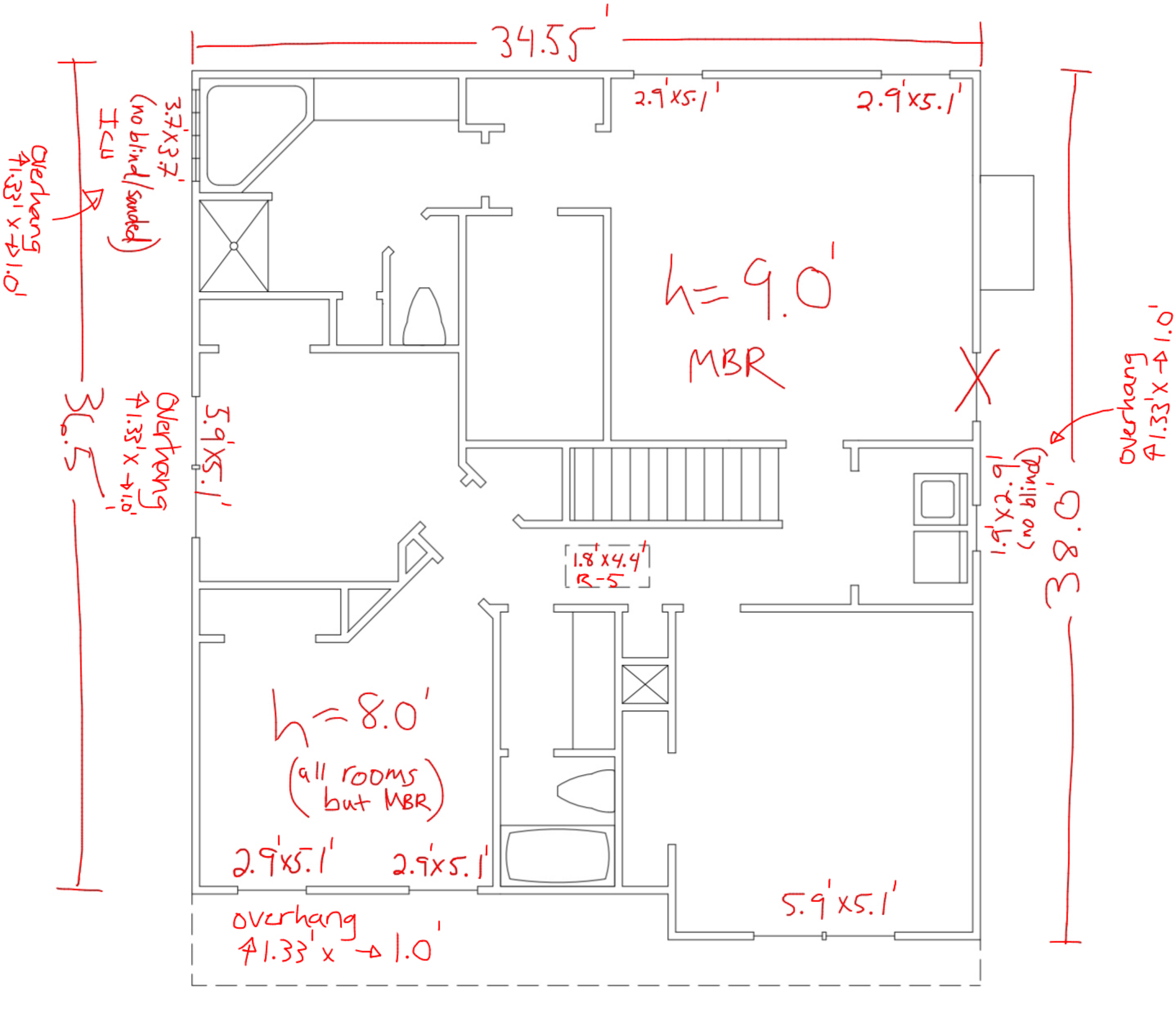
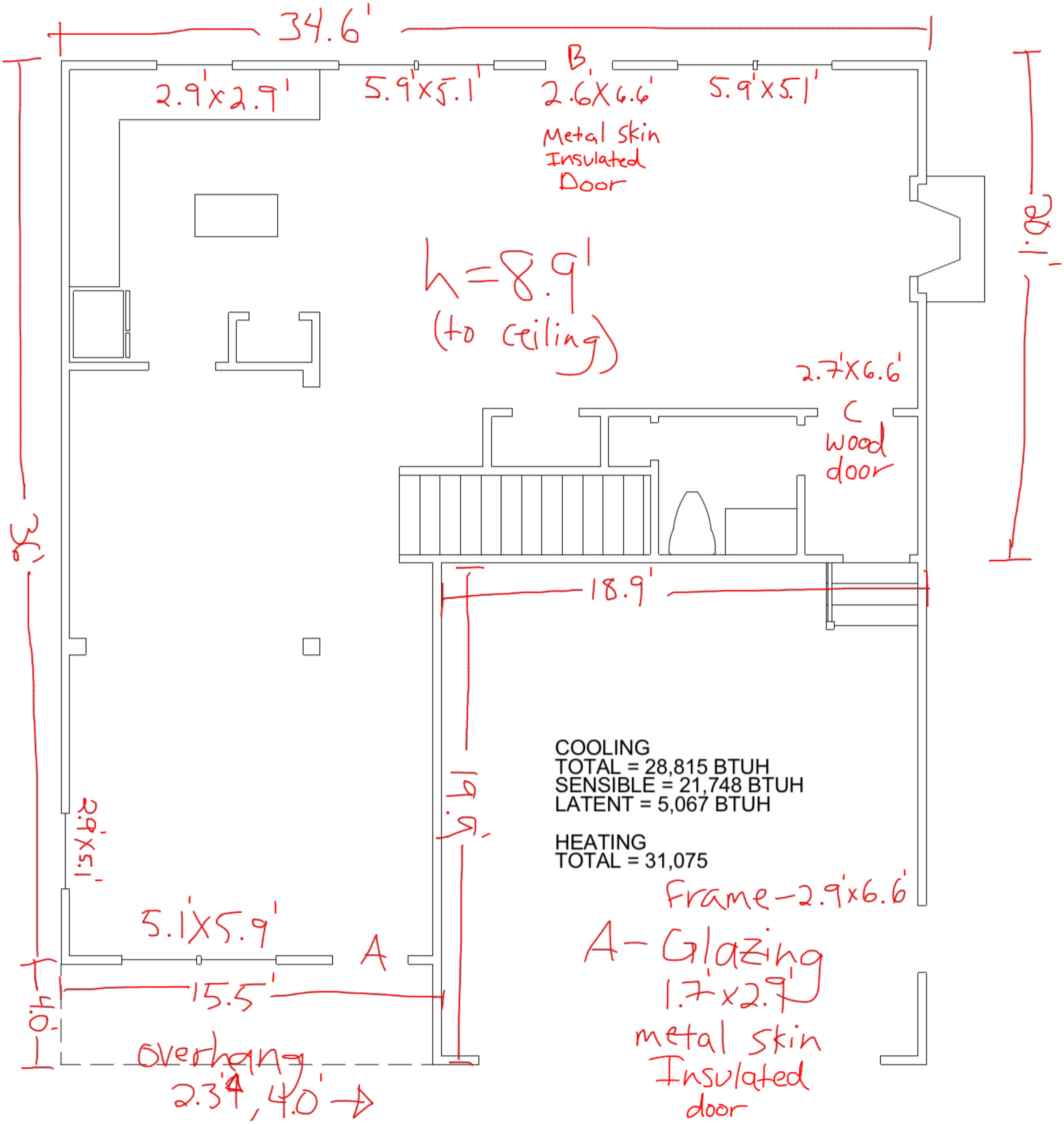
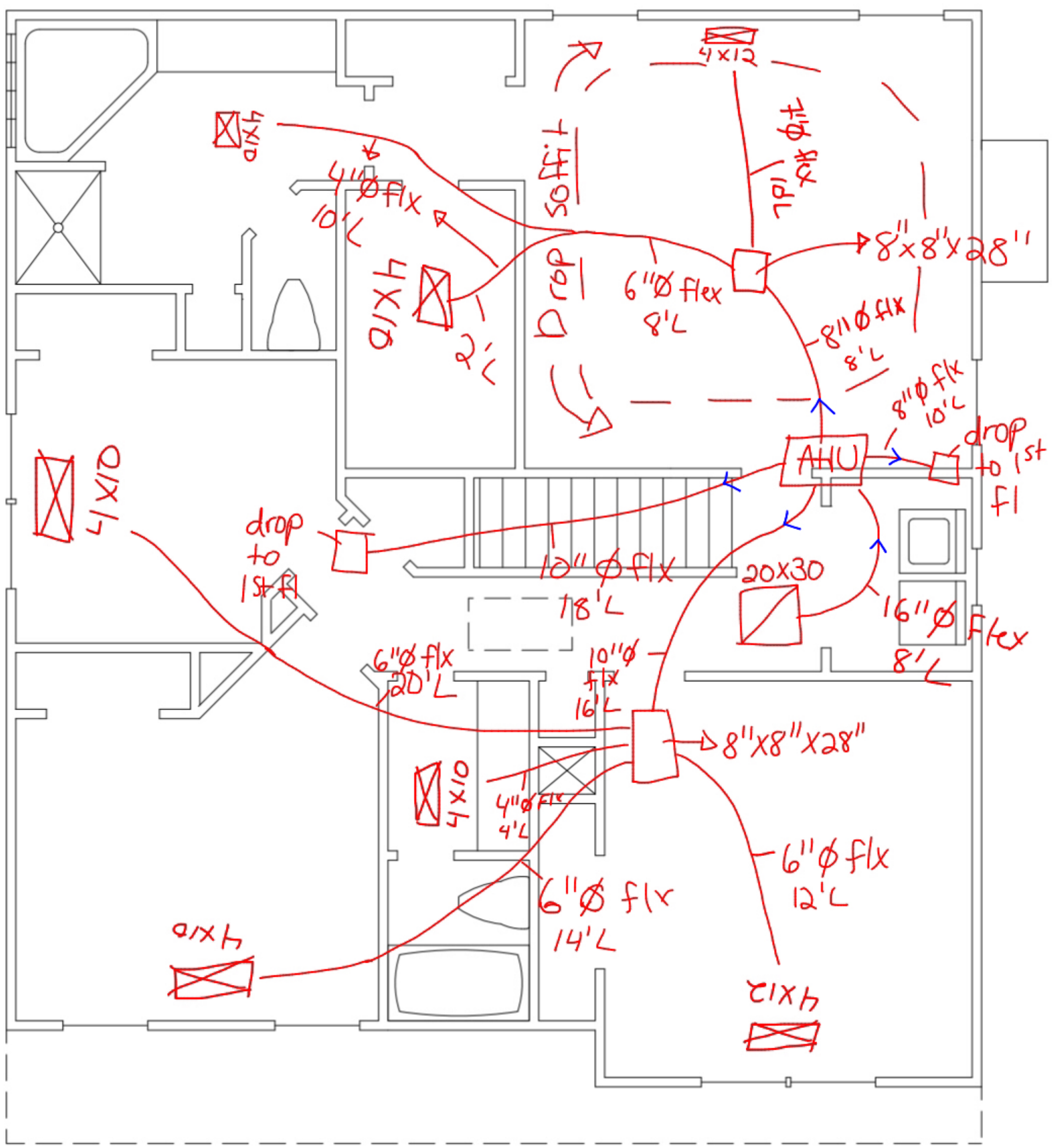
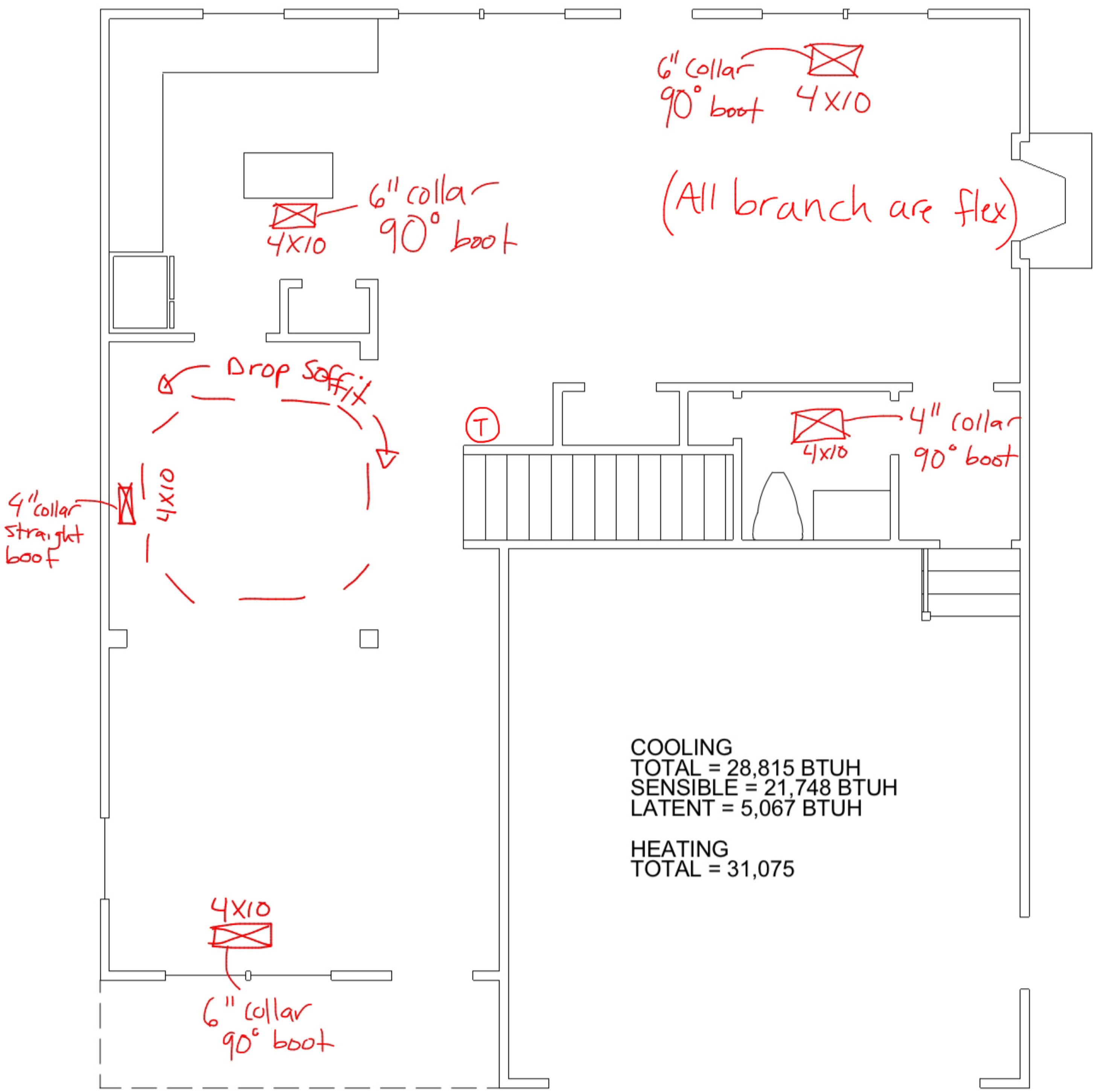

34.55'
2.9'x5.1'
2.9'x5.1'
3.7'x3.7' (no blind/sanded)
ICU
overhang 1.33' x → 1.0'
h=9.0'
MBR
36.5
overhang 1.33' x → 1.0'
5.9'x5.1'
overhang 1.33' x → 1.0'
1.9'x2.9' (no blind)
38.0'
1.8'x4.4' B-5
h=8.0' (all rooms but MBR)
2.9'x5.1'
2.9'x5.1'
5.9'x5.1'
overhang 1.33' x → 1.0'

SCALE = 1/8" = 1'


34.6'
B
2.9'x2.9'
5.9'x5.1'
2.6'X6.6'
5.9'x5.1'
Metal Skin
Insulated
Door
h=8.9'
(to ceiling)
2.7'X6.6'
C
wood
door
18.9'
36'
19.8'
19.9'
COOLING
TOTAL = 28,815 BTUH
SENSIBLE = 21,748 BTUH
LATENT = 5,067 BTUH
HEATING
TOTAL = 31,075
Frame-2.9'x6.6'
1.5'x2.9'
5.1'X5.9'
A
A-Glazing
1.7'x2.9'
15.5'
4.0'
overhang
2.34', 4.0'
metal skin
Insulated
door

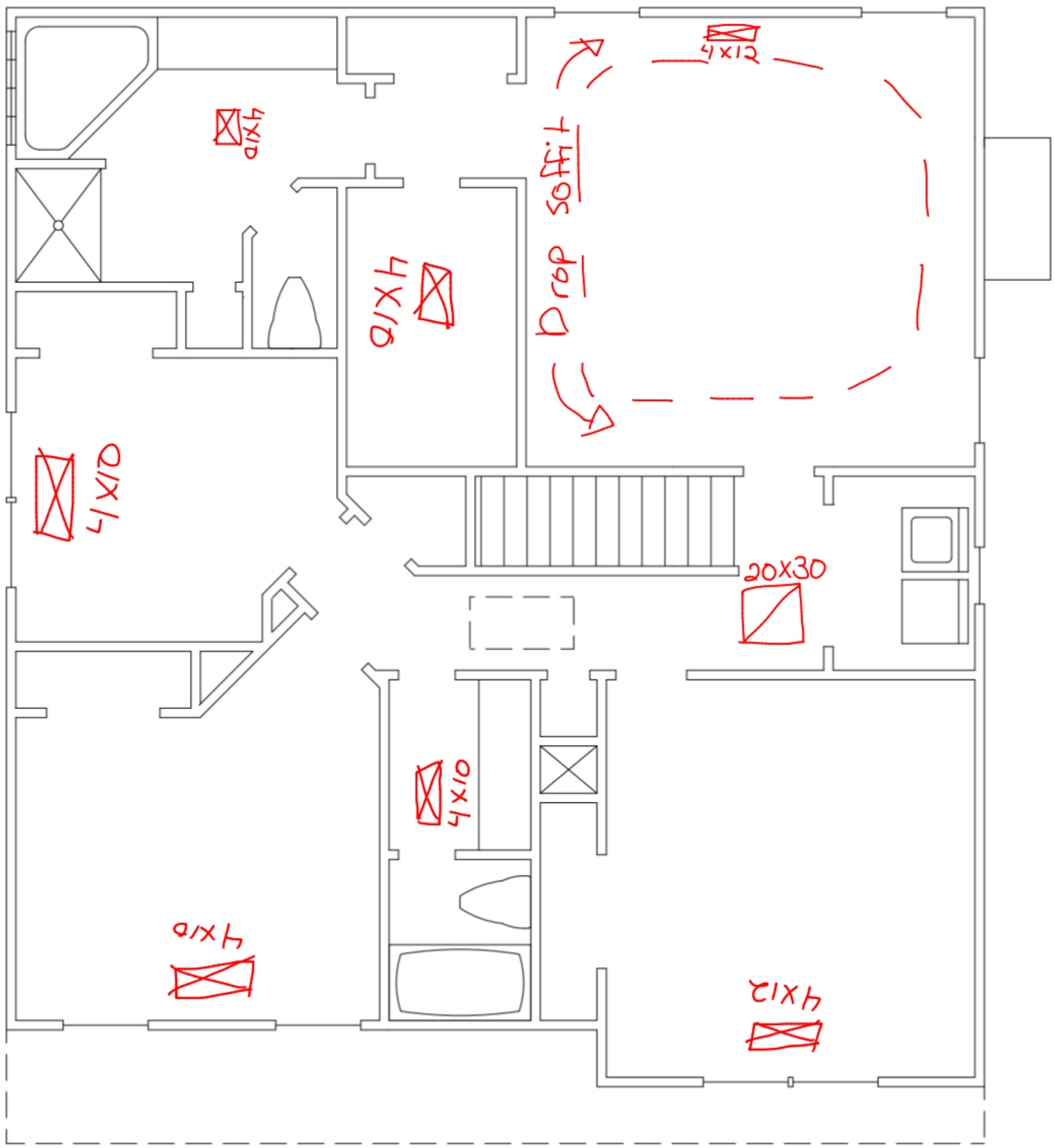

4x12
soffit
drop
4"Ø flx
10'L
6"Ø flex
8'L
8"x8"x28"
8"Ø flx
8'L
8"Ø flx
10'L
AHU
drop to 1st fl
4x10
drop to 1st fl
10"Ø flx
18'L
20x30
16"Ø flex
8'L
6"Ø flx
20'L
10"Ø flx
16'L
8"x8"x28"
4x10
4"Ø flx
4'L
6"Ø flx
14'L
6"Ø flx
12'L

SCALE = 1/8" = 1'



COLLING
TOTAL = 28,815 BTUH
SENSIBLE = 21,748 BTUH
LATENT = 5,067 BTUH

HEATING
TOTAL = 31,075

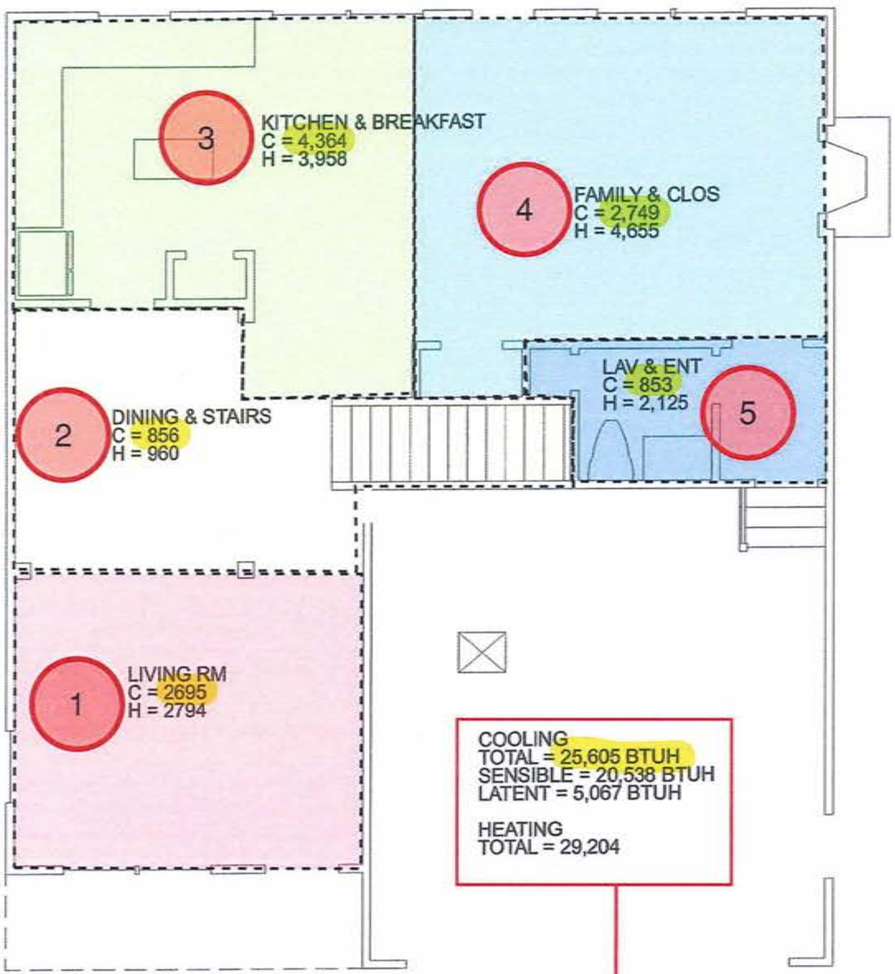


SCALE = 1/8" = 1'

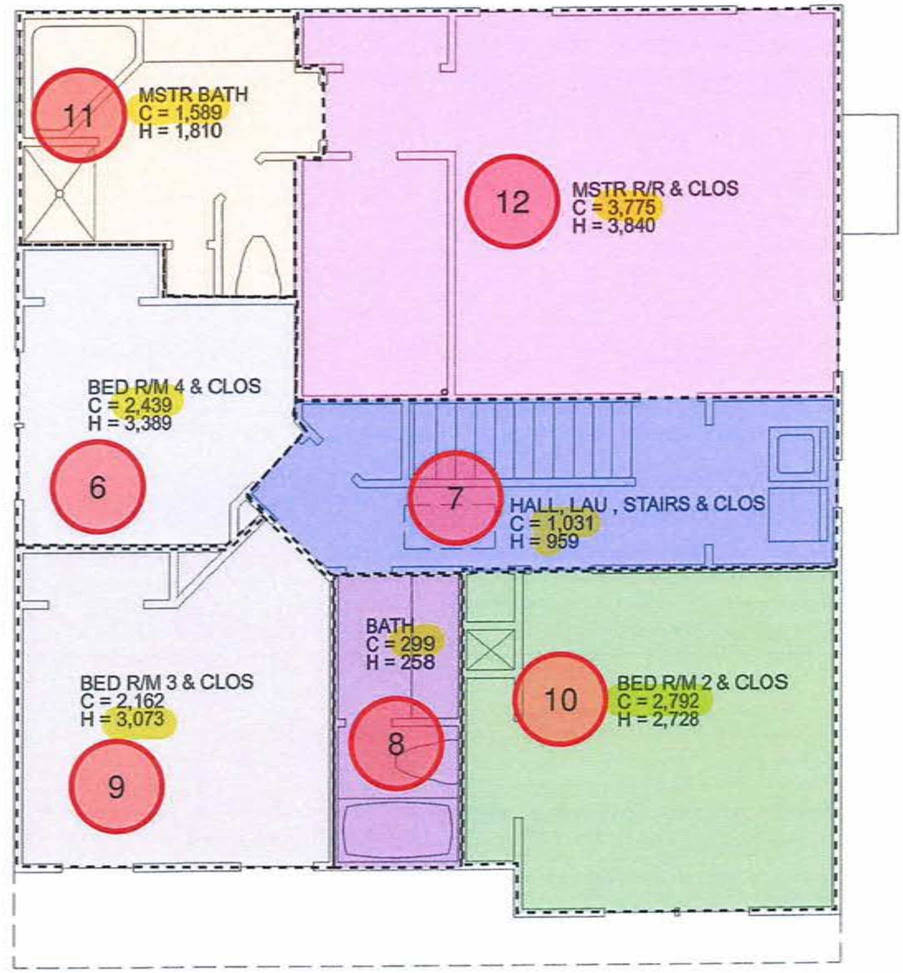
Addendum #2 to the May 21, 2021 Agenda Package

Complete Manual J Calculation and approved building plans for the Anthony T. Grant Jr. home

*Color of room/numeric label corresponds with color of column on spread sheet. BTUH of cooling calculated for each space and is also highlighted on both.



SCALE = 1/8" = 1'



SCALE = 1/8" = 1'

*Whole house calculated load (see column labeled "4281 COLE AVE." on spread sheet)

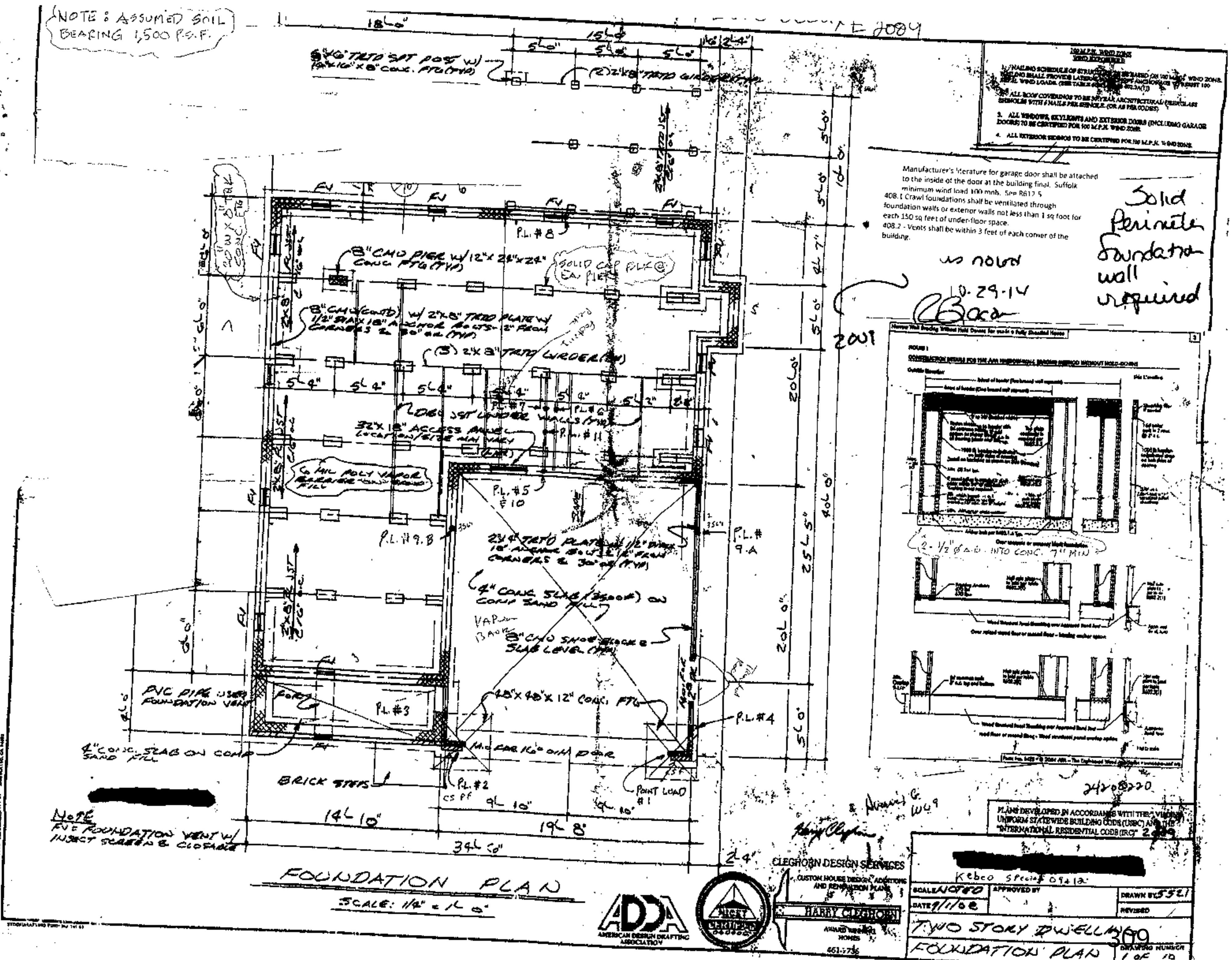
Data inputs based on Ecovative's "as-built" data collection

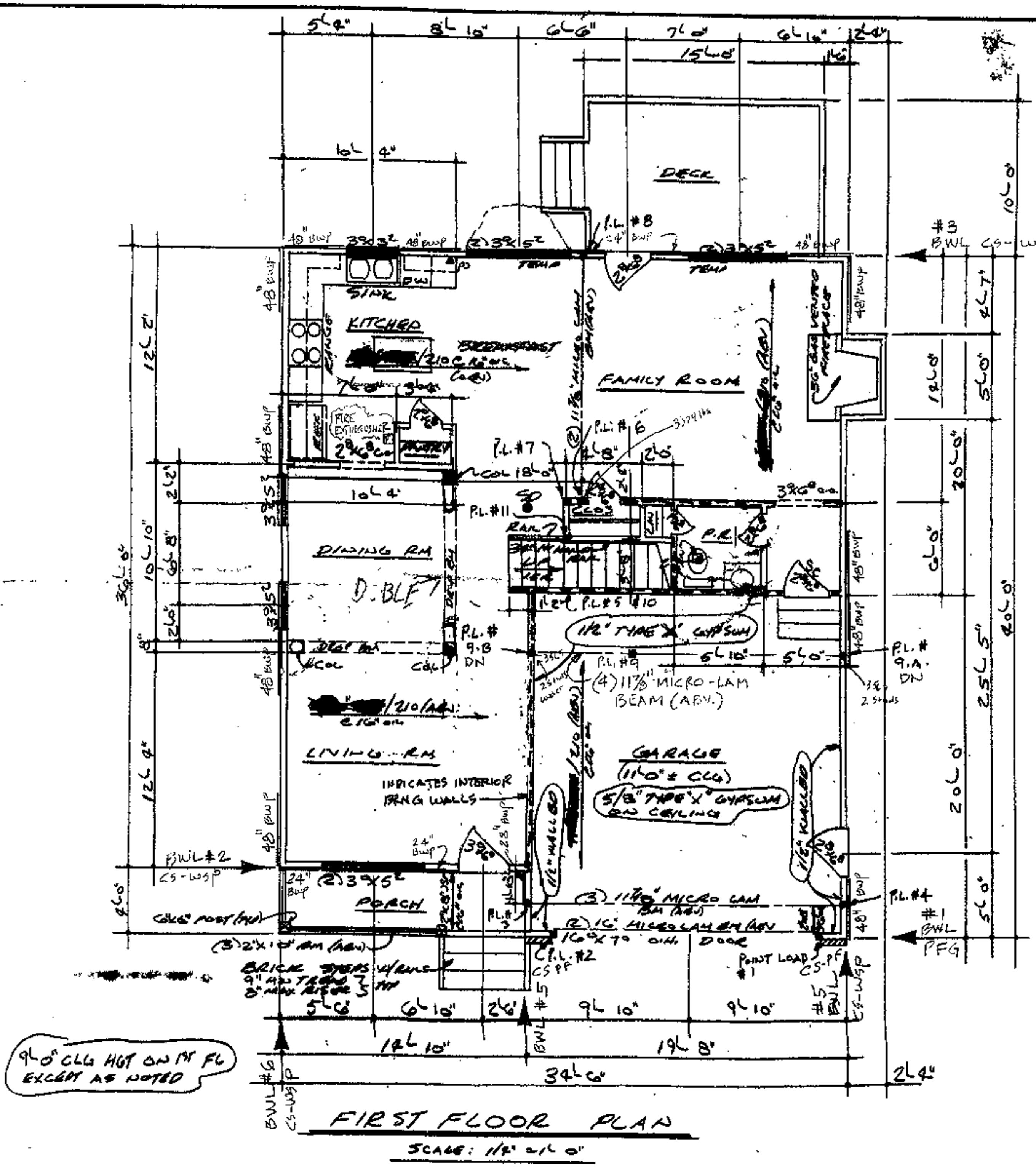
*Whole House

1	Name of Room					4281 COLE AVE			Living Room			Dining & Stairs			Kitchen & Brekfast			Family & Clos		
2	Running Ft. Exposed Wall					288			40			24			30			31		
3	Room Dimensions Ft.					2214			189			206			230			246		
4	Ceiling Ht. Ft.		Directions Room Faces						9			9			9			9		
	TYPE OF EXPOSURE		Const. No.	HTM		Area or Length	BTUH		Area or Length	BTUH		Area or Length	BTUH		Area or Length	BTUH		Area or Length	BTUH	
				Htg.	Clg.		Hrg	Clg		Hrg	Clg		Hrg	Clg		Hrg	Clg		Hrg	Clg
5	Gross Exposed Walls & Partitions	a				2,446			360			216			270			279		
		b																		
		c																		
		d																		
6	Windows & Glass Door Htg.	a	3-D	18.1		227	4,109								39	706		48	869	
		b																		
		c																		
		d																		
7	Windows & Glass Doors Clg.	North			16.0	90		1,440	30		480									
		E & W			45.0	65		2,925	15		675									
		South			25.0	117		2,925							39		975	48		1,200
		NE & NW			33.0															
		SE & SW			46.0															
		SHADE			16.0															
8	Other doors		11-C	23.5	11.1	40	940	444	20	470	222									
9	Net Exposed Walls & Partitions	a	12-I	2.8	1.9	2,134	5,975	4,055	295	826	561	216	605	410	231	647	439	231	647	439
		b																		
		c																		
		d																		
10	Ceilings	a	18-F	1.8	1.3	1,220	2,196	1,586												
		b																		
11	Floors	a	19-D	1.3					189	246		206	268		230	299		246	320	
		b	23-D	46.5																
12	Infiltration HTM			49.9	8.8	267	13,329	2,346	20	998	176				39	1,947	343	48	2,396	422
13	Sub total Btuh Loss = 6+8+9+10+11+12						26,549			2,540			873			3,599			4,232	
14	Duct Btuh Loss			10.0%			2,655			254			87			360			423	
15	Total Btuh Loss = 13+14						29,204			2,794			960			3,958			4,655	
16	People @ 230 & Appliances 1800							2,950									1,800			
17	Sensible Btuh Gain = 7+8+9+10+11+12+16							18,670			2,113			410			3,557			2,061
18	Duct Btuh Gain				10.0%			1,867			211			41			356			206
19	Total Sensible Gain							20,538			2,325			451			3,912			2,267
	Infiltration CFM			Latent Gain		125		4,067	11		371	12		404	14		451	15		483
	Latent from People							1,000												
	Total Latent Load							5,067			371			404			451			483
	Design CFM							853		1	90		2	29		3	145		4	92
	Total System Load							25,605			2,695			856			4,364			2,749
	Selected Capacity			27,500		Actual CFM		917			96			31			156			98

Lav & Entrance						Bed 4 & Clos			Hall Stairs, Lau & Clos			Bath			Bed 3 & Clos		
17						33			7			5			27		
70						214			180			68			182		
9			14			8			8			8			8		
Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg
153						264			56			40			216		
						30	543		6	109					30	543	
						30		480							30		480
									6		270						
20	470	222															
133	372	253				234	655	445	50	140	95	40	112	76	186	521	353
						214	385	278	180	324	234	68	122	88	129	232	168
70	91																
20	998	176				30	1,498	264	6	300	53				30	1,498	264
	1,932						3,081			872			234			2,794	
	193						308			87			23			279	
	2,125						3,389			959			258			3,073	
								230									230
		650						1,696			652			164			1,495
		65						170			65			16			149
		715						1,866			717			181			1,644
4		137				11		373	10		314	4		119	10		317
								200									200
		137						573			314			119			517
5		28				6		81	7		34	8		10	9		72
		853						2,439			1,031			299			2,162
		31						87			37			11			77

Bed 2 & Clos			Mstr Bath			Mstr Bedroom & Clos		
13			22			39		
129			133			367		
8			8			8		
Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg	Area or Length	BTUH Hrg	BTUH Clg
104			176			312		
30	543		14	253		30	543	
30		1,350	14		630			
						30		750
74	207	141	162	454	308	282	790	536
129	232	168	133	239	173	367	661	477
30	1,498	264	14	699	123	30	1,498	264
	2,480			1,645			3,491	
	248			165			349	
	2,728			1,810			3,840	
		230						460
		2,152			1,234			2,486
		215			123			249
		2,367			1,357			2,735
7		225	7		232	20		640
		200						400
		425			232			1,040
10		93	11		53	12		126
		2,792			1,589			3,775
		100			57			135


NOTE: ASSUMED SOIL BEARING 1,500 P.S.F.
100 M.P.H. WIND ZONE
WIND REQUIREMENTS
1. NAILING SCHEDULE OF STRUCTURAL ... BE BASED ON 100 M.P.H. WIND ZONE. ... SHALL PROVIDE LATERAL ... ANCHORAGE TO RESIST 100 ... WIND LOADS. (SEE TABLE ...)
2. ALL ROOF COVERINGS TO BE 30 YEAR ARCHITECTURAL FIBERGLASS SHINGLES WITH 6 NAILS PER SHINGLE. (OR AS PER CODES)
3. ALL WINDOWS, SKYLIGHTS AND EXTERIOR DOORS (INCLUDING GARAGE DOORS) TO BE CERTIFIED FOR 100 M.P.H. WIND ZONE.
4. ALL EXTERIOR SIDINGS TO BE CERTIFIED FOR 100 M.P.H. WIND ZONE.
Manufacturer's literature for garage door shall be attached to the inside of the door at the building final. Suffolk minimum wind load 100 mph. See R612.5
408.1 Crawl foundations shall be ventilated through foundation walls or exterior walls not less than 1 sq foot for each 150 sq feet of under-floor space.
408.2 - Vents shall be within 3 feet of each corner of the building.
Solid Perimeter Foundation wall required
as noted
10-29-14
2009
8"CMU PIER W/12"X 24"X24" CONC. FTG (TYP)
SOLID CAP BLK @ EA. PIER
8" CMU (CONT) W/ 2"X8" TRTD PLATE W/ 1/2" DIA X 18" ANCHOR BOLTS 2" FROM CORNERS & 30" OC (TYP)
(3) 2"X8" TRTD GIRDER (TYP)
DBL JST UNDER WALLS (TYP)
32"X 18" ACCESS PANEL LOCATION/SIZE MAY VARY
6 MIL POLY VAPOR BARRIER ON GRADE FILL
2X4 TRTD PLATE W/ 1/2" DIA X 18" ANCHOR BOLTS 2" FROM CORNERS & 30" OC (TYP)
4" CONC SLAB (3500#) ON COMP SAND FILL
8" CMU SHOE BLOCK @ SLAB LEVEL (TYP)
48"X 48"X 12" CONC. FTG
PVC PIPE USED FOUNDATION VENT
4" CONC. SLAB ON COMP SAND FILL
BRICK STEPS
POINT LOAD #1
P.L. #2
P.L. #3
P.L. #4
P.L. #5
P.L. #7
P.L. #8
P.L. #9.A
P.L. #9.B
P.L. #11
14'10"
19'8"
34'0"
9'10"
5'4"
5'0"
15'4"
18'0"
20'0"
40'0"
NOTE
PVC FOUNDATION VENT W/ INSECT SCREEN & CLOSABLE
[redacted]
FOUNDATION PLAN
SCALE: 1/4" = 1'0"
Failure Wall Bracing Without Hold Downs for use in a Fully Sheathed House
2 - 1/2" Ø A.B. INTO CONC. 7" MIN
CLEGHORN DESIGN SERVICES
CUSTOM HOUSE DESIGN, ADDITIONS AND RENOVATION PLANS
HARRY CLEGHORN
ADDA AMERICAN DESIGN DRAFTING ASSOCIATION
PLANS DEVELOPED IN ACCORDANCE WITH THE VIRGINIA UNIFORM STATEWIDE BUILDING CODE (USBC) AND THE "INTERNATIONAL RESIDENTIAL CODE (IRC)" 2009
[redacted]
Kebco Special 09412
SCALE NOTED
DATE 9/1/08
APPROVED BY
DRAWN BY 5521
REVISED
TWO STORY DWELLING
FOUNDATION PLAN
DRAWING NUMBER 1 OF 10
309



FIRST FLOOR PLAN

SCALE: 1/2" = 1'-0"

BRACE WALL PANELS REQ'D.

LINE	LENGTH	TABLE 602.10.3(1)	ADJ. FACT. 602.10.3(2)	BWP LENGTH	METHOD
#1	19'-8"	9.5'	.95	= 9.02'	PFG
#2	14'-0"	7.0'	(602.10.2.3)	= 48"	CS-WSP
#3	34'-6"	15.5'	.95	= 14.7'	CS-WSP
#4	40'-0"	17.5'	.95	= 16.6'	CS-WSP
#5	4'-0"	2.4'	.95	= 2.2'	CS-WSP
#6	36'-0"	16.0'	.95	= 15.2'	CS-WSP

NOTE: SEE TABLE R602.10.5 FOR LENGTH OF PANELS SHOWN THAT ARE LESS THAN 48".

FIRST FLOOR	927 S.F.
SECOND FLOOR	1269 S.F.
LIVING	2196 S.F.
GARAGE	393 S.F.
FRONT PORCH	60 S.F.
DECK	150 S.F.
TOTAL	2799 S.F.

CLEGHORN DESIGN SERVICES
CUSTOM HOUSE DESIGN, ADDITIONS, AND RENOVATION PLANS
GARY CLEGHORN
AWARD WINNING HOMES
461-7736

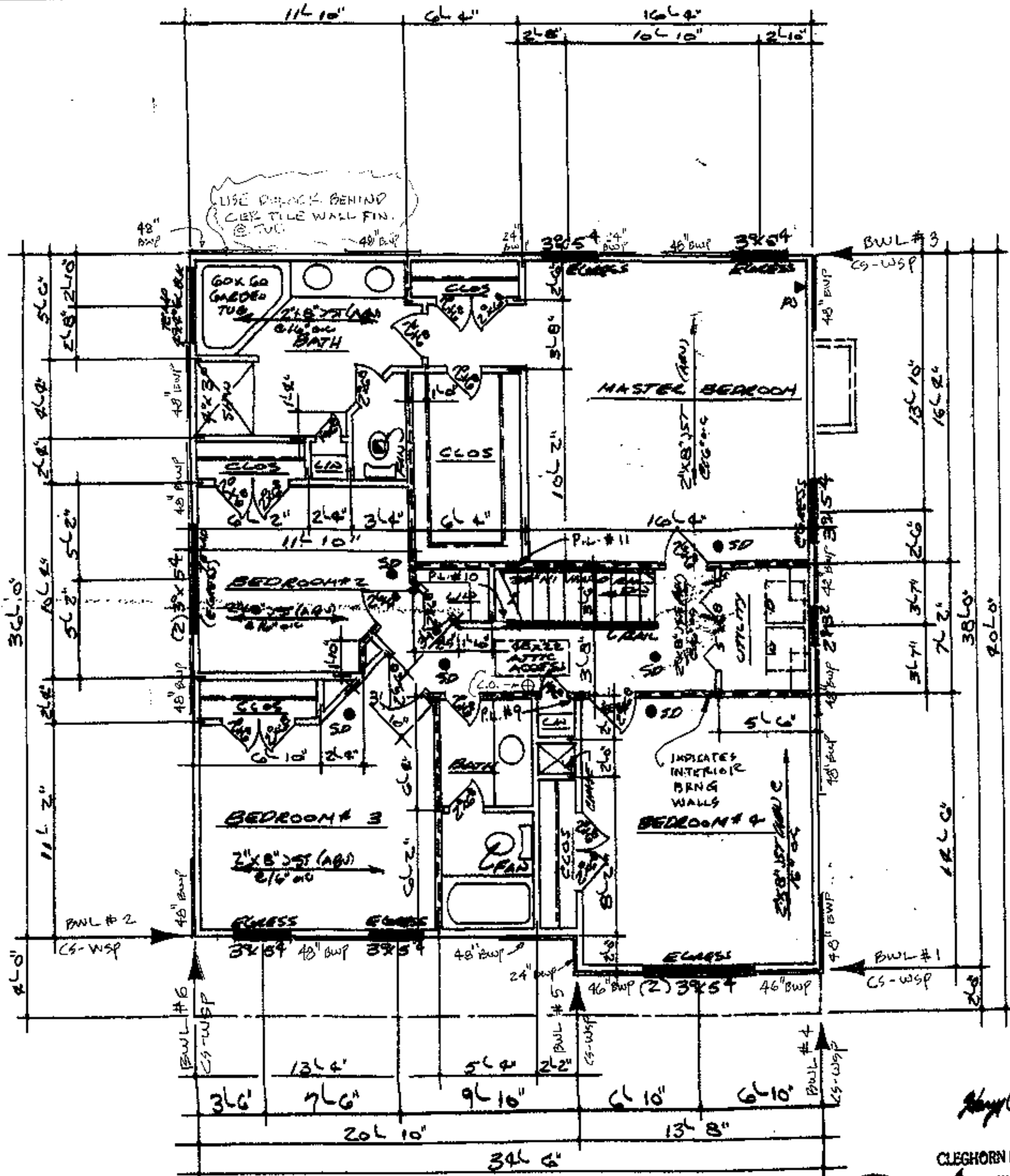
ADDA AMERICAN DESIGN DRAFTING ASSOCIATION

EMPIRE EXTERIORS LLC

SCALE NOTED | APPROVED BY | DRAWN BY SSZI
DATE 7/1/08 | REVISED

TWO STORY DWELLING

FIRST FLOOR PLAN



SECOND FLOOR PLAN

SCALE: 1/2" = 1'0"

Harry Cleghorn

CLEGHORN DESIGN SERVICES

CUSTOM HOUSE DESIGN, ADDITIONS AND RENOVATION PLANS

HARRY CLEGHORN

AWARD WINNING HOMES

ADDA

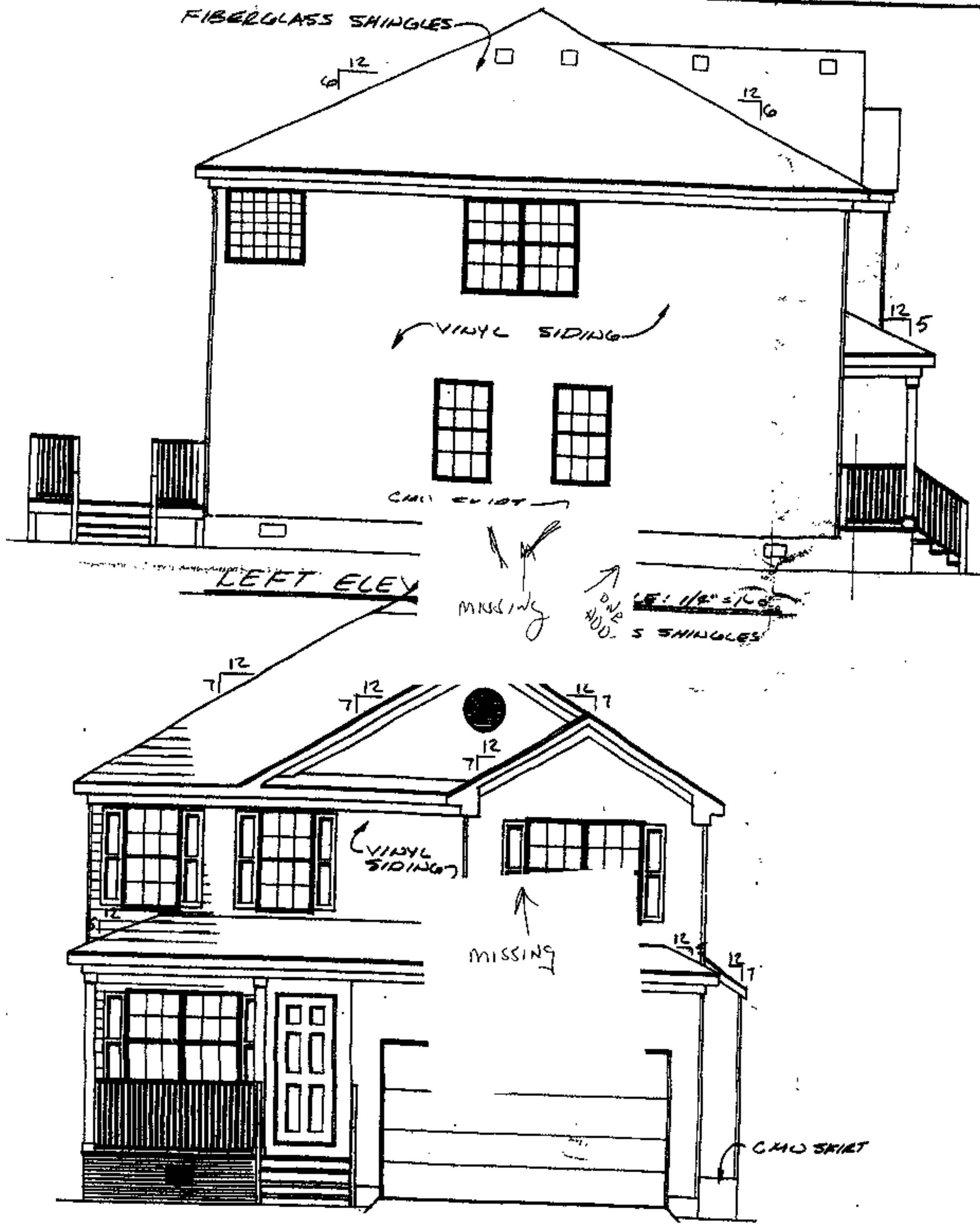
NICET

EMPIRE EXTERIORS LLC

TWO STORY DWELLING

SECOND FLOOR PLAN

311

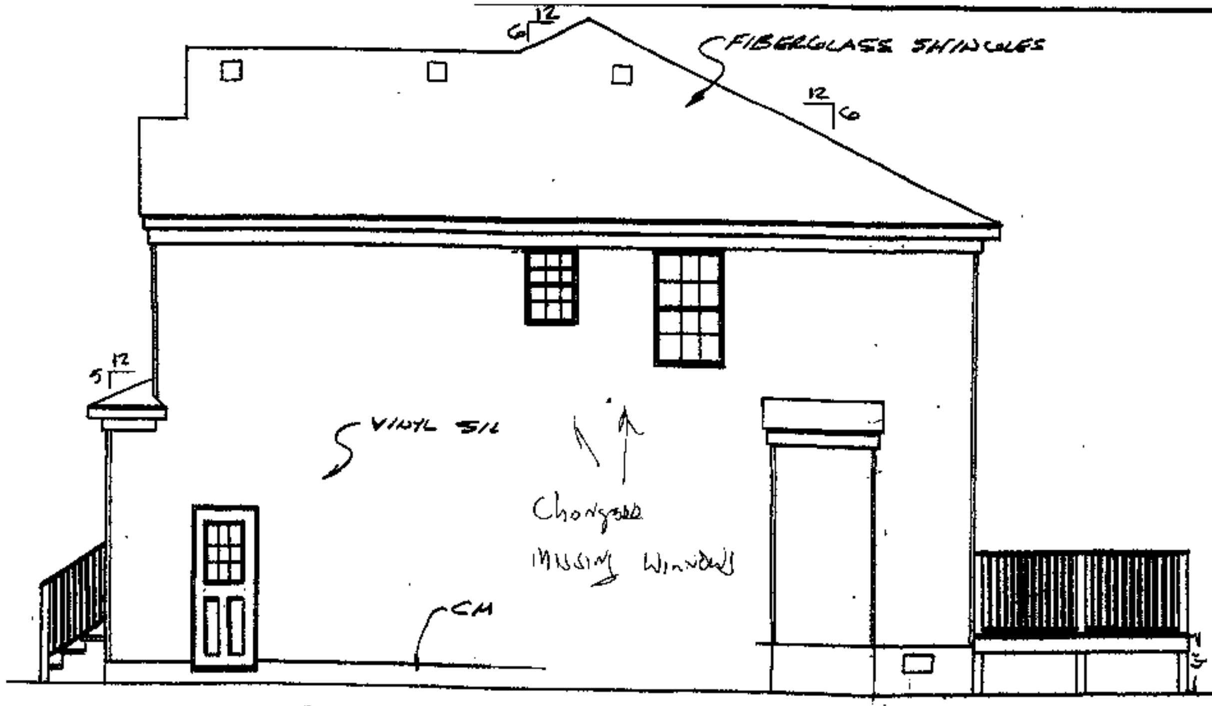


CLEGHORN DESIGN SERV

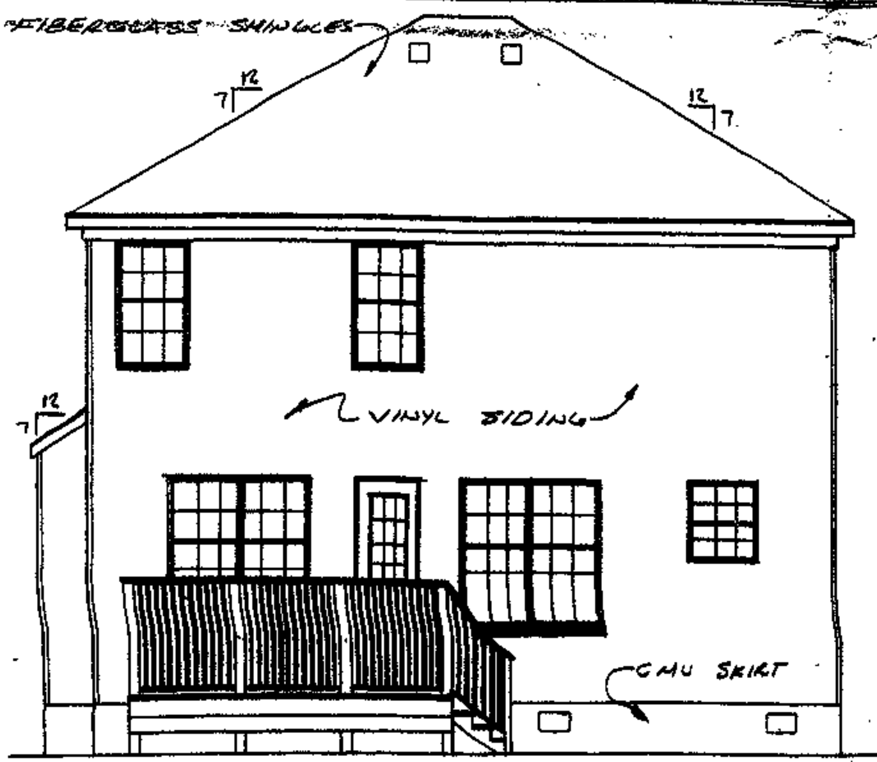
EMPIRE EXTERIORS LLC

SCALE NOTED | APPROVED BY
DATE 7/1/08

TWO STORY DWELLING



RIGHT ELEVATION SCALE: 1/8" = 1'-0"



REAR ELEVATION SCALE: 1/8" = 1'-0"

AMERICAN DESIGN DRAFTING ASSOCIATION

CLEGHORN DESIGN SERVICES
CUSTOM HOUSE DESIGN, ADDITIONS AND RENOVATION PLANS
HARRY CLEGHORN
AWARD WINNING HOMES
461-7736

EMPIRE EXTERIORS LLC		
SCALE: NOTED	APPROVED BY	DRAWN BY 5521
DATE 7/1/08		REVISED
TWO STORY DWELLING		
ELEVATIONS	313	DRAWING NUMBER 5 OF 10

TABLE R503.2.1.1(1)
ALLOWABLE SPANS AND LOADS FOR WOOD STRUCTURAL PANELS FOR ROOF AND SUBFLOOR SHEATHING AND COMBINATION SUBFLOOR UNDERLAYMENT[a,b,c]

SPAN RATING	MINIMUM NOMINAL PANEL THICKNESS (inch)	MAXIMUM SPAN (inches) With edge support	MAXIMUM SPAN (inches) Without edge support	LOAD (pounds per square foot, at maximum span) Total load	LOAD Live load	MAXIMUM SPAN (inches)
Sheathing[e]		Roof[f]				Subfloor[j]
12/0	5/16	12	12	40	30	0
16/0	5/16	16	16	40	30	0
20/0	5/16	20	20	40	30	0
24/0	3/8	24	20	40	30	0
24/16	7/16	24	24	50	40	16
32/16	15/32, 1/2	32	28	40	30	16
40/20	19/32, 5/8	40	32	40	30	20
48/24	23/32, 3/4	48	36	45	35	24
60/32	7/8	60	48	45	35	32
Underlayment, C-C plugged, single floor[e]		Roof[f]				Combination subfloor underlayment[k]
16 o.c.	19/32, 5/8	24	24	50	40	16
20 o.c.	19/32, 5/8	32	32	40	30	20
24 o.c.	23/32, 3/4	48	36	35	25	24
32 o.c.	7/8	48	40	50	40	32
48 o.c.	1 3/32, 1 1/8	60	48	50	40	48

TABLE R602.3.1[a]
MAXIMUM ALLOWABLE LENGTH OF WOOD WALL STUDS EXPOSED TO WIND SPEEDS OF 100 MPH OR LESS IN SEISMIC DESIGN CATEGORIES A, B, C and D[b,c]

HEIGHT (feet)	ON-CENTER SPACING (inches) 24	16	12	8
Supporting a roof only				
>10	2x4	2x4	2x4	2x4
12	2x6	2x4	2x4	2x4
14	2x6	2x6	2x6	2x4
16	2x6	2x6	2x6	2x4
18	NP[d]	2x6	2x6	2x6
20	NP[d]	NP[d]	2x4	2x6
24	NP[d]	NP[d]	NP[d]	2x6
Supporting one floor and a roof				
>10	2x6	2x4	2x4	2x4
12	2x6	2x6	2x6	2x4
14	2x6	2x6	2x6	2x4
16	NP[d]	2x6	2x6	2x4
18	NP[d]	2x6	2x6	2x4
20	NP[d]	NP[d]	2x6	2x6
24	NP[d]	NP[d]	NP[d]	2x6
Supporting two floors and a roof				
>10	2x6	2x6	2x4	2x4
12	2x6	2x6	2x6	2x6
14	2x6	2x6	2x6	2x6
16	NP[d]	NP[d]	2x6	2x6
18	NP[d]	NP[d]	2x6	2x6
20	NP[d]	NP[d]	NP[d]	2x6
22	NP[d]	NP[d]	NP[d]	NP[d]
24	NP[d]	NP[d]	NP[d]	NP[d]

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kN/m², 1 pound per square inch = 6.895 kPa, 1 mile per hour = 1.609 km/h.
a. Design required.
b. [illegible]
c. [illegible]
d. Utility, standard, stud and No. 3 grade lumber of any species are not permitted.

TABLE R602.3(3)
ALLOWABLE STUD SPACING FOR WOOD STRUCTURAL PANEL WALL SHEATHING

PANEL SPAN RATING	PANEL NOMINAL THICKNESS (inch)	MAXIMUM STUD SPACING (inches) Siding nailed to:[a] Stud	Sheathing
12/0, 16/0, 20/0, or wall—16 o.c.	5/16, 3/8	16	16[b]
24/0, 24/16, 32/16 or wall—24 o.c.	3/8, 7/16, 15/32, 1/2	24	24[c]

For SI: 1 inch = 25.4 mm.
a. Blocking of horizontal joints shall not be required.
b. Plywood sheathing 3/8-inch thick or less shall be applied with long dimension across studs.
c. Three-ply plywood panels shall be applied with long dimension across studs.

HANGERS.

32. EXTERIOR WALLS TO HAVE SHEATHING, & NAILED IN ACCORDANCE WITH TABLE (R602.3(1)).

33. ALL INTERIOR LOAD-BEARING WALLS TO BE SAME AS EXTERIOR WALLS SHOWN EXCEPT ½" WALL BOARD ON BOTH SIDES (EXCEPT AS SHOWN).

33. STAIR TREADS & RISERS (R311.5.3) RISER HEIGHT, TREAD DEPTH, PROFILE & WINDER TREADS SHALL BE IN ACCORDANCE WITH SECTION (R311.5.3).

34. GUARDS REQUIRED FOR PORCHES, BALCONIES OR RAISED FLOOR SURFACES MORE THAN 30" ABOVE THE FLOOR OR GRADE BELOW SHALL HAVE GUARDS NO LESS THEN 36" IN HEIGHT AND IN ACCORDANCE WITH (R312.1).

35. HEADROOM - THE MINIMUM ROOM IN ALL PARTS OF THE STAIRWAY SHALL NOT BE LESS THAN 6'-8" MEASURED VERTICALLY FROM THE SLOPED PLANE ADJOINING THE TREAD NOSING OR FROM THE FLOOR SURFACE OF THE LANDING OR PLATFORM.

36. STAIRWAY ILLUMINATION - ALL INTERIOR AND EXTERIOR STAIRWAYS SHALL BE PROVIDED WITH A MEANS TO ILLUMINATE THE STAIRS, INCLUDING THE LANDINGS AND TREADS. (R303.6)

37. DESIGN PRESSURE TO BE IN ACCORDANCE WITH SECTION (R301.2.1.3)

38. ALL SLEEPING ROOMS MUST HAVE AT LEAST ONE OPERABLE ESCAPE AND RESCUE OPENING WITH A SILL HEIGHT OF NOT MORE THAN 44" ABOVE THE FLOOR (R310.1)

39. FOR FLOOR JOIST SPANS SEE TABLE (R502.3.1(1) & (R502.3.1(2)).

40. FOR CEILING JOIST SPANS SEE TABLE (R802.4(1)) & (R802.4(2)).

41. FOR RAFTER SPANS SEE TABLE (R802.5.1(1)) THROUGH (R802.5.1(8)).

42. RAFTER & CEILING JOIST BEARING SEE (R802.6).

43. ROOF SHEATHING AND NAILING TO BE IN ACCORDANCE WITH (R803.2.1).

44. ROOF TIE-DOWNS TO BE IN ACCORDANCE WITH SECTION (R802.11).

45. TRUSS BRACING TO BE IN ACCORDANCE WITH SECTION (R802.10.3).

46. CEILING JOIST AND RAFTER CONNECTIONS TO BE IN ACCORDANCE WITH SECTION (R802.3.1).

DESIGN LOADS	LIVE LOADS	DEAD LOADS
LIVING AREAS	40 P.S.F.	10 P.S.F.
SLEEPING AREAS	30 P.S.F.	10 P.S.F.
CEILING JOISTS	20 P.S.F.	10 P.S.F.
LIMITED STORAGE	20 P.S.F.	7 P.S.F.
[illegible]	[illegible]	7 psf

(SEE TABLES (R301.5 & R301.4) FOR ADDITIONAL INFORMATION)

FOUNDATION PREPARATION NOTES

1. EXCAVATE A MINIMUM OF 6" OF EXISTING MATERIAL INCLUDING ALL ORGANICS, ROOTS, DEBRIS, RUBBLE AND SOFT WET SOIL IN WOODED AREAS 5'-0" FROM OUTSIDE BUILDING PERIMETER.

2. CARE SHALL BE EXERCISED DURING GRADING OPERATIONS AT THE SITE COMBINATIONS OF EXCESS SURFACE MOISTURE FROM PRECIPITATION AND THE TRAFFIC OF ANY HEAVY CONSTRUCTION EQUIPMENT INCLUDING HEAVY COMPACTION EQUIPMENT, MAY CREATE "PUMPING" AND A GENERAL DETERIORATION OF BEARING CAPABILITIES OF THE SHALLOWER SOIL. THE GRADING SHOULD THEREFORE BE CARRIED OUT DURING A DRY SEASON, IF POSSIBLE. THIS SHOULD MINIMIZE THESE POTENTIAL PROBLEMS, ALTHOUGH THEY MAY NOT BE ELIMINATED. IF HOWEVER SUCH PROBLEMS ARISE, THE OPERATIONS IN THE AREA AFFECTED SHALL BE STOPPED AND A SOIL ENGINEER CALLED IN FOR AN EVALUATION OF THE CONDITION. THE NEED FOR A CONSIDERABLE AMOUNT OF UNDER CUTTING WITHIN THE FOUNDATION EXCAVATIONS AND OTHER EARTH WORK AREAS SHOULD BE ANTICIPATED IF THE WORK IS ATTEMPTED DURING ADVERSE SEASONAL CONDITIONS. THE EARTH WORK CONTRACTOR SHALL BACKFILL AND COMPACT WITH A WELL GRADED CRUSHED STONE OR SAND FOR REPLACEMENT AND REPAIR OF DETERIORATED SUB GRADE.

3. FILL ALL EXCAVATED AREAS WITH APPROVED BORROW MATERIAL, PLACE IN 8" MAXIMUM LOOSE LIFTS AND COMPACT TO A MINIMUM OF 95% OF THE MAXIMUM DENSITY N ACCORDANCE WITH ASTM D-698.

4. ALL CONTROLLED FILL MATERIAL SHALL BE SELECT SANDY MATERIAL FREE FROM ALL ORGANIC OR OTHER DELETERIOUS MATERIAL WITH NOT MORE THAN 20% BY WEIGHT PASSING A NO. 200 SIEVE.

5. IF SOFT POCKETS ARE ENCOUNTERED IN THE FOOTING EXCAVATIONS, THE UNSUITABLE MATERIAL SHALL BE REMOVED AND THE FOOTING LOCATED AT A LOWER ELEVATION. THE PROPOSED FOOTING ELEVATION MAY BE REESTABLISHED BY BACKFILLING WITH A VERY LEAN CONCRETE, CRUSHED STONE OR GRAVEL, COMPACTED.

6. ALL REINFORCING STEEL SHALL BE IN ACCORDANCE WITH ASTM A-615, GRADE 60 SPECIFICATIONS, EXCEPT STIRRUPS AND TIES, WHICH SHALL BE GRADE 40. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A-185.

7. CONCRETE PROTECTION FOR REINFORCING AS WELL AS PLACING AND FABRICATION OF REINFORCING SHALL BE IN ACCORDANCE WITH THE "AMERICAN CONCRETE INSTITUTE BUILDING CODE REQUIREMENTS" (ACI-318-77).

GENERAL NOTES

1. ALL DIMENSIONS TO BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST UNIFORM STATEWIDE CODE (USBC) AND THE LATEST INTERNATIONAL RESIDENTIAL CODE (IRC) 2006. 2009

3. ALL ELECTRICAL, PLUMBING AND HVAC SHALL BE IN ACCORDANCE WITH THE LATEST (USBC) & (IRC).

4. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS FOR THE CONSTRUCTION PRIOR TO ANY WORK.

5. ALL EXTERIOR DOORS AND WINDOWS SHALL BE IN ACCORDANCE WITH THE (IRC) CONCERNING INGRESS AND EGRESS AND THE CURRENT ENERGY CODE SPECIFICATIONS.

6. ALL FOOTINGS SHALL BEAR ON UNDISTURBED SOIL CAPABLE OF SUPPORTING A SUPERIMPOSED LOAD OF 1500 PSF

7. ALL CONCRETE SHALL BE A MINIMUM OF 2500 P.S.I. FOR ALL CONCRETE SLABS, FOOTINGS & DRIVE WAYS.

8. DESIGNER ASSUMES NO RESPONSIBILITY FOR ACTUAL SOIL CONDITIONS ENCOUNTERED.

9. DESIGNER ASSUMES NO RESPONSIBILITY FOR ACTUAL CONSTRUCTION.

10. DESIGNER ASSUMES NO RESPONSIBILITY FOR ACTUAL SIZING OF MICROLAM AND STEEL BEAMS.

11. ALL INSTALLATION OF MATERIAL, WINDOWS, DOORS AND EXTERIOR FINISHES TO BE INSTALLED PER MANUFACTURER SPECIFICATIONS, DESIGNER ASSUMES NO RESPONSIBILITY FOR THERE INSTALLATION.

12. HAND RAILING HEIGHT SHALL BE NOT LESS THEN 34 INCHES AND NOT MORE THEN 38 INCHES (R311.5.6.1) AND ALL PICKETS SHALL BE LESS THAN 4 INCHES SPACING (R312.2). HANDRAIL GRIP SIZE TO BE IN ACCORDANCE WITH (R311.5.6.3)

13. CODES GOVERN OVER PLANS, VERIFY WITH ALL LOCAL CODES AND SPECIFICATIONS.

14. VERIFY ALL MECHANICAL REQUIREMENTS PRIOR TO FRAMING TO AVOID ANY CONFLICTS.

15. ALL FOOTINGS SHALL BEAR ON UNDISTURBED BEARING SOIL BELOW THE LOCAL FROST LINE.

16. ALL STRUCTURAL STEEL SHALL BE A-36 AND AT LEAST THE SIZE SHOWN ON PLAN (OR AS PER STRUCTURAL ENGINEER).

17. ALL STRUCTURAL WOOD SHALL CONTAIN THE GRADE MARK OF THE GRADING RULES AGENCY HAVING JURISDICTION (FOLLOW FRAMING/LUMBER SPECS.)

18. ALL WOOD TRUSSES, IF ANY, SHALL BE CERTIFIED BY THE TRUSS MANUFACTURER TO HAVE THE CAPABILITY TO SUPPORT THE LIVE AND DEAD LOADS SPECIFIED BY THE REQUIRED CODES.

19. EXACT QUANTITIES OF FOUNDATION BLOCK REQUIRED MAY VARY FROM THE TYPICAL WALL SECTION.

20. ALL WINDOWS MARKED (TEMP) SHALL HAVE SAFETY GLAZING IN ACCORDANCE WITH THE REQUIRED CODES (R308.4)

21. ALL MASONRY VENEER CONSTRUCTION TO BE IN ACCORDANCE WITH THE REQUIRED CODES (R703.7) (INCLUDING WALL TIES, WEEP HOLES SPACING, LINTEL SIZES & FLASHING DETAILS).

22. ROOF VENTILATION TO BE IN ACCORDANCE WITH (R806.2).

23. FIRE BLOCKING SHALL BE PROVIDED TO CUT OFF ALL CONCEALED DRAFT OPENINGS (BOTH VERTICAL AND HORIZONTAL) AND TO FORM AN EFFECTIVE FIRE BARRIER BETWEEN STORIES, AND BETWEEN A TOP STORY AND THE ROOF SPACE (R602.8)

24. FOUNDATION ANCHORAGE - WHEN BRACING WALL PANELS ARE SUPPORTED ON CONTINUOUS FOUNDATIONS, THE WALL SILL PLATE OR COLD-FORMED STEEL BOTTOM TRACK SHALL BE ANCHORED TO THE FOUNDATION IN ACCORDANCE WITH (R403.1.6)

25. VAPOR RETARDER - A 6 MIL POLYETHYLENE OR APPROVED VAPOR RETARDER WITH JOINTS LAPPED NOT LESS THAN 6 INCHES SHALL BE PLACED BETWEEN THE CONCRETE FLOOR SLAB AND THE BASE COURSE OR THE PREPARED SUBGRADE WHERE NO BASE COURSE EXISTS. (R506.2.3)

26. CRAWL SPACE SHALL BE IN ACCORDANCE WITH (R408).

27. PROTECTION AGAINST DECAY - ALL WOOD IN CONTACT WITH THE GROUND AND THAT SUPPORTS PERMANENT STRUCTURES INTENDED FOR HUMAN OCCUPANCY SHALL BE APPROVED PRESSURE PRESERVATIVE TREATED WOOD SUITABLE FOR GROUND CONTACT USE, EXCEPT UNTREATED WOOD MAY BE USED WHERE ENTIRELY BELOW GROUND WATER LEVEL OR CONTINUOUSLY SUBMERGED IN WATER (R319.1).

28. P.T. WOOD FASTENERS - FASTENERS FOR PRESSURE PRESERVATIVE AND FIRE - RETARDANT - TREATED WOOD SHALL BE OF HOT - DIPPED GALVANIZED STEEL, STAINLESS STEEL, SILICON BRONZE OR COPPER (R319.3).

29. DRAFT STOPPING REQUIRED - (R502.12). WHEN THERE IS USABLE SPACE BOTH ABOVE THE CONCEALED SPACE OF A FLOOR/CEILING ASSEMBLY, DRAFT STOPS SHALL BE INSTALLED SO THAT THE AREA OF THE CONCEALED SPACE DOES NOT EXCEED 1,000 SQUARE FEET. DRAFT STOPPING SHALL DIVIDE THE CONCEALED SPACE INTO APPROXIMATELY EQUAL AREAS. WHERE THE ASSEMBLY IS ENCLOSED BY A FLOOR MEMBRANE ABOVE AND THE CEILING MEMBRANE BELOW DRAFT STOPPING SHALL BE PROVIDED IN FLOOR/CEILING ASSEMBLIES UNDER THE FOLLOWING CIRCUMSTANCES:
1. CEILING IS SUSPENDED UNDER THE FLOOR FRAMING.
2. FLOOR FRAMING IS CONSTRUCTED OF TRUSS-TYPE OPEN-WEB OR PERFORATED MEMBERS.

30. MIN BEARING (R502.6). THE ENDS OF EACH JOIST, BEAM OR GIRDER SHALL HAVE NOT LESS THAN 1.5 INCHES (38mm) OF BEARING ON WOOD OR METAL AND NOT LESS THAN 3 INCHES (76mm) ON MASONRY OR CONCRETE EXCEPT WHERE SUPPORTED ON A 1-INCH - BY - 4 - INCH (25.4mm BY 102mm) RIBBON STRIP AND NAILED TO THE ADJACENT STUD OR BY THE USE OF APPROVED JOIST

47. DUCTS IN GARAGE AND DUCTS PENETRATING THE WALLS TO BE IN ACCORDANCE WITH R309.1.1

48. PROVIDE FLOOD VENTS WHEN REQUIRED IN ACCORDANCE WITH R323.2.2

49. HVAC EQUIPMENT WHEN IN GARAGE TO BE IN ACCORDANCE WITH M1307.3

50. HVAC RETURN AIR TO BE IN ACCORDANCE WITH R1602.

STEEL ANGLE HEADER OPENING			
SIZE OF STEEL ANGLE	NO STORY ABOVE	ONE STORY ABOVE	TWO STORIES ABOVE
3" X 3" X 1/4"	6' - 0"	4' - 6"	3' - 6"
4" X 3" X 1/4"	8' - 0"	6' - 0"	4' - 6"
5" X 3 1/2" X 5/16"	10' - 0"	8' - 0"	6' - 0"
6" X 3 1/2" X 5/16"	14' - 0"	9' - 6"	7' - 0"

NOTES

1. ALL WINDOWS TO BE DOUBLE PANE (SINGLE HUNG, DOUBLE HUNG OR CASEMENT) AND MUST MEET ALL INGRESS/EGRESS CODES.
2. ALL EXTERIOR DOORS-INSULATED AND MUST MEET INGRESS/EGRESS CODES.
3. ALL BATH FANS SHOULD VENTED TO EXTERIOR.
4. PROVIDE SHEAR WALL PANELS ATA CORNERS AND AT 25 FT. INTERVALS.
5. [illegible]

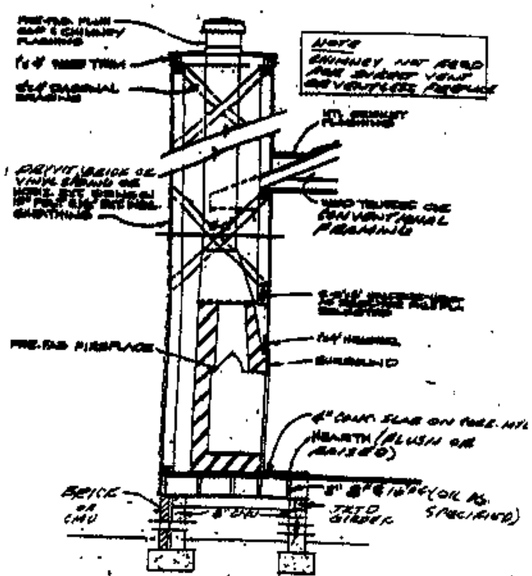
Harry Cleghorn

CLEGHORN DESIGN SERVICES
CUSTOM HOUSE DESIGNS, ADDITIONS AND RENOVATION PLANS
HARRY CLEGHORN
AWARD WINNING DESIGNS

EMPIRE EXTERIORS LLC

SCALE: NONE	APPROVED BY	DRAWN BY: 5521
DATE: 7/1/08		REVISED
TWO STORY DWG		

314



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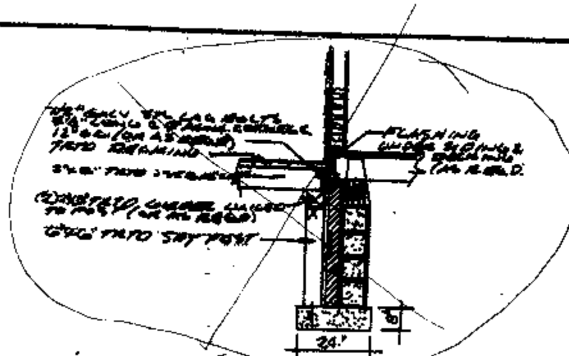
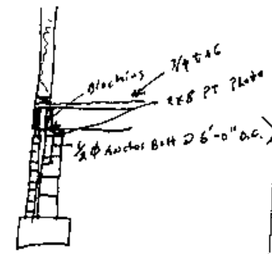
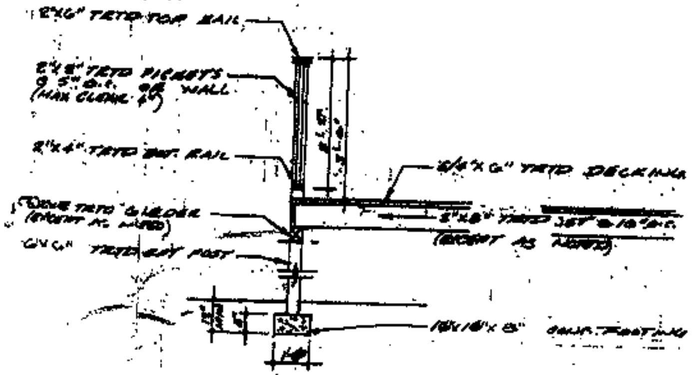


DECK TO HOUSE DETAIL

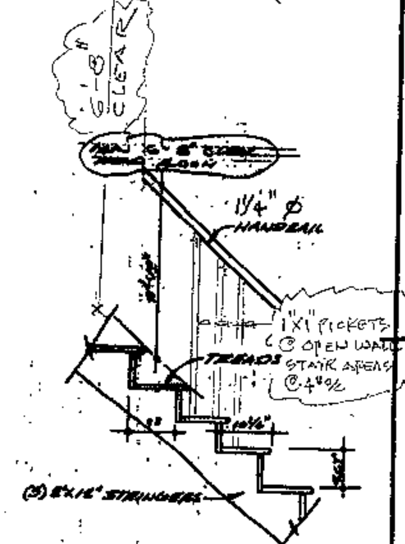
SCALE: 1/2" = 1'-0"

SIMILAR





DECK SECTION



STAIR SECTION

SCALE: 3/4" = 1'-0"

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EMPIRE EXTERIORS LLC		
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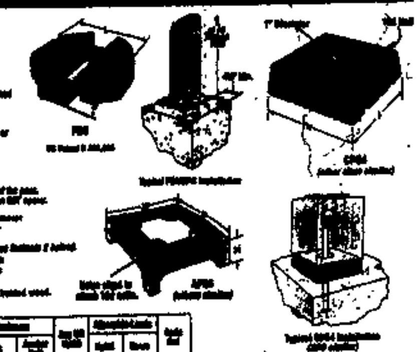
TWO STORY DWELLING		

ARCHITECTURAL PRODUCTS GROUP



CLEGHORN DESIGN SERVICES

CUSTOM HOUSE DESIGN, ADDITIONS AND RENOVATION PLANS

HARRY CLEGHORN

AWARD WINNING HOMES

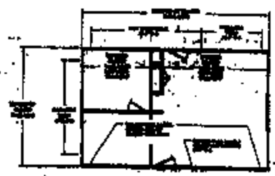
461-7736

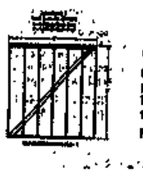
EMPIRE EXTERIORS LLC		
SCALE NOTED	APPROVED BY	DRAWN BY 5521
DATE 7/1/08		REVISED
TWO STORY DWELLING		
HDR TABLES / POST ATTACHMENT		DRAWING NUMBER 8 OF 10

...A Basic Interpretation of the Code

If we draw an outline of a house as a perfect rectangle, we would have four braced wall lines. Generally, a braced wall line is a representation of the length of a single wall in a house. Depending on the length of the wall, at least two braced wall panels need to be installed along the braced wall line.

Reference: IRC/2000 - R602.10.1; IBC/2000 - 2308.3.2





What are braced wall panels?

Braced wall panels are reinforcements along a wall line that, when constructed properly, will resist Mother Nature's lateral forces. Again, within each wall line there are at least two braced wall panels. The code provides 8 ways to build a standard panel, allowing a range of widths from 4 ft. to 8 ft.

Reference: IRC/2000 - R602.10.3; IBC/2000 - 2308.9.3

If I don't have 4 ft. of wall space in my plans, what are my alternatives?

We don't always have 4 ft. of wall so the code gives us an alternate braced wall panel option. This option allows for a 2' 8" wall but requires additional hardware – 2 holdowns, sheathing and 2 anchor bolts. The code is very specific and explains exactly how to build an alternate braced panel.

Reference: IRC/2000 - R602.10.6; IBC/2000 - 2308.9.3.1

Why add hardware on a 2' 8" wall?

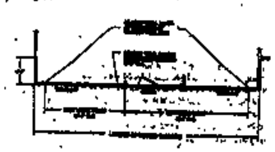
In the alternate braced wall panel section of the code, the purpose of the hardware, once again, is to resist Mother Nature's lateral forces. The more narrow the wall gets in relation to its height, the easier it is to "tip" over. Imagine a refrigerator being pushed on some concrete. If you push it, it will slide (shear). If it hits a rock, it will tip over (overturning). As a result, the anchor bolts are there to resist shear forces and the holdowns are there to resist overturning.

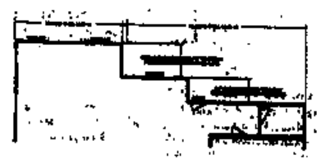
Reference: IRC/2000 - R602.10.6; IBC/2000 - 2308.9.3.1

Where exactly do these braced walls go?

For every braced wall line, you need at least two braced wall panels. They should be located at the corners or at the ends of the braced wall line. If a panel can't be placed at the corner you can start the panel up to 12½ ft. from the corner and then every 25 ft. on center until you come to the end of your braced wall line. You are also allowed to take up to 4 ft. offset and still maintain the same braced wall line.

Reference: IRC/2000 - R602.10.1; IBC/2000 - 2308.3.2





What's an offset?

An offset is when there is a break in the wall line, for example, for a porch and front door, or a bay window. The code allows up to a 4 ft. offset on a braced wall line. If you have more than a 4 ft. offset, the code states that you must start a new braced wall line, which means additional braced wall panels.

Reference: IRC/2000 - R602.10.1; IBC/2000 - 2308.3.2

Okay, so I don't have 4 ft. and I don't have 2'-8" in my plans. What's the solution?

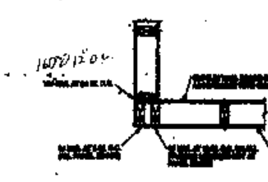
There are three options:

1. Redesign your house so your braced panels are at least 2'-8".
2. Hire an engineer.
3. Use an engineered product that is narrower than 2'-8" and that meets all the prescriptive requirements of the code, such as Strong-Wall® Wall or Strong-Wall Shearwall.

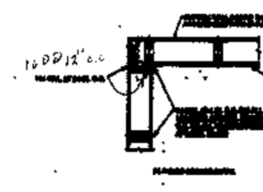
SIMPSON STRONG-TIE COMPANY, INC.

[illegible]

ALL WALL BRACING TO BE IN ACCORDANCE WITH R-602.10



16OD 12" o.c.



16OD 12" o.c.

AMERICAN DESIGN DRAFTING ASSOCIATION

CLEGHORN DESIGN SERVICES

CUSTOM HOUSE DESIGN, ADDITIONS AND RENOVATION PLANS

461-7986

EMPIRE EXTERIORS LLC

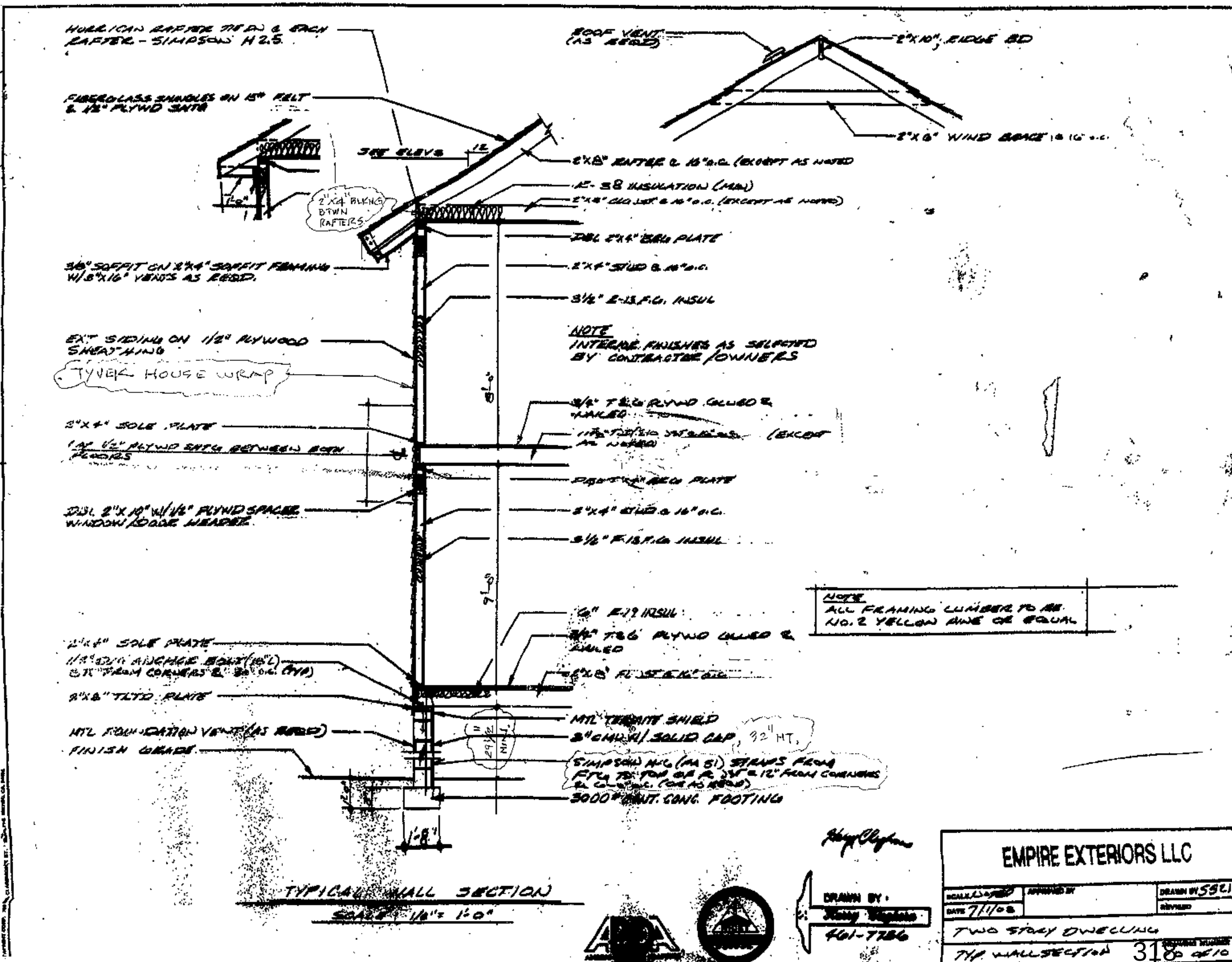
SCALE: NOTED	APPROVED BY	DRAWN BY SSZI
DATE 7/1/08		REVISED

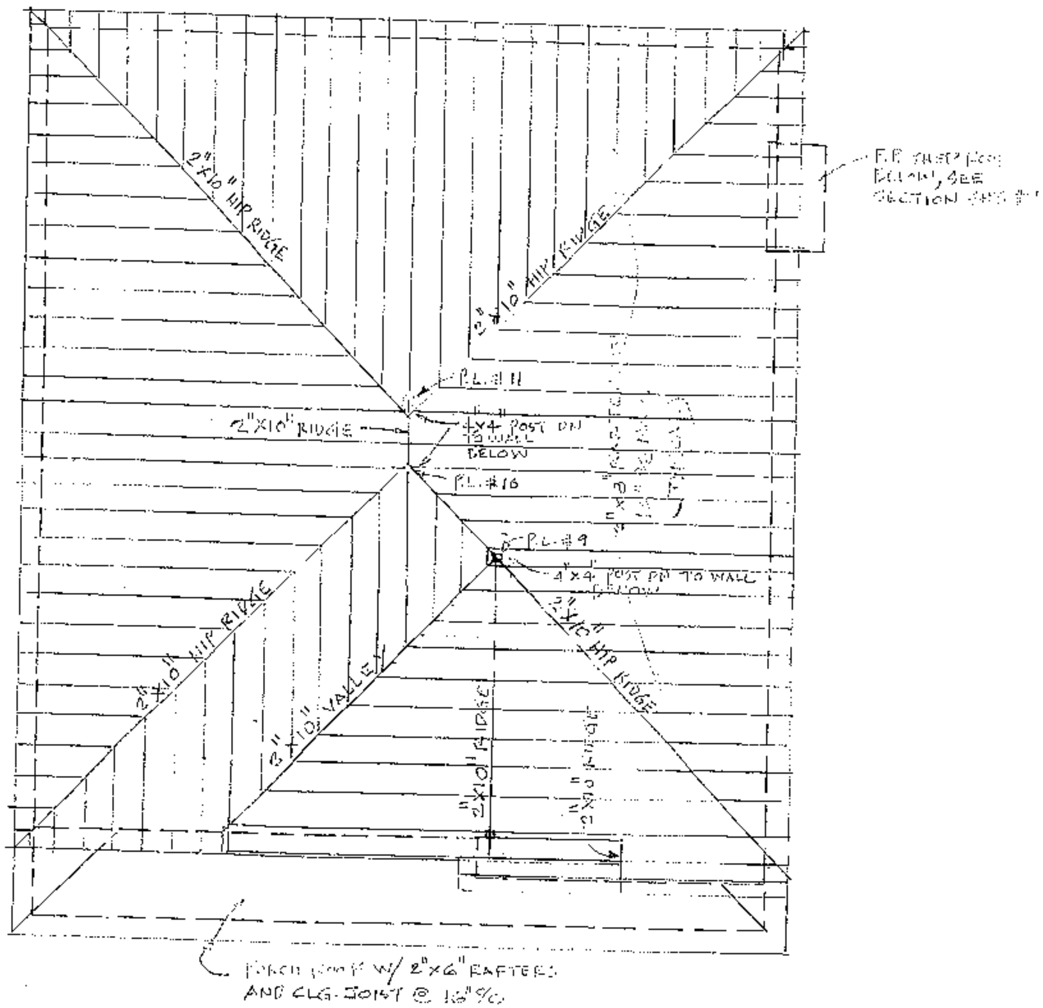
TWO STORY DWELLING

TYP WALL BRACING DETS

DRAWING NUMBER 9 of 10

317


HURRICAN RAFTER TIE DN & EACH RAFTER - SIMPSON H2.5
ROOF VENT (AS REQD)
2"X10" RIDGE BD
2"X6" WIND BRACE
FIBERGLASS SHINGLES ON 15# FELT & 1/2" PLYWD SHTG
SEE ELEVS
12
2"X8" RAFTER @ 16" o.c. (EXCEPT AS NOTED)
R-38 INSULATION (MIN)
2"X4" BLKNG BTWN RAFTERS
DBL 2"X4" CLG PLATE
3/8" SOFFIT ON 2"X4" SOFFIT FRAMING W/8"X16" VENTS AS REQD.
2"X4" STUD @ 16" o.c.
3 1/2" R-13 F.G. INSUL
NOTE
INTERIOR FINISHES AS SELECTED BY CONTRACTOR / OWNERS
EXT SIDING ON 1/2" PLYWOOD SHEATHING
TYVEK HOUSE WRAP
8'-0"
3/4" T&G PLYWD GLUED & NAILED
2"X4" SOLE PLATE
2"X4" SOLE PLATE
3'-0"
2"X4" STUD @ 16" o.c.
3 1/2" R-13 F.G. INSUL
9'-0"
NOTE
ALL FRAMING LUMBER TO BE NO. 2 YELLOW PINE OR EQUAL
R-19 INSUL
3/4" T&G PLYWD GLUED & NAILED
2"X8" FL JST @ 16" o.c.
2"X4" SOLE PLATE
2"X8" TLTD PLATE
MTL TERMITE SHIELD
MTL FOUNDATION VENT (AS REQD)
8" CMU W/ SOLID CAP, 32" HT,
FINISH GRADE
3000# MIN. CONC. FOOTING
1'-8"
TYPICAL WALL SECTION
SCALE 1/2" = 1'-0"
DRAWN BY:
461-7286
EMPIRE EXTERIORS LLC
DATE 7/1/08
TWO STORY DWELLING
TYP. WALLSECTION
318



ROOF FRAMING

SCALE: 1/4" = 1'-0"

Hampton Roads Regional
1 & 2 Family Residential Plan Submittal Guidelines

Date 10-9-14 Application # ________ Model same as Name/No. K-Special Contractor Kebco ________ Reviewed by _____ Reply Checked by _____

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CK	N/A	REJ	REF #	ITEM	CODE REF	REC	REMARKS
				100 - ITEMS NEED CHECKED ON SUBMITTALS			
				Plans			
☐	☐	☐	101	Code under which designed	103.2	☐	
☐	☐	☐	102	Registered Design Professional seal (if required)	111.1	☐	
☐	☐	☐	103	Plans in architectural scale (1/8" smallest and readable) (Reduction of original scale not acceptable)	109.3	☐	
☐	☐	☐	104	All sheets numbered and bound sequentially	109.3	☐	
☐	☐	☐	105	Designer's name, address, and occupation	111.1	☐	
☐	☐	☐	106	Energy efficiency (prescriptive or ResCheck)	1101.2, 303.1	☐	
				Site Plan			
☐	☐	☐	107	Approved site plan	109.2	☐	
☐	☐	☐	108	Must match drawing layout	109.2	☐	
☐	☐	☐	109	Drainage	401.3	☐	
☐	☐	☐	110	Exterior wall location (fire separation distance)	302	☐	
☐	☐	☐	111	Compaction certification (as required)	506.2.1	☐	
☐	☐	☐	112	Flood Zone	322	☐	
				Soils report (as required)			
☐	☐	☐	113	Include 2 borings	109.3, 401.4	☐	
☐	☐	☐	114	Show locations	109.3	☐	
				HVAC permit application			
☐	☐	☐	115	Manual D and J (as required)	109.1, 1401.3	☐	
				Water / Sewer disposal system			
☐	☐	☐	116	State on application	109.3	☐	
				Other			
☐	☐	☐	117			☐	

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☐	☐	☐	117			☐	

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CK	N/A	REJ	REF #	ITEM	CODE REF	REC	REMARKS
☐	☐	☐	118			☐	
				200 FOUNDATION PLAN			
				Grading			
☐	☐	☐	201	Engineered fill	506.2.1	☐	
☐	☐	☐	202	Unusual grade elevation issues / concrete slab on grade	403.1.7, 506.2.1	☐	
				Footings			
☐	☐	☐	203	Exterior footings: locations, depth and width or per soil report	403.1.1, 401.2	☐	
☐	☐	☐	204	Piers: size, height, and location	403.1.1	☐	
☐	☐	☐	205	Rebar: number and size	Table 404.1.1	☐	
				Vented and conditioned crawl spaces			
☐	☐	☐	206	Flood vents, if required	322.2.2	☐	
☐	☐	☐	207	Vents within 3' of corners	408.1	☐	
☐	☐	☐	208	Vent calculations	408.1	☐	
☐	☐	☐	209	Crawl access door 16" x 24"	408.4	☐	
☐	☐	☐	210	Unvented conditioned crawl (air flow)	408.3	☐	
☐	☐	☐	211	Unvented conditioned crawl (insulation) specify ICC/ES report	1102.2.9, Table 1102.1	☐	
				Foundation Walls			
☐	☐	☐	212	Masonry or concrete foundation walls: thickness	404.1.1, 404.1.5	☐	
☐	☐	☐	213	Pier and curtain walls	404.1.5.3	☐	
☐	☐	☐	214	Point loads	401.2	☐	
				Details			
☐	☐	☐	215	Grout type & reinforcement double wythe walls	609.1.1, 608.1	☐	
☐	☐	☐	216	Vertical rebars	Table 404.1.1(2)-(4)	☐	
☐	☐	☐	217	Anchor bolts or other mfgr's anchor type, size and spacing	403.1.6	☐	
☐	☐	☐	218	P.T. plate, girder, joists <18" to inside crawl grade	317.1	☐	
☐	☐	☐	219	Stem wall at garage: reqd if wall supports a BWP	602.10.9	☐	
☐	☐	☐	220	Retaining walls: >24" in height (design reqd)	404.1.3, 108.2	☐	
☐	☐	☐	221	Wall design for flood areas: sealed RDP design if reqd.	322.1.2	☐	
☐	☐	☐	222	Superior walls sealed RDP design reqd. ICC/ES report	112.3, 109.3	☐	
☐	☐	☐	223	ICF foundation walls	611	☐	
☐	☐	☐	224	Wall opening detail (CMU & concrete pour)	601.2, 611.8	☐	
☐	☐	☐	225	Non continuous lintel bond beam	401.2	☐	
				Other			
☐	☐	☐	226			☐	
☐	☐	☐	227			☐	
				300 BASEMENT PLAN			
				Room			
☐	☐	☐	301	Room names, minimum size, ceiling height	304.1, 305.1	☐	
☐	☐	☐	302	Bedrooms in basement –emergency escape & rescue openings	310	☐	
☐	☐	☐	303	Size of all doors and windows on plan view	109.1, 310, 311	☐	
☐	☐	☐	304	Window wells	301.1, 301.2	☐	
☐	☐	☐	305	Interior load bearing walls identified	502.4	☐	
☐	☐	☐	306	Bathroom fixture clearance – height of ceiling	305.1, Figure307.1	☐	
☐	☐	☐	307	Code compliant stair: riser/tread, width, headroom, handrail	311.7	☐	
☐	☐	☐	308	Garage in basement - separation to habitable space: 1/2" walls, 5/8" type X ceilings, 1/2" underside of stairs, rated door	3025.1, 302.6, 302.7	☐	
				Braced walls			

CK	N/A	REJ	REF #	ITEM	CODE REF	REC	REMARKS
			309	Wall line numbers, min. length panels required	602.1		
			310	BWP: method(s), nailing schedule, actual length	Table 602.3.1		
			311	CS method: 24" end walls, 24" return walls or 800# hold downs	602.10.7		
				400 BASEMENT and/or FIRST FLOOR FRAMING PLAN			
			401	Basement: Min 3.5" slab, 6 mil vapor barrier	506.1-506.2.3		
			402	Basement: Thickened slab details supporting load bearing walls	Figure 403.1(1)		
			403	Basement: Point loads	111.1, 501.2		
			404	Basement: Steel beams sized and located	111.1		
			405	Basement: Steel column sized and located	111.1		
			406	Dimensional lumber (size, grade, species, spacing, direction)	502.1		
			407	I-joist (manufacturer, series, depth, spacing, direction)	112.2		
			408	Open web floor trusses drawings / fireblocking	502.11.4, 502.13		
			409	Framing of openings	502.10		
			410	Double joists under bearing partitions	502.4		
			411	Steel beams and calc sheets	109.1, 109.3		
			412	Posts/columns (parallel strand lumber - gang posts / dimensional lumber - gang nailed posts)	109.1, 109.3		
			413	Engineered LVL beam location and calc sheets	109.3, 301.1		
			414	Point loads	501.2		
			415	Draft stopping 1000sf open truss: GB or plywood on floor trusses	502.12		
				Other			
			416				
			417				
				500 FIRST FLOOR PLAN			
				Room			
			501	Names, minimum size, ceiling height	304, 305		
			502	Interior load bearing walls identified	601.2, 602.4		
			503	Bedrooms – emergency escape rescue openings	310		
			504	Size of all doors and windows on plan view	109.1, 310, 311		
			505	Landing at exterior doors	311.4.3		
			506	Glazing (indicate tempered glass where required)	308.4		
			507	Bathroom fixture clearance	Figure 307.1		
			508	Hall width: 36" min.	311.6		
			509	Code compliant stair: riser/tread, width, headroom, handrail	311.7, 312.3		
			510	Required psi garage slab and slope direction	Table 402.2, 309.4, Table 301.2(1)		
			511	Garage - separation to habitable space	302.5, 302.6		
			512	Fireplace type: requirements	1102.4, Table 1001.1		
			513	Deck, porch, ramp details: attachment to house, guards, etc	312.1		
			514	Deck ledger to band joist attachment	502.2.2.3, Table 502.2.2.1		
			515	DCA-6 decks / 2-story decks	502.2.2		
			516	Point loads	501.2		
				Braced walls			
			517	Wall line numbers, min. length panels required	602.10.1		
			518	BWP: method(s), nailing schedule, actual length – simplified method	602.10.1, 602.10.2, 602.12, Table 602.1.2.4		
			519	CS method: 24" end walls, 24" return walls or 800# hold downs	602.10.7		

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☐	☑	☐	520	Portal framing details, stem walls	602.10.9, 602.10.6 & (6.2, 6.3, 6-4), Figure 602.10.6.4	☐	
☐	☑	☐	521	Blocking along BWPs	602.10.8.1, 602.10.8.(1) & (2)	☐	
☐	☑	☐	522	Blocking of joists at support wall or beam (lateral restrain at joist end)	502.7	☐	
				Other			
☐	☑	☐	523			☐	
☐	☑	☐	524			☐	
				600 SECOND FLOOR PLAN			
				Framing Plan			
☐	☑	☐	601	Dimensional lumber floor (size, grade, species, spacing, direction)	502.1	☐	
☐	☑	☐	602	I-joist layout (mfgr, series, depth, spacing, direction)	111.1, 112.2	☐	
☐	☑	☐	603	Open web floor truss layout: sealed RDP incl. detail sheets	111.1, 502.11.4	☐	
☐	☑	☐	604	Framing of openings	502.10	☐	
☐	☑	☐	605	Double joists under bearing partitions	502.4	☐	
☐	☑	☐	606	Steel beams and calc sheets	109.1, 10.9.3	☐	
☐	☑	☐	607	Posts / columns – restrain	109.1, 407.3	☐	
☐	☑	☐	608	Point loads	501.2	☐	
☐	☑	☐	609	Engineered LVL beam location and calc sheets	109.3, 301.1	☐	
				Rooms			
☐	☑	☐	610	Room names, minimum size, ceiling height	304, 310.1	☐	
☐	☑	☐	611	Interior load bearing walls identified	601.2	☐	
☐	☑	☐	612	Bedrooms - emergency escape rescue openings	310	☐	
☐	☑	☐	613	Size of all doors and windows on plan view	109.1, 310, 311	☐	
☐	☑	☐	614	Glazing (indicate tempered glass where required)	308.4	☐	
☐	☑	☐	615	Bathroom fixture clearance	Figure 307.1	☐	
☐	☑	☐	616	Hall width: 36" min.	311.6	☐	
☐	☑	☐	617	Attic access: hatch, pull down stair or code compliant stair must be located in hallway or accessible area	807.1; 311.7 (Stairs)	☐	
				Braced walls			
☐	☑	☐	618	Wall line numbers, min. length panels required	602.10.1	☐	
☐	☑	☐	619	BWP: method(s), nailing schedule, actual length – simplified method	602.10.1, 602.10.2, 602.12, Table 602.1.2.4	☐	
☐	☑	☐	620	CS method: 24" end walls, 24" return walls or 800# hold downs	602.10.7	☐	
☐	☑	☐	621	Portal framing details, stem walls	602.10.6 & (6.2, 6.3, 6-4), Figure 602.10.6.4	☐	
☐	☑	☐	622	Blocking along BWPs	602.10.8.1, 602.10.8.(1) & (2)	☐	
☐	☑	☐	623	Blocking of joists at support at wall or beam	502.7	☐	
				Other			
☐	☑	☐	624			☐	
☐	☑	☐	625			☐	
				700 ATTIC FLOOR FRAMING PLAN			
☐	☑	☐	701	Dimensional lumber ceiling joists (size, grade, species, spacing, direction)	802.4	☐	
☐	☑	☐	702	Dimensional lumber floor joists (size, grade, species, spacing,	502.3, 502.1	☐	

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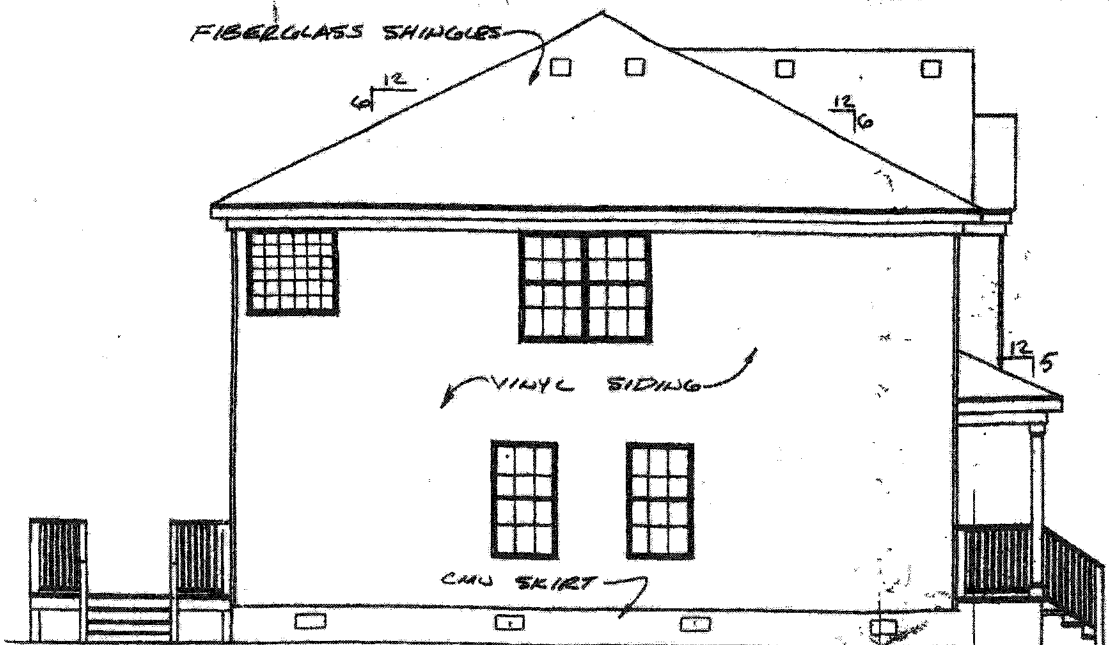
				direction)			
☐	☐	☐	703	I-joist layout (mfgr, series, depth, spacing, direction)	111.1, 112.2	☐	
☐	☐	☐	704	Framing of openings	502.10	☐	
☐	☐	☐	705	Steel beams and calc sheets	109.3, 301.1	☐	
☐	☐	☐	706	Posts / columns	109.3	☐	
☐	☐	☐	707	Engineered LVL beam location and calc sheets	109.3, 301.1	☐	
				Other			
☐	☐	☐	708			☐	
☐	☐	☐	709			☐	
				800 HABITABLE / STORAGE ATTIC FLOOR PLAN (whenever there is a fixed stairway)			
				Rooms			
☐	☐	☐	801	Room names, minimum size, ceiling height, habitable attic	304, 305, Chapter 2	☐	
☐	☐	☐	802	Bedroom(s) emergency escape and rescue openings	310	☐	
☐	☐	☐	803	Size of all doors and windows on plan view	109.1, 310, 311	☐	
				Other			
☐	☐	☐	804			☐	
☐	☐	☐	805			☐	
				900 ROOF PLANS			
				Show each individual / rafters, hip/valley members, ridge & supports			
☐	☐	☐	901	Rafters (size, grade, species, spacing, direction)	802.1	☐	
☐	☐	☐	902	Valley framing details - post required	802.3, 109.3	☐	
☐	☐	☐	903	Ridge beams / Post (required when there is not a ceiling joist to resist thrust)	802.3	☐	
				Truss			
☐	☐	☐	904	Truss layout & engineers detail sheets	802.10	☐	
☐	☐	☐	905	Girder truss loads and appropriate posts / columns	801.2	☐	
☐	☐	☐	906	RDP seal	802.10.2	☐	
☐	☐	☐	907	Individual truss loads and uplift	802.10.1	☐	
☐	☐	☐	908	Gable end details and bracing requirements	802.11.1, 802.10.3	☐	
				Details			
☐	☐	☐	909	Rafter ties, collar ties	802.3.1	☐	
☐	☐	☐	910	Complex roof - specify all members	801.2	☐	
☐	☐	☐	911	Ceiling/roof diaphragm & blocking (if required)	109.3, 602.10.8.1	☐	
☐	☐	☐	912	Uplift (hurricane ties)	802.11.1	☐	
☐	☐	☐	913	Masonry veneers & chimney support by wood framing: design by RDP if required	109.3, 703.7.2	☐	
☐	☐	☐	914	Hurricane tie schedule - size with nail count per mfg specs	802.10.5	☐	
☐	☐	☐	915	Vent calcs. to net free flow for roof: 1sqft per150sqft or 300 sqft	806.2	☐	
☐	☐	☐	916	Details- unvented roof	806.4	☐	
				Exposure			
☐	☐	☐	917	Uplift connectors / load path to foundation: when uplift $\geq$ 20psf	Table 301.2(3), Table 301.2 (2), 802.11.1	☐	
☐	☐	☐	918	Roof sheathing and nailing schedule	Table 602.3.1	☐	
				Other			
☐	☐	☐	919			☐	
☐	☐	☐	920			☐	
				1000 ELEVATIONS			

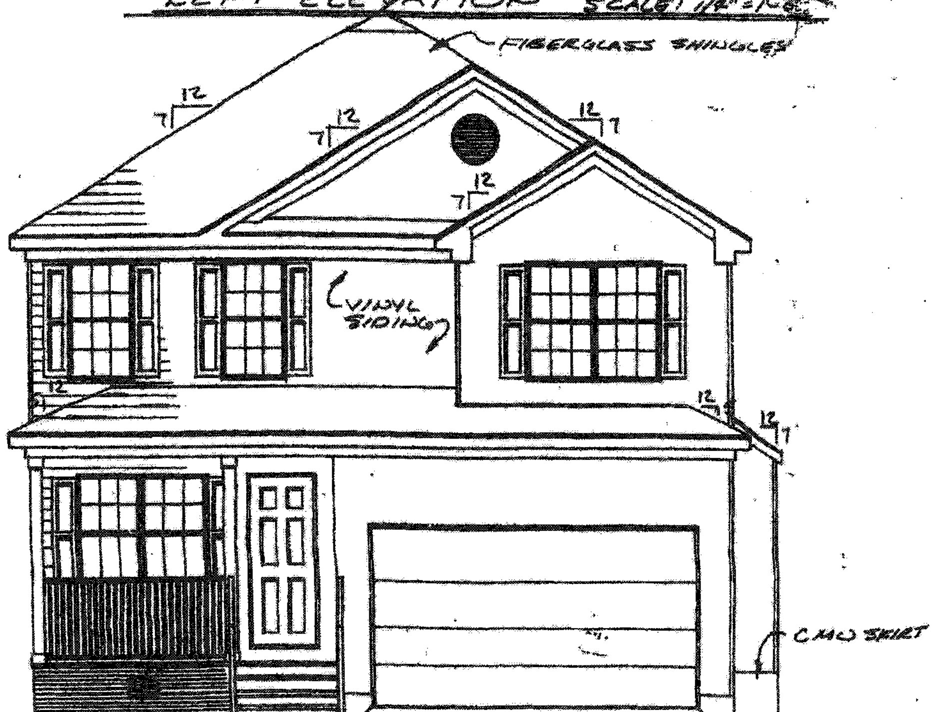
CK	N/A	REJ	REF #	ITEM	CODE REF	REC	REMARKS
			1001	Finished floor to finished floor heights (ceiling heights)	109.1		
			1002	Front, side and rear elevations (incl. door and windows locations)	109.1		
			1003	Grade changes of basements- number of stories	109.1		
				Other			
			1004				
			1005				
				1100 SECTIONS - show load path			
			1101	Full cross sections showing areas-at load path and critical construction, (reference cross section -show location on plan)	109.1		
			1102	Partial - exterior wall construction: stud size and spacing anchorage	602.3.1, Table 602.3(5)		
			1103	All material used	109.3		
			1104	Roof pitch /roof covering	109.3, 905.1		
			1105	Change in thickness CMU	606.2.3		
			1106	Crawl space grade > fin. grade or drainage system	408.6		
			1107	Interior bearing wall details: stud size and spacing-anchorage	602.4, 602.2		
			1108	Tall wall details: sealed design (elevation view)	Table 602.3 (5)		
			1109	Connector chart (type and load path)	109.3, 301.1, 802.11.1		
			1110	Insulation @ basement walls: R10 (continuous) or R13 (w/studs)	1101.3, Table 1102.1		
			1111	@ crawl space under floor: R19	1101.3. Table 1102.1		
			1112	@condition crawl R10 - slob on grade ICC-ES report	1102.1, 1102.2.8, 112.2		
			1113	@ stud walls: R13	Table1102.1, 1101.3		
			1114	@ roof: R38 or R30 if covered top plate – (attic access)	1102.2.1, 1102.2.3, Table 1102.1,		
			1115	Roofing: type of roof covering - shingles, tile, metal, etc	902.1		
			1116	Termite barrier	318		
			1117	Wood frame is limited to 3 stories maximum - story height	101.2, 301.3, Table 602.3.1		
			1118	Steel frame is limited to 3 stories maximum	603.1.1		
			1119	ICF walls is limited to 2 stories maximum – S. P.s	611.2, Sect. 613		
			1120	Column restraint & attachment to beam	407.3, 802.11.1		
			1121	Slab on grade: 6 mil vapor barrier under concrete slabs (not reqd at garage)	506.2.3		
				Other			
			1122				
			1123				
				1200 MISCELLANEOUS DETAILS			
				Walls			
			1201	Weather resistant barrier (complying with ASTM D226)	703.2; T703.4		
			1202	Brick anchorage	703.7.4		
			1203	Brick ledge detail	301.1, 401.2		
			1204	Bay window detail	109.3, 301.1		
			1205	Dormer framing detail	109.3		
			1206	Glass block installation details	610		
			1207	Bearing frame wall to block wall detail (cripple walls)	602.9		
			1208	Chimney framing details	109.3		
				Openings			
			1209	Header/opening details 5' or greater	109.3		
			1210	Doors and window details for masonry openings	401.2, 606.10		

CK	N/A	REJ	REF #	ITEM	CODE REF	REC	REMARKS
				Veneer supports			
☐	☐	☐	1211	Veneer support: specify if by walls or by roof rafters; lintel size and details (nailing, bolting, stops)	703.7.2.1, 703.7.2.2	☐	
☐	☐	☐	1212	Design required	401.2	☐	
				Stairs			
☐	☐	☐	1213	Stairways - width, treads and risers, landings, winders, spiral	311.7	☐	
☐	☐	☐	1214	Handrails (4 or more risers)	311.7.7	☐	
☐	☐	☐	1215	Guards	Section 312	☐	
				Other			
☐	☐	☐	1216			☐	
☐	☐	☐	1217			☐	
				1300 GENERAL NOTES			
☐	☐	☐	1301	Window sill heights: 18" min when > 72" above grade or surface below	612.2	☐	
☐	☐	☐	1302	Exterior wall locations: fire separation distance w.r.t property lines	302.1, Table 302.1	☐	
☐	☐	☐	1303	Specify code edition: 2006 IRC	103.2	☐	
☐	☐	☐	1304	Square footage per floor, decks, porches, and garage	109.3	☐	
☐	☐	☐	1305	Complete Table R301.2(1) + exposure category. (see jurisdictional design criteria)	Table 301.2(1), 301.2, 301.5	☐	
☐	☐	☐	1306	Design load criteria	301.2, T301.5	☐	
☐	☐	☐	1307	Soil bearing capacity: ☐ tested, ☐ assumed, ☐ per code	401.4, 401.4.1	☐	
☐	☐	☐	1308	Approved fireblocking material on plans: manufacturer's literature on site	602.8, 302.11.1	☐	
☐	☐	☐	1309	Garage doors wind rating: Jamb attachment mfgr's literature	301.2.1	☐	
☐	☐	☐	1310	Roof water discharge (if shrink swell soil)	801.3	☐	
☐	☐	☐	1311	Termite method: manufacturer's product name or literature	320.1	☐	
☐	☐	☐	1312	Flashing windows /doors: mfgr's requirements on site for inspect	703.8, 109.3	☐	
☐	☐	☐	1313	Carbon Monoxide Alarms	315.1	☐	
☐	☐	☐	1314	Fire Extinguishers	329.1	☐	
☐	☐	☐	1315	Smoke Detectors	315.1	☐	
				Other			
☐	☐	☐	1316			☐	
☐	☐	☐	1317			☐	
				1400 SPECIAL CONSTRUCTION DETAILS DETERMINED BY SPECIFIC PLANS			
				Flood resistant construction			
☐	☐	☐	1401	Structural systems	322	☐	
				Sound Transmission			
☐	☐	☐	1402	Airport noise (see jurisdictional ordinance)	327.2	☐	
				Townhouses			
☐	☐	☐	1403	Firewall detail and ratings	112.3 (ICC/ES)	☐	
☐	☐	☐	1404	Structural independent	302.2.4	☐	
☐	☐	☐	1405	Through wall penetrations	302.2.4.1	☐	
☐	☐	☐	1406	Parapets	302.2.2-302.2.3	☐	
				Sunrooms			
☐	☐	☐	1407	Define sunroom	202	☐	
☐	☐	☐	1408	Min. R values	1102.2.11	☐	

CK	N/A	REJ	REF #	ITEM	CODE REF	REC	REMARKS
☐	☑	☐	1409	Glazing - U factor .50 skylite .75 (if glazing less than 40%, treat as room)	**1102.3.5, 1102.4.1, Chapter 2**	☐	
				Other			
☐	☐	☐	1410			☐	
☐	☐	☐	1411			☐	



LEFT ELEVATION SCALE: 1/4" = 1'-0"



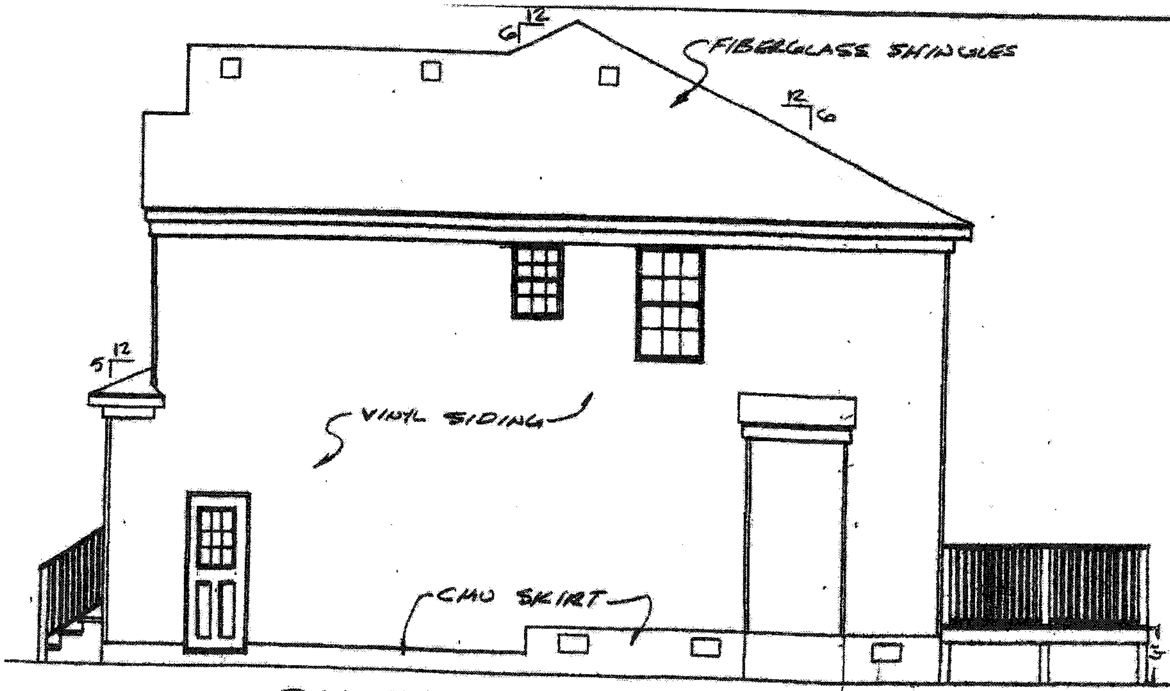
CLEGHORN DESIGN SERV
CUSTOM HOUSE DESIGN AND RENOVATION PL
HARRY GLAS
461-7736

AMERICAN DESIGN DRAFTING ASSOCIATION

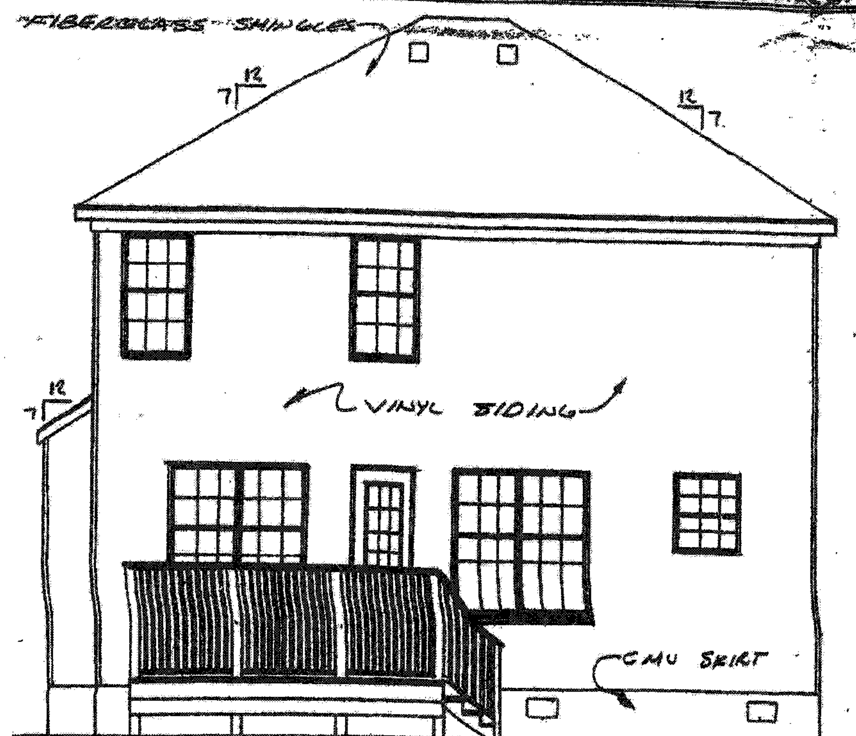
EMPIRE EXTERIORS LLC

SCALE NOTED	APPROVED BY	DRAW
DATE 7/1/08		REV

TWO STORY DWELLING



RIGHT ELEVATION SCALE: 1/8" = 1'-0"

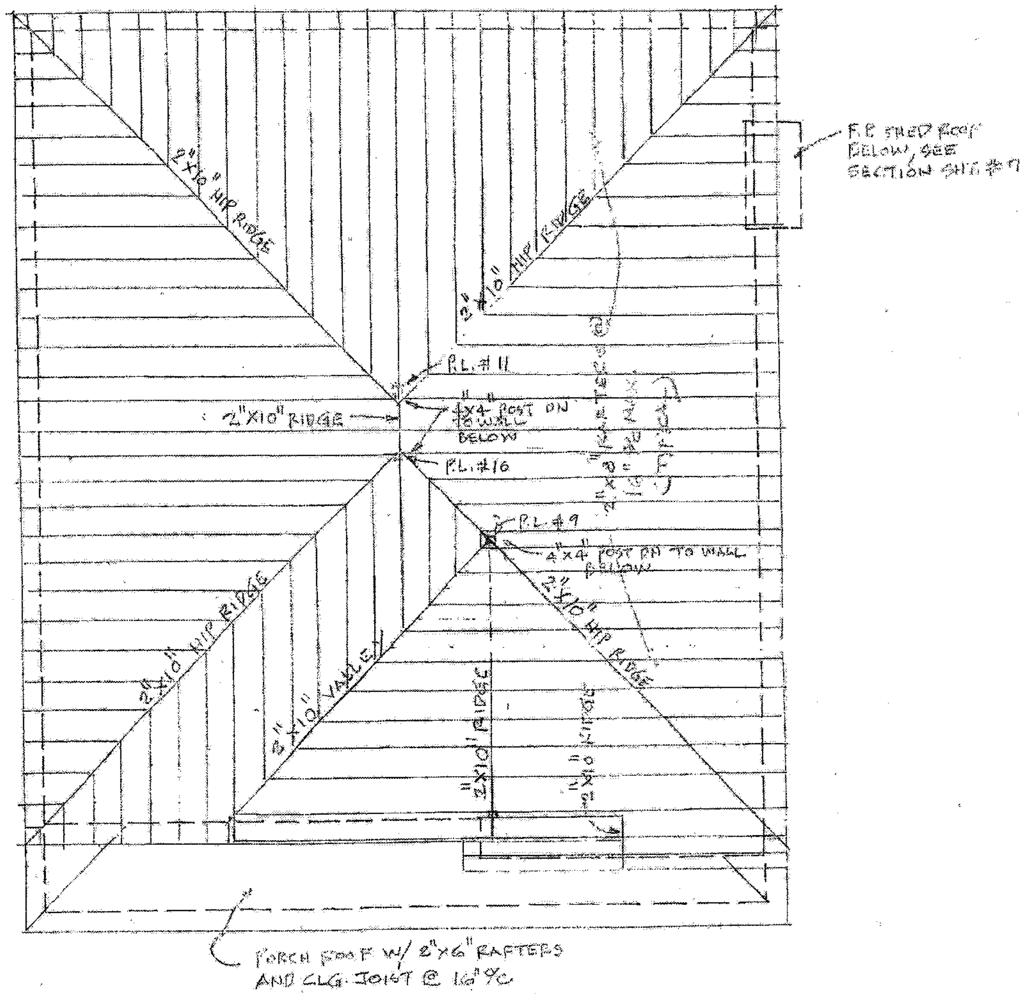


REAR ELEVATION SCALE: 1/8" = 1'-0"

ADDA
AMERICAN DESIGN DRAFTING ASSOCIATION

CLEGHORN DESIGN SERVICES
CUSTOM HOUSE DESIGN, ADDITIONS AND RENOVATION PLANS
HARRY CLEGHORN
AWARD WINNING HOMES
461-7736

EMPIRE EXTERIORS LLC		
SCALE: NOTED	APPROVED BY	DRAWN BY: 5521
DATE: 7/1/08		REVISED:
TWO STORY DWELLING		
ELEVATIONS		DRAWING NUMBER 7 OF 10



ROOF FRAMING

SCALE: 1/4" = 1'- 0"

Google Earth feet 50 meters 10

Supplemental Information Provided by Staff

ACCA®

Form J1AE
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703/575-4477 • Fax 703/575-4449
Printed in U.S.A. 2005

Plan No. ____________
Date ____________
Calculated by ____________

WORKSHEET: MANUAL J8AE
LOAD CALCULATIONS FOR RESIDENTIAL AIR CONDITIONING

To be used with ACCA's Manual J8AE

For Name ____________
Address ____________
City/State/Province ____________
By Contractor ____________
Address ____________
City/State/Province ____________

Equipment Summary

Make ____________ Model ____________ Type ____________
Heating Input (Btuh) ____________ Heating Output (Btuh) ____________ Efficiency ____________
Sensible Cooling (Btuh) ____________ Latent Cooling (Btuh) ____________ Total (Btuh) ____________
COP/EER/SEER/HSPF ____________ Cooling CFM ____________ Heating CFM ____________

Space Thermostat ( ) Heat ( ) Heat/Cool ( ) Night Setback ( )

Construction Data

Windows ____________
____
____
Doors ____________
____
Walls ____________
____
Roof ____________
Ceiling ____________
____

Floor ____________
____
____
Partitions ____________
____
Basement Walls ____________
____
Ground Slab ____________
____
____

Instructions

For BLOCK LOADS: Use supporting data from Worksheets A–H (on pages 3, 6, 7, and 8) to complete Form J1AE (on page 2).

For ROOM-BY-ROOM LOADS: Form J1AE (page 2) mates at the arrows with page 4 (Room Calculation Worksheet). The individual room loads are "tallied" into Block Load/Room Summation column (page 2).
Use supporting data from Worksheets A– H (on pages 3, 6, 7, and 8) to complete Form J1AE (on page 2).

Note: Worksheet F is not part of the Abridged Edition methodology and is not included in Form J1AE.

WORKSHEET: **FORM J1AE**

ABRIDGED EDITION OF MANUAL J, 8TH EDITION

1) Room	Block Load / Room Summation		
L, H & W in decimal feet and gross SqFt areas	Length	Height or Width	Gross Area
2) Exposed Wall			
3) Partition			
4) Floor			
5) Ceiling	Slope >		

Project:			Location:			
ACCA	Indoor db Heating		Latitude		DR	
	Indoor db Cooling		99% db		HTD	
	Indoor RH Cooling		1% db		CTD	
	Elevation		Grains		ACF	

			Construction Number Direction & Details	Heating HTM	Cooling HTM	Net Area	Btuh Heating	Btuh Cooling
6A	Windows & Glass Doors	a						
	Total Area (SqFt) =	b						
		c						
		d						
		e						
		f						
		g						
		h						
		i						
		j						
		k						
		l						
6B	Skylights	a						
	Total Area (SqFt) =	b						
		c						
		d						
7	Wood & Metal Doors	a						
	Total Area (SqFt) =	b						
		c						
		d						
8	Above Grade Walls	a						
	Total Area (SqFt) =	b						
		c						
		d						
		e						
		f						
	Partition Walls	g						
	Total Area (SqFt) =	h						
9	Below Grade Walls	a						
	Total Area (SqFt) =	b						
10	Ceilings	a						
	Total Area (SqFt) =	b						
		c						
	Partition Ceilings	d						
	Total Area (SqFt) =	e						
11A	Passive Floors	a						
	Total Area (SqFt) =	b						
	Use feet of exposed edge for slab	c						
	Partition Floors	d						
	Total Area (SqFt) =	e						

12	Infiltration	a	Envelope Leakage		Infilt Cfm for Heating			
	Gross exposed wall area for WAR	b	No of Fireplaces		Infilt Cfm for Cooling			
13	Internal Gains	a	Number of bedrooms		# Occupants >			
	One occupant = 230 sensible Btuh	b	Appliances (1200 Btuh or 2400 Btuh)					
14	Sub Totals (sum lines 6A through 13)							
15	Duct Loss / Gain:				Factors >			
16	Ventilation	Maximum ventilation Cfm for MJ8ae is 50			Cfm for this job >			
19	Blower Heat Gain	Manufacturer's performance data has blower heat discount (1,707 if no, 0 if yes)						
20	Total Sensible Loss or Gain (sum lines 14 through 20)							

21	A) Latent Infiltration Gain (Btuh)	
	B) Latent for Occupants (One occupant = 200 Btuh)	
	C) Latent for Plants (Small = 10, Med = 20, Large = 30)	
	D) Latent for Duct in Unconditioned Space	
	E) Latent Ventilation Gain	
	F) Total Latent Gain (Btuh)	

THIS FORM MATES WITH **ROOM CALCULATION WORKSHEET**

WORKSHEET A: **INDOOR & OUTDOOR DESIGN CONDITIONS**

Project:		City, State:				Table 1A Latitude >	
Indoor Design Conditions	Heating Drybulb >		Winter humidification		Cooling drybulb >		Cooling RH% >	
Outdoor Design Conditions	99% Drybulb >		1% Drybulb >		Grains Difference >		Daily Range >	
Heating temperature difference (HTD) = Indoor heating drybulb - Outdoor 99% drybulb >					Table 1A Elevation >		Refer to Table 1A and see
Cooling temperature difference (CTD) = Outdoor 1% drybulb - Indoor cooling drybulb >					Table 10A ACF >		Sections 3-6 and 3-7

WORKSHEET C: **SKYLIGHTS**

Referance	HTD	CTD	T3 CTD
Temperatures			

Round CTD value for Table 3 lookup; use + 1 or - 1; or +2 or -2; as required (16 = 15; 17 = 15; 18 = 20; 19 = 20)

			a	b	c	d
		Line # for J1ae, Item 6B				
		Direction glass faces >				
		Number of panes >				
		Glass tilt angle (degrees) >				
		Frame type (w, m, mb, v) >				
		Curb height (Inches) >				
1	Area of roof opening (curb length x curb width) for one skylight (SqFt)					
2	Curb size (see Table 2B-4)					
3	Number of identical skylight assemblies					
4	Net area (SqFt) of identical skylight assemblies (L1 x L3)	**To J1ae -->**				
5	Table 2A construction number	**To J1ae -->**				
6	Table 2A Ueff-value					
7	Heating HTM = Ueff x HTD	**To J1ae -->**				
8	Cooling HTM from Table 3C	**To J1ae -->**				

WORKSHEET E: **INFILTRATION**

Input Data	Heating	Cooling	Number Bedrooms	Occupants (# BR + 1)	Number Fireplaces	Burner Btuh	HTD	CTD	T1 Grains	T10 ACF
Floor area (SqFt) >										
Conditioned above grade volume (CuFt) >							Note: Burner Btuh = 0 for direct-vent appliance			

Table 8 Outdoor Air Requirement

			Heating	Cooling
1	Outdoor air Cfm for 0.35 ACH requirement	0.35 x above grade volume / 60 =		
2	Outdoor air Cfm for occupants	20 x number of occupants =		
3	Outdoor air Cfm for burners that take combustion air from conditioned space	0.50 x input capacity (Btuh) / 1000 =		
4	Suggest value for fresh air Cfm	Maximum value from lines 1, 2 or 3 =		

Envelope Infiltration Rate

5	Tightness of construction (see table 5A)	Envelope =		Fireplace =			
6	Table 5A ACH for heating	Envelope ACH (heating) =		Cfm for one fireplace =			
7	Table 5A ACH for cooling	Envelope ACH (cooling) =				Heating	Cooling
8	Infiltration Cfm for heating	Line 6 ACH x above grade volume for heating / 60 + Line 6 fireplace Cfm x number of fireplaces =					
9	Infiltration Cfm for cooling	Line 7 ACH x above grade volume for cooling / 60 =					

Infiltration Loads

10	Infiltration load for heating (Btuh)	**To J1ae >**		< 1.1 x ACF x Line 8 Cfm x HTD
11	Sensible infiltration load for cooling (Btuh)	**To J1ae >**		< 1.1 x ACF x Line 9 Cfm x CTD
12	Latent infiltration load for cooling (Btuh)	**To J1ae >**		< 0.68 x ACF x Line 9 Cfm x Grains

Suggested Value for Engineered Ventilation Cfm

13	Compare infiltration rate with suggested fresh air rate	Line 4 Cfm - line 8 Cfm for heating =		Line 4 Cfm - line 9 Cfm for cooling =	
14	Suggest value for engineered ventilation Cfm -->		<-- Largest positive value from line 13 (see line 11, Worksheet H)		

WORKSHEET G: **DUCT RUNS IN UNCONDITIONED SPACE**

Duct Load Table		Heating	Cooling	Table 1 Values	99% db	1% db	Grains
	Floor Area (SqFt) >						

Note: If a 7D-AE system serves a main floor area (FAm) and a basement floor area (FAb), the referance floor area equals 0.75 x (FAm + FAb) or FAm (use the largest value).

Base-case load factors and latent heat value from Table 7 (eyeball interpolation is acceptable)

Line	Existing Construction			Improved Construction		
	R-Value	Base-case factors from table		R-Value	Base-case factors from table	
1		Heat loss factor =			Heat loss factor =	
2	Leakage	Sensible gain factor =		Leakage	Sensible gain factor =	
3		Latent gain (Btuh) =			Latent gain (Btuh) =	
	R-Value Correction (WIF)					
4		For heat loss =			For heat loss =	
5		For sensible gain =			For sensible gain =	
6		Adjusted heat loss factor =		< Line 1 factor x line 4 adjustment >		
7		Adjusted sensible gain factor =		< Line 2 factor x line 5 adjustment >		
	Leakage Rate Correction (LCF)					
8		For heat loss =			For heat loss =	
9		For sensible gain =			For sensible gain =	
10		For latent gain =			For latent gain =	
11		Adjusted heat loss factor =		< Line 6 factor x line 8 adjustment t >		
12		Adjusted sensible gain factor =		< Line 7 factor x line 9 adjustment >		
13		Adjusted latent gain (Btuh) =		< Line 3 value x line 10 adjustment >		
	Surface Area Adjustment (default for new construction = no adjustment = 1.0)					
14		Installed supply area (SqFt) =			Installed supply area (SqFt) =	
15		Default supply area (SqFt) =			Default supply area (SqFt) =	
16		Rs = Installed area / default area =			Rs = Installed area / default area =	
17		Installed return area (SqFt) =			Installed return area (SqFt) =	
18		Default return area (SqFt) =			Default return area (SqFt) =	
19		Rr = Installed area / default area =			Rr = Installed area / default area =	
20	Ks =	Kr =		Ks =	Kr =	
21		SAA (heating and sensible cooling) =		< Ks (L20) x Rs (L16) + Kr (L20) x Rr (L19) >		
22		LGA latent cooling) =		< Latent LGA = Rr (L19) >		
	Heat Loss and heat gain factors and latent gain (Btuh)					
23	**To J1ae --->**	Net heat loss factor =		< Line 11 Factor x Line 21 SAA value >		
24	**To J1ae --->**	Net sensible gain factor =		< Line 12 Factor x Line 21 SAA value >		
25	**To J1ae --->**	Net latent gain (Btuh) =		< Line 13 gain x Line 22 LGA adjustment >		

WORKSHEET H: **ENGINEERED VENTILATION**

Input Data		Heating	Cooling	HTD	CTD	T1 Grains	T10 ACF
	Above grade volume (CuFt) >						

Code Value for Outdoor Cfm

Line	Item	Value	Comment
1	Air changes per hour specified by the local code =		or ... Cfm required by local code =
2	Largest above grade (heated or cooled) volume =		< see input data, above
3	Outdoor air Cfm equivalent of code ACH value =		< ACH (line 1) x volume (line 2) / 60
4	Code value for minimum amount of outdoor air Cfm =		< Largest Cfm value from line 1 or 3
5	Code Cfm may be provided by any combination of infiltration Cfm and engineered ventilation Cfm ... (yes/no)		
6	Code Cfm shall be provided by engineered ventilation ... (yes/no)		
7	Estimated infiltration Cfm value (enter smallest Cfm value from lines 8 & 9 Worksheet E) ...		
8	Code Cfm requirement...		< If line 5 = yes; Cfm = line 4 - line 7 ... or ... If line 6 = yes (Cfm = line 4 value)
	Design Value for Engineered Ventilation Cfm		
9	Suggested ventilation Cfm (line 14 Worksheet E) =		
10	Practioner-specified value for ventilation Cfm =		**< To J1ae** *See Section 3-13, Manual MJ8ae*

Note 1: Code Cfm value is a mandatory minimum. The system designer may chose to use a larger value.

Note 2: Use the unabridged version of Manual J if the design Cfm value exceeds 50 Cfm.

Note 2: Use the unabridged version of Manual J if the design features heat recovery equipment.

Engineered Ventilation Loads

Line	Item		Value	Formula
11	Heat loss (Btuh)	**To J1ae >**		< 1.1 x ACF x Line 10 Cfm x HTD
12	Sensible gain (Btuh)	**To J1ae >**		< 1.1 x ACF x Line 10 Cfm x CTD
13	Latent gain (Btuh)	**To J1ae >**		< 0.68 x ACF x Line 10 Cfm x Grains

ACCA

Heating temperature difference (HTD) >		CTD for Table 4 CLTD lookup >		*Round CTD value for Table 4 lookup; use + 1 or - 1; or +2 or -2; as required*
Cooling temperature difference (CTD) >		Daily range for Table 4 CLTD lookup >		*(16 = 15; 17 = 15; 18 = 20; 19 = 20)*

col	1	2	3	4	5	6	7	8	9	10	11	12	13
ref	Table 4A	Survey	Survey	C2 x C3	Survey	C4 - C5	Survey	Table 4A	Wks. A	C8 x C9	Table 4A	Table 4B	C8 x C12
	Construction Number plus Door and Wall Direction	Length (Ft)	Average Height (Ft) or Width (Ft)	Gross Area (SqFt)	Area of Openings (SqFt)	Net Area (SqFt)	Exposed Slab Edge (Ft)	U-Value or Slab F-Value	HTD *or* *PTD-H*	Heating HTM	Group Number	CLTD *or* *PTD-C*	Cooling HTM
7) Wood and Metal Doors						To J1ae	To J1ae			To J1ae			To J1ae
a					Use gross if < 50 %; use French door if > 50%								
b													
c													
d													
8) Above Grade Walls													
a													
b													
c													
d													
e													
f													
8) Partition Walls Use partition temperature difference for heating (PTD-H) and cooling (PTD-C)													
g													
h													
9) Below Grade Walls													
a													
b													
10) Ceilings	Slope	*For sloped ceiling: Enter slope angle in degrees; then Gross Area = (L x W) / Cosine of slope angle*											
a													
b													
c													
10) Partition Ceilings		*Use partition temperature difference for heating (PTD-H) and cooling (PTD-C)*											
d													
e													
11A) Passive Floors (construction Numbers 20, 21 and 22)					*Use F-value and running feet of exposed edge for slab floors*								
a													
b													
c													
11A) Partition Floors (Construction Number 19)					*Use partition temperature difference for heating (PTD-H) and cooling (PTD-C)*								
d													
e													

ROOM CALCULATION WORKSHEET

Length	Height or Width	Gross Area	Length	Height or Width	Gross Area	Length	Height or Width	Gross Area	Length	Height or Width	Gross Area	Length	Height or Width	Gross Area	Length	Height or Width	Gross Area
Slope >			Slope >			Slope >			Slope >			Slope >			Slope >		
Net Area	Btuh Heating	Btuh Cooling	Net Area	Btuh Heating	Btuh Cooling	Net Area	Btuh Heating	Btuh Cooling	Net Area	Btuh Heating	Btuh Cooling	Net Area	Btuh Heating	Btuh Cooling	Net Area	Btuh Heating	Btuh Cooling
WAR			WAR			WAR			WAR			WAR			WAR		
# Occ >			# Occ >			# Occ >			# Occ >			# Occ >			# Occ >		
Appliance Btuh >			Appliance Btuh >			Appliance Btuh >			Appliance Btuh >			Appliance Btuh >			Appliance Btuh >		

ROOM CALCULATION WORKSHEET

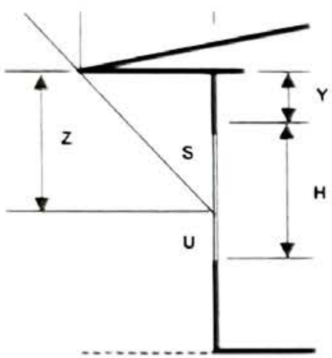
Length	Height or Width	Gross Area	Length	Height or Width	Gross Area	Length	Height or Width	Gross Area	Length	Height or Width	Gross Area	Length	Height or Width	Gross Area	Length	Height or Width	Gross Area
Slope >			Slope >			Slope >			Slope >			Slope >			Slope >		
Net Area	Btuh Heating	Btuh Cooling	Net Area	Btuh Heating	Btuh Cooling	Net Area	Btuh Heating	Btuh Cooling	Net Area	Btuh Heating	Btuh Cooling	Net Area	Btuh Heating	Btuh Cooling	Net Area	Btuh Heating	Btuh Cooling
WAR			WAR			WAR			WAR			WAR			WAR		
# Occ >			# Occ >			# Occ >			# Occ >			# Occ >			# Occ >		
Appliance Btuh >			Appliance Btuh >			Appliance Btuh >			Appliance Btuh >			Appliance Btuh >			Appliance Btuh >		

WORKSHEET B: **HEATING AND COOLING HTM & LOAD AREA FOR WINDOWS** (FLAT, BAY OR GARDEN) **AND GLASS DOORS** (HINGED SLIDING OR FRENCH)

HTD	CTD	T3 CTD

Round CTD value for Table 3 lookup: use +1 or -1 or +2 or -2 as required (16 = 15, 17 = 15, 18 = 20, 19 = 20)

		Northerly Direction or Obviously Shaded by Overhang	All Other Directions
Form J1ae, item 6A			
Line ID (a, b, c ... etc.)			
Direction glass faces			
Number of panes			
Frame type (w, m, mtb, v)			
1) Table 2A construction number	**To J1ae –>**		
2) Table 2A U-value			
3) Unadjusted heating HTM = U x HTD			
4) Heating HTM adjustment (see Note 1)			
5) Adjusted heating HTM (L3 x L4)	**To J1ae –>**		
6) Cooling HTM from Table 3A (default = blinds @ 45 deg)			
7) Cooling HTM adjustment (see Note 2)			
8) Adjusted C-HTM (L6 x L7)	**N, NE, NW to J1ae –>**		
9) Area of opening (SqFt) for one unit			
10) Number of identical assemblies			
11) Net area of identical assemblies (L9 x L10)	**To J1ae –>**		



If S is negative or zero, stop! Then copy the line 8 HTM to line 26

If S > H, jump to line 19, then copy the line 21 HTM to line 26

Internal shade same as used for Line 6

Overhang (OH) Adjustment

12) Opening height (H) in feet	
13) Overhang length (X) in feet	
14) SLM value for local latitude	
15) Shade line to OH (Z) = L13 x L14	
16) Distance below OH (Y)	
17) Shaded height (S) = L15 - L16	
18) Unshaded height (U) = L12 - L17	
19) North HTM from Table 3A	
20) HTM adjustment (copy line 7)	
21) Adjusted North HTM (L19 x L20)	
22) Shaded glass factor = L17 / L12	
23) Unshaded glass factor = L18 / L12	
24) Shaded HTM = L21 x L22	
25) Unshaded HTM = L8 x L23	
To J1ae > 26) Effective HTM = L24 + L25	

SLM Values for North Latitudes

Latitude	25	30	35	40	45	50
E or W	0.83	0.83	0.82	0.81	0.80	0.79
SE or SW	1.89	1.63	1.41	1.25	1.13	1.10
South	10.10	5.40	3.53	2.60	2.05	1.70

Note 1: Default = 1.0; Bay window = 1.15; Garden window = 2.75; French door = 0.70

Note 2: Default = 1.0; Insect screen = 0.90; Bay window = 1.15; Garden window = 2.00; French door = 0.70

Tables 3A, 3B, and 3C are informative (MJ8$_{AE}$ procedure are not part of this Standard).

Table 3A

MJ8$_{AE}$ Procedure: Default Cooling HTM for Generic Windows and Glass Doors

No External Sun Screen, Clear Glass

Cooling Load (Btuh) = HTM × Reference Area
Bay Window HTM = 1.15 × Table HTM
Garden Window HTM = 2.00 × Table HTM
French Door HTM = 0.70 × Table HTM
Use Single Pane, Clear Glass for Jalousie Window

Default indoor design temperature = 75°F.
Outdoor design temperature provided by Table 1.
Load area appears above HTM values.
Table 3, note 2 ~~(after Table 3E-5)~~ specifies the order of application of the HTM adjustment procedures.

Recommended Adjustments

1) *Full outdoor insect screen = 0.80 × Table HTM*
   Half outdoor insect screen = 0.90 × Table HTM
   Full indoor insect screen = 0.90 × Table HTM
   Half indoor insect screen = 0.95 × Table HTM
2) *Shade by external overhang (See Table 3E-1)*

No Optional Adjustments

~~*1) See Table 3E-3 for foreground reflectance adjustment*~~
~~*2) 40° North latitude, see Table 3E-2 for latitude adjustment*~~
~~*3) Medium color blind, drape or roller shade. See Table 3E-4 for light or dark color adjustment.*~~

Table 3A 3A-1 — Clear Glass

No Internal Shade

Default Assembly Performance	Single Pane						Double Pane						Triple Pane ~~or Double Pane Low-e~~					
	U-Value		SC		SHGC		U-Value		SC		SHGC		U-Value		SC		SHGC	
	0.98		0.85		0.74		0.56		0.75		0.65		0.42		0.70		0.61	
Design CTD	10	15	20	25	30	35	10	15	20	25	30	35	10	15	20	25	30	35
Exposure	HTM for Rough Opening						HTM for Rough Opening						HTM for Rough Opening					
North	24	29	34	39	44	49	18	21	24	27	29	32	16	18	20	22	24	26
NE or NW	56	61	66	70	75	80	46	49	52	55	57	60	42	44	46	48	50	53
East or West	80	84	89	94	99	104	67	70	73	76	78	81	62	64	66	68	70	72
SE or SW	68	73	78	83	88	93	57	60	63	65	68	71	52	54	56	59	61	63
South	40	45	50	55	60	65	32	35	38	41	44	46	29	31	33	36	38	40

Vertical or Horizontal Blinds with Slats At 45 Degrees

Default Assembly Performance	Single Pane						Double Pane						Triple Pane ~~or Double Pane Low-e~~					
	U-Value		SC		SHGC		U-Value		SC		SHGC		U-Value		SC		SHGC	
	0.98		0.60		0.52		0.56		0.50		0.44		0.42		0.45		0.39	
Design CTD	10	15	20	25	30	35	10	15	20	25	30	35	10	15	20	25	30	35
Exposure	HTM for Rough Opening						HTM for Rough Opening						HTM for Rough Opening					
North	16	21	26	31	35	40	11	13	16	19	22	25	9	11	13	15	17	19
NE or NW	36	41	46	50	55	60	27	30	33	36	38	41	24	26	28	30	32	34
East or West	51	56	61	66	71	76	40	43	46	49	51	54	35	37	40	42	44	46
SE or SW	44	49	54	59	64	68	34	37	40	42	45	48	30	32	34	36	38	40
South	25	30	35	40	45	49	18	21	24	27	29	32	16	18	20	22	24	26

Drape or Roller Shade Half Drawn

Default Assembly Performance	Single Pane						Double Pane						Triple Pane ~~or Double Pane Low-e~~					
	U-Value		SC		SHGC		U-Value		SC		SHGC		U-Value		SC		SHGC	
	0.98		0.70		0.61		0.56		0.60		0.52		0.42		0.55		0.48	
Design CTD	10	15	20	25	30	35	10	15	20	25	30	35	10	15	20	25	30	35
Exposure	HTM for Rough Opening						HTM for Rough Opening						HTM for Rough Opening					
North	17	22	27	32	37	41	12	14	17	20	23	26	10	12	14	16	18	20
NE or NW	40	45	50	55	60	65	32	34	37	40	43	46	28	30	32	34	36	38
East or West	58	63	68	73	78	83	47	50	53	55	58	61	42	44	46	49	51	53
SE or SW	50	54	59	64	69	74	40	43	45	48	51	54	35	38	40	42	44	46
South	28	32	37	42	47	52	21	24	26	29	32	35	18	20	22	24	27	29

Drape or Roller Shade Fully Drawn

Default Assembly Performance	Single Pane						Double Pane						Triple Pane ~~or Double Pane Low-e~~					
	U-Value		SC		SHGC		U-Value		SC		SHGC		U-Value		SC		SHGC	
	0.98		0.50		0.44		0.56		0.45		0.39		0.42		0.40		0.35	
Design CTD	10	15	20	25	30	35	10	15	20	25	30	35	10	15	20	25	30	35
Exposure	HTM for Rough Opening						HTM for Rough Opening						HTM for Rough Opening					
North	15	20	25	30	34	39	10	13	16	19	21	24	8	10	12	15	17	19
NE or NW	31	36	41	46	51	56	25	28	31	33	36	39	21	24	26	28	30	32
East or West	44	49	54	59	64	69	37	40	42	45	48	51	32	34	35	38	40	42
SE or SW	38	43	48	53	58	63	31	34	37	40	42	45	27	29	31	33	35	37
South	22	27	32	37	42	47	17	20	23	25	28	31	14	16	19	21	23	25

Table 4A

Heating and Cooling Performance for Opaque Panels
U-Values and Group Numbers or CLTD Values

Construction Number 12
Frame Walls and Partitions

Wall or partition with brick veneer, plus interior finish (40 to 50 Lb / SqFt)
Wall with siding or stucco, or light partition, plus interior finish (7 to 20 Lb / SqFt)
Exterior finish code: b = brick veneer; s = stucco or siding
Framing code: w = wood, m = metal (studs 16 Inches on center, 75% cavity, 25% framing)
Reference Area = Gross Wall Area - Area of Window and Door Openings

Construction Number	Insulation R-Values	Description of Construction	Exterior Finish	U-Value with Wood Studs	U-Value with Metal Studs	Group Number
12A — No Insulation In Stud Cavity						
12A-0b w/m 12A-0s w/m	Cavity: None Board: None	Frame construction, no cavity insulation, no board insulation, wood sheathing	Brick Siding	0.253 0.240	0.315 0.295	E A
12A-2b w/m 12A-2s w/m	Cavity: None Board: R-2	Frame construction, no cavity insulation, R-2 board insulation	Brick Siding	0.194 0.186	0.230 0.219	E A
12A-3b w/m 12A-3s w/m	Cavity: None Board: R-3	Frame construction, no cavity insulation, R-3 board insulation	Brick Siding	0.162 0.157	0.187 0.180	F B
12A-4b w/m 12A-4s w/m	Cavity: None Board: R-4	Frame construction, no cavity insulation, R-4 board insulation	Brick Siding	0.139 0.135	0.157 0.152	F B
12A-5b w/m 12A-5s w/m	Cavity: None Board: R-5	Frame construction, no cavity insulation, R-5 board insulation	Brick Siding	0.122 0.119	0.136 0.132	G C
12A-6b w/m 12A-6s w/m	Cavity: None Board: R-6	Frame construction, no cavity insulation, R-6 board insulation	Brick Siding	0.109 0.106	0.120 0.117	G C
12B — R-11 Insulation In 2 x 4 Stud Cavity						
12B-0b w/m 12B-0s w/m	Cavity: R-11 Board: None	Frame construction, R-11 cavity insulation, no board insulation, wood sheathing	Brick Siding	0.097	0.122	H B
12B-2b w/m 12B-2s w/m	Cavity: R-11 Board: R-2	Frame construction, R-11 cavity insulation, R-2 board insulation	Brick Siding	0.086	0.106	I C
12B-3b w/m 12B-3s w/m	Cavity: R-11 Board: R-3	Frame construction, R-11 cavity insulation, R-3 board insulation	Brick Siding	0.079	0.096	J D
12B-4b w/m 12B-4b w/m	Cavity: R-11 Board: R-4	Frame construction, R-11 cavity insulation, R-4 board insulation	Brick Siding	0.073	0.088	J D
12B-5b w/m 12B-5s w/m	Cavity: R-11 Board: R-5	Frame construction, R-11 cavity insulation, R-5 board insulation	Brick Siding	0.068	0.081	K E
12B-6b w/m 12B-6s w/m	Cavity: R-11 Board: R-6	Frame construction, R-11 cavity insulation, R-6 board insulation	Brick Siding	0.064	0.075	K F
12C — R-13 Insulation In 2 x 4 Stud Cavity						
12C-0b w/m 12C-0s w/m	Cavity: R-13 Board: None	Frame construction, R-13 cavity insulation, no board insulation, wood sheathing	Brick Siding	0.091	0.115	I C
12C-2b w/m 12C-2s w/m	Cavity: R-13 Board: R-2	Frame construction, R-13 cavity insulation, R-2 board insulation	Brick Siding	0.081	0.101	J D
12C-3b w/m 12C-3s w/m	Cavity: R-13 Board: R-3	Frame construction, R-13 cavity insulation, R-3 board insulation	Brick Siding	0.075	0.092	K E
12C-4b w/m 12C-4s w/m	Cavity: R-13 Board: R-4	Frame construction, R-13 cavity insulation, R-4 board insulation	Brick Siding	0.069	0.084	K E
12C-5b w/m 12C-5s w/m	Cavity: R-13 Board: R-5	Frame construction, R-13 cavity insulation, R-5 board insulation	Brick Siding	0.064	0.078	K F
12C-6b w/m 12C-6s w/m	Cavity: R-13 Board: R-6	Frame construction, R-13 cavity insulation, R-6 board insulation	Brick Siding	0.060	0.072	K G

All Table 4 pages are part of the requirements for this Standard.

Table 4A

Heating and Cooling Performance for Opaque Panels
U-Values and Group Numbers or CLTD Values

Heating Application

Heating Load HTM = U-Value x (Indoor Design Temperature – Outdoor Design Temperature)

Heating Load (Btuh) = HTM x Reference Area

Default indoor design temperature = 70°F.
Outdoor design temperature provided by Table 1.
Reference area provided with construction number.

Heating Exceptions

Number 15 — Basement walls may be partly above grade and partly below grade:
Below Grade Heating HTM = Below Grade U-Value x HTD; Heating Load = HTM x Below Grade Wall Area
Above Grade Heating HTM = Above Grade U-Value x HTD; Heating Load = HTM x Net Above Grade Wall Area
Above Grade Cooling HTM = Above Grade U-Value x CLTD; Cooling Load = HTM x Net Above Grade Wall Area
Number 19 — Passive or radiant floor over enclosed craw space: HTM = U-Value x Floor TD From Table 19
Number 20 — Radiant floor over open crawlspace: HTM = U-Value x (HTD + 25)
Number 22 — Passive slab floor: HTM = F-Value x HTD; Heating Load = HTM x Running Feet of Exposed Edge
Number 22 — Radiant slab floor: HTM = F-Value x (HTD + 25); Heating Load = HTM x Running Feet of Exposed Edge
Table 4C — Partition wall for closed garage
Table 4D — Partition wall for closed sunroom
Table 4E — Ceiling below an encapsulated attic

Cooling Application

Cooling HTM = U-Value x Table 4B CLTD Value

Cooling Load (Btuh) = HTM x Reference Area

Default indoor design temperature = 75°F.

Outdoor design temperature and daily range provided by Table 1.
Design Temperature Difference = Outdoor Design Temperature – Indoor Design Temperature
Use the CLTD provided by Table 4A or use the Table 4A group number and the Table 4B CLTD.
Reference area provided with construction number.

Cooling Exceptions

Table 4C — Partition wall for closed garage
Table 4D — Partition wall for closed sunroom
Table 4E — Ceiling below an encapsulated attic

Construction Number 11
Wood and Metal Doors
Reference Area = Area of Rough Opening (SqFt)

Wood Door		**U-Value**
A.	Hollow Core	0.47
B.	Hollow Core with Wood Storm	0.30
C.	Hollow Core with Metal Storm	0.32
D.	Solid Core	0.39
E.	Solid Core with Wood Storm	0.26
F.	Solid Core with Metal Storm	0.28
G.	Panel	0.54
H.	Panel with Wood Storm	0.32
I.	Panel with Metal Storm	0.36
Metal Door		**U-Value**
J.	Fiberglass Core	0.60
K.	Fiberglass Core with Storm	0.36
L.	Paper Honeycomb Core	0.56
M.	Paper Honeycomb Core, with Storm	0.34
N.	Polystyrene Core	0.35
O.	Polystyrene Core with Storm	0.21
P.	Polyurethane Core	0.29
Q.	Polyurethane Core with Storm	0.17

CLTD Values
Medium Color Wood or Metal Doors

10		15			20			25		30	35
L	M	L	M	H	L	M	H	M	H	H	H
25.0	21.0	30.0	26.0	21.0	35.0	31.0	26.0	36.0	31.0	36.0	41.0

Wood and metal doors do not have a group number.

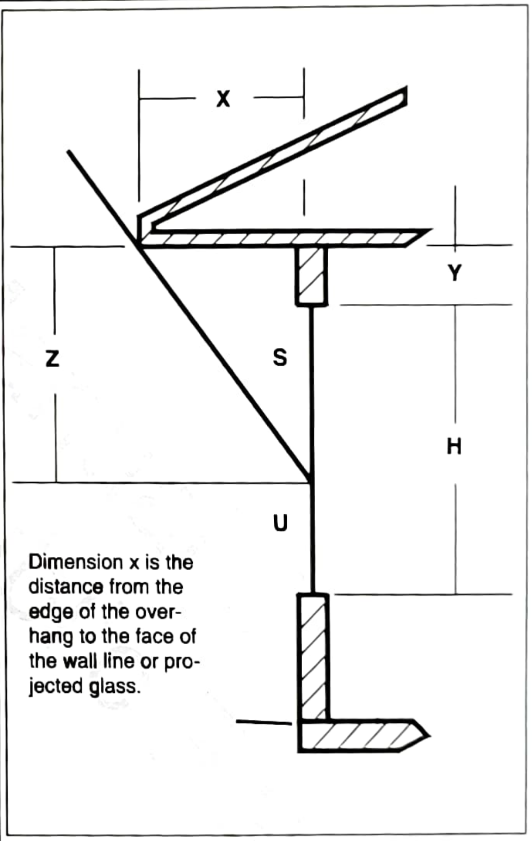
Tables 3E-1 through 3E-3 are part of the requirements for this Standard.

Table 3E
Heat Gain Adjustment for ~~Generic and NFRC Rated~~ Fenestration
~~HTM Adjustments for Overhang, Foreground Reflectance, Latitude and Internal Shade Color~~

Table 3E-1 adjustment procedures for shade by an overhang ~~and foreground reflectance~~ apply to generic, rated, and MJ8AE windows and glass doors. The Table 3E-2 foreground reflectance adjustment applies to generic and rated windows and glass doors. ~~The HTM adjustment procedures for latitude and internal shade color only apply to generic fenestration (the HTM equation for rated fenestration is sensitive to latitude and shade color).~~ Table 3E-3 ~~3E-5~~ estimates the shading coefficient for an unrated or undocumented sun screen. Table 3, note 2 ~~(follows Table 3E-5)~~ specifies the order of application of the HTM adjustment procedures.

HTM Adjustment for Shade by an Overhang

Shaded Glass Area Calculation	Operation	Window #1	Window #2	Window #3
A) Direction glass faces				
B) Overhang distance	X (Ft)			
C) SLM value at latitude				
D) S-line to overhang (Z Ft)	Z = X × SLM			
E) Top of opening to overhang	Y (Ft)			
F) Shaded glass height (S Ft)	S = Z − Y			
G) Height of opening	H (Ft)			
H) Unshaded glass height (U Ft)	U = H − S			
I) Width of opening	W (Ft)			
J) Shaded area (SqFt)	S × W			
K) Unshaded area (SqFt)	U × W			
L) Adjusted HTM_N (From Table 3)				
M) Adjusted HTM_D (From Table 3)				
N) Btuh gain for shaded area	Lines: J × L			
O) Btuh gain for area in sun	Lines: K × M			
P) Btuh gain for entire assembly	Lines: N + O			
Q) Total assembly area (SqFt)	H × W			
R) HTM_{OH} for entire assembly	Lines: P / Q			



Midsummer Shade Line Multiplier Values (SLM)

Direction of Exposure	Degrees North Latitude 25	30	35	40	45	50
East and West	0.83	0.83	0.82	0.81	0.80	0.79
South-East and South-West	1.89	1.63	1.41	1.25	1.13	1.01
South	10.1	5.40	3.53	2.60	2.05	1.70

1) Use this table to determine the shaded and sunlit areas of a generic, NFRC rated, and MJ8AE windows and glass doosr shaded by an overhang. Refer to Section 19–13 for discussion and examples pertaining to its use.
2) Shade line multiplier values are for August—East at 8 to 9 A.M.; West at 3 to 4 P.M.; South-East at 9 to 10 A.M.; South-West at 2 to 3 P.M. and South at 3 to 4 P.M..

Table 3E-1

Table 1A

Outdoor Design Conditions for the United States

Location	Elevation Feet	Latitude Degrees North	Heating 99% Outdoor Dry Bulb	Cooling						HDD_{65} CDD_{50} Ratio
				Outdoor Air		Design Grains			Daily Range (DR)	
				1% Dry Bulb	Coincident Wet Bulb	55% RH Indoors	50% RH Indoors	45% RH Indoors		
Fort Polk	335	31	30	94	76	37	44	50	M	0.27
Bogalusa	119	30	28	93	77	43	50	57	M	0.29
Bossier City, Barksdale AFB	167	32	27	94	77	42	48	55	M	0.36
Grand Isle	33	29	41	87	78	59	66	73	L	0.13
Houma	9	29	35	93	78	50	56	63	L	0.19
Lafayette Regional AP	43	30	32	93	78	48	55	61	M	0.21
Lake Charles Regional AP	10	30	33	93	78	49	56	62	M	0.21
Leesville, Fort Polk	330	31	30	94	76	36	43	49	M	0.33
Minden	278	32	25	96	76	32	39	46	M	0.44
Monroe Regional AP	82	33	27	95	78	45	52	58	M	0.36
Natchitoches	121	31	26	95	77	40	47	53	M	0.35
New Orleans NAS	0	30	34	91	78	53	60	66	M	0.21
New Orleans IAP	20	30	35	92	78	49	56	63	M	0.18
New Orleans Lakefront AP	10	30	39	92	78	53	60	66	L	0.14
Patterson Memorial	10	30	36	91	76	42	49	55	M	0.19
Salt Point RMOS	10	30	36	91	74	30	36	43	L	0.19
Shreveport, Downtown	180	33	30	97	76	33	40	46	M	0.32
Shreveport Regional AP	259	32	28	95	76	36	43	49	M	0.34
Venice (West Bay, Blind Bay)	39	29	43	87	78	60	67	73	L	0.12
Maine										
Auburn-Lewiston	289	44	-1	84	69	12	19	26	M	3.91
Augusta AP	361	44	1	84	69	12	19	26	M	3.33
Bangor IAP	194	45	-2	84	69	11	18	25	M	3.66
Bar Harbor AWOS	85	44	1	79	66	1	8	15	M	4.65
Brunswick NAS	75	44	2	83	69	12	19	25	M	3.35
Caribou Municipal AP	623	47	-10	81	67	4	11	17	M	6.04
Greenville AMOS	1,037	45	-9	81	66	0	7	14	M	5.42
Houlton IAP	476	46	-11	82	68	6	13	20	M	5.69
Lewiston	358	44	–2	85	70	15	22	29	M	2.99
Limestone, Loring AFB (Arcadia DD)	745	46	–9	80	66	3	9	16	M	3.77
Loring AFB, Limeston	745	47	-10	81	66	3	9	16	M	6.16
Millinocket AP	413	45	–9	83	68	8	14	21	M	4.88
Northern Aroostook Regional AP	1,014	47	-9	79	65	-1	6	13	M	6.74
Portland International I Jetport	62	44	4	84	70	16	22	29	M	3.34
Presque Isle Municipal AP	535	47	-14	82	66	0	6	13	M	6.12
Rockland, Knox AWOS	56	44	3	79	66	5	12	18	M	4.80
Sanford Municipal AP AWOS	243	43	0	85	69	9	16	23	M	3.81
Waterville AWOS	331	45	-1	82	69	13	20	26	M	3.88
Wiscasset Municipal AP	69	44	1	82	69	16	23	29	M	3.90
Maryland										
Andrews AFB	282	39	18	91	74	30	37	43	M	1.12
Balitimore CO	24	39	17	89	76	43	50	56	M	0.80
Baltimore-Washington IAP	154	39	17	91	74	29	36	42	M	1.18
Cumberland	790	39	10	89	74	33	39	46	M	1.57
Fredrick AP	313	39	12	91	75	34	41	48	M	1.11
Hagerstown	704	39	12	91	74	29	36	43	M	1.58
Lexington Park, Patuxent River NAS	39	38	21	90	76	40	47	53	M	0.97
Salisbury Wicomico Co. AP	59	38	18	90	76	41	47	54	M	1.11
Thomas Point	39	39	21	85	76	50	57	63	L	1.07

All Table 2 pages are part of the requirements for this Standard.

Table 2A

Default Performance Values for Generic Fenestration

Heating HTM = U-Value x (Indoor Design Temperature – Outdoor Design Temperature)
Heating Load (Btuh) = HTM x Load Area

Default indoor design temperature = 70°F.
Outdoor design temperature provided by Table 1.
Load area provided with construction number.

Default U-value and SHGC Generic Windows and Glass Doors Clear, Heat Absorbing or Reflective Glass Load Area = Area of Rough Opening (SqFt)	**Type of Frame Construction**							
	Metal No Break		**Metal with Break**		**Wood, Wood with Metal Clad or Vinyl**		**Insulated Fiberglass**	
Number 1 — Clear, Heat Absorbing or Reflective Glass	**U**	**SHGC**	**U**	**SHGC**	**U**	**SHGC**	**U**	**SHGC**
Clear Glass (c)								
1A-c Single pane operable window or sliding glass door	1.27	0.75	1.08	0.75	0.90	0.64	0.81	0.64
1B-c Single pane window, fixed sash	1.13	0.78	1.07	0.78	0.98	0.75	0.94	0.75
1C-c Single pane window with storm (default = 2 pane operable)	0.87	0.67	0.65	0.67	0.57	0.56	0.49	0.56
1D-c Double pane operable window or sliding glass door	0.87	0.67	0.65	0.67	0.57	0.56	0.49	0.56
1E-c Double pane window, fixed sash	0.69	0.69	0.63	0.69	0.56	0.66	0.53	066
1F-Oc Triple pane window or sliding glass door	0.72	0.60	0.51	0.60	0.44	0.51	0.38	0.51
1F-Fc Triple pane window, fixed sash (or any double pane with storm)	0.55	0.62	0.48	0.60	0.42	0.59	0.40	0.59
Heat Absorbing Glass (h)								
1A-h Single pane operable window or sliding glass door	1.27	0.52	1.08	0.52	0.90	0.52	0.81	0.52
1B-h Single pane window, fixed sash	1.13	0.52	1.07	0.52	0.98	0.52	0.94	0.52
1C-h Single pane window with storm (default = 2 pane operable)	0.87	0.44	0.65	0.44	0.57	0.44	0.49	0.44
1D-h Double pane operable window or sliding glass door	0.87	0.44	0.65	0.44	0.57	0.44	0.49	0.44
1E-h Double pane window, fixed sash	0.69	0.44	0.63	0.44	0.56	0.44	0.53	0.44
1F-Oh Triple pane window or sliding glass door	0.72	0.30	0.51	0.30	0.44	0.30	0.38	0.30
1F-Fh Triple pane window, fixed sash (or any double pane with storm)	0.55	0.30	0.48	0.30	0.42	0.30	0.40	0.30
Reflective Glass (r)								
1A-r Single pane operable window or sliding glass door	1.27	0.35	1.08	0.35	0.90	0.30	0.81	0.30
1B-r Single pane window, fixed sash	1.13	0.36	1.07	0.36	0.98	0.34	0.94	0.34
1C-r Single pane window with storm (default = 2 pane operable)	0.87	0.27	0.65	0.27	0.57	0.26	0.49	0.26
1D-r Double pane operable window or sliding glass door	0.87	0.27	0.65	0.27	0.57	0.22	0.49	0.22
1E-r Double pane window, fixed sash	0.69	0.27	0.63	0.27	0.56	0.26	0.53	0.26
1F-Or Triple pane window or sliding glass door	0.72	0.18	0.51	0.18	0.44	0.18	0.38	0.18
1F-Fr Triple pane window, fixed sash (or any double pane with storm)	0.55	0.18	0.48	0.18	0.42	0.18	0.40	0.18
Rated Glass								
1G Products rated and labeled by the NFRC (see Table 3D-1)	See label, NFRC Directory or manufacturer's engineering data.							