



Home Performance Report

T. Smith

Property Address:

115 E. Ogden
Naperville IL



Insight Property Services, Inc

**Joe Konopacki
115 E. Ogden Ave.
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Naperville, IL 60563
630-878-4192**



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Date: 1/1/2013	Time: 09:15 AM	Report ID: HP-111008
Property: 115 E. Ogden Naperville IL	Customer: T. Smith	Real Estate Professional:

Comment Key or Definitions

The following definitions of comment descriptions represent this inspection report. All comments by the inspector should be considered before purchasing this home. Any recommendations by the inspector to repair or replace suggests a second opinion or further inspection by a qualified contractor. All costs associated with further inspection fees and repair or replacement of item, component or unit should be considered before you purchase the property.

Inspected (IN) = I visually observed the item, component or unit and if no other comments were made then it appeared to be functioning as intended allowing for normal wear and tear.

Not Inspected (NI) = I did not inspect this item, component or unit and made no representations of whether or not it was functioning as intended and will state a reason for not inspecting.

Not Present (NP) = This item, component or unit is not in this home or building.

Repair or Replace (RR) = The item, component or unit is not functioning as intended, or needs further inspection by a qualified contractor. Items, components or units that can be repaired to satisfactory condition may not need replacement.

Standards of Practice:

BPI Building Performance Institute

In Attendance:

Homeowner

Type of building:

Single Family (1 story)

Home Faces:

West

Weather:

Clear

Ground/Soil surface condition:

Dry

Safety Items



Customer
T. Smith

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2. Combustion Appliance Zone CAZ

2.6 Water Heater Spillage Test

Unsafe

- +** **Spillage Test Results:** A spillage test was conducted on the water heater under Worst Case Depressurization. According to BPI Technical Standards, combustion appliances may spill fumes for up to 60 seconds upon start up. **Your water heater vent spilled beyond 60 seconds and "Failed" the spillage test.** The spillage was off to the right side and stopped soon after a minute. This is likely due to an obstruction in the exhaust flue and air flow from duct leaks nearby.

2.7 Water Heater Draft Test

Unsafe

- +** **Minimum Draft Pressure Test:** This test is to determine if there is enough "draw" or negative pressure that will remove the toxic exhaust fumes in the flue of the water heater to the outdoor air. **The Draft Pressure reading on the water heater during "Worst Case Depressurization" was -1.8 Pa.** This number should be more negative than the Minimum Required Draft Pressure of **-1.5 Pa.**

Even though the draft pressure was more than the minimum, it is not strong enough to draw away all the exhaust gases resulting in partial exhaust spillage. Recommend the flue and chimney be inspected, cleared of any debris and a liner installed to foster stronger draft. A Combustion Safety Test should be performed after repair are made.

2.10 Summary: Did this home pass the BPI Combustion Appliance Safety Test?

Unsafe

- +** No, this home did not pass due to the exhaust spillage of the water heater. While there is not evidence of any immediate danger, these problems should eventually be addressed due to the increased risk of safety

2. Combustion Appliance Zone CAZ

concerns of the occupants of the home. It is recommended these repairs be performed by a qualified contractor. Please contact me with any questions you have.

2.12 Gas Meter/Pipe leaks (inside)

Unsafe

- ⊕ Gas leaks were detected and tagged near the water heater and furnace. A qualified individual should repair and re-test the gas leaks as soon as possible.

2.13 Chimney, Flue & Vent Piping (gas water heaters or heat systems)

Unsafe

- ⊕ The water heater flue and chimney should be cleared of debris and a continuous liner should be installed. This will keep the flue clear of debris and foster a stronger draft for the water heater.

2.16 Change gas dryer vent pipe to metal (solid, flexible)

Unsafe

- ⊕ The dryer vent pipe is made of vinyl and can burn. Recommend upgrading to metal duct, solid or flexible.

2.18 CO Detector

Unsafe

- ⊕ The average service life of a carbon monoxide detector is 2-3 yrs. Be sure to replace batteries yearly and replace the units entirely after 3 years. Recommend one CO detector near each CO source (**water heater** / furnace, kitchen) and one within 15 feet of the bed rooms.

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Workscope Phase 1



Customer

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Naperville IL

This Summary is not the entire report. The complete report may include additional information of concern to the customer. It is recommended that the customer read the complete report.

4. Building Enclosure Performance/Ventilation

4.1 Home Air Leakage measurement (CFM@50)

Action Recommended



The blower door measured **3,800 CFM50** of air being pulled in through air leaks in your home's Building Envelope. This air is coming in through gaps, cracks, cavities in and around the components that make up the home's Building Envelope (which is typical of all homes that have not been air sealed). A conversion calculation was done to estimate your home's "Natural" Air Changes per Hour of **0.6 ACHn**. The entire volume of air in you home is exchanged approximately once every **1.68 hour(s)**. The goal is 1 air change every 3 hours or .35 ACHn.

4.4 Room Pressure Test (leaks to outside) during Blower Door test

Action Recommended



With the home depressurized to -50 Pa, rooms were closed and the pressure difference measured tells how much pressure relief is resulting from leaks to the outside. 0 is no leaks. 50 is "open door" leaky.

The basement leakage was a very significant 23 Pa, much of it coming by way of the exterior wall cavities and other bypasses leading to the attic. (28.5 Pa measured in the kitchen was largely from the open door to the basement.)

4.6 Exhaust Fans (bathroom, dryer, etc.) and venting

Action Recommended



It is recommended that every bathroom with a tub or shower have a high-quality, quiet (<1.5 sones), 80+cfm exhaust fan installed. These fans should be exhausted to the outdoors by way of insulated ducting

4. Building Enclosure Performance/Ventilation

through a roof mounted, dampered vent. A fan should be installed in the 1st floor bathroom before any insulation is added to the attic.

4.7 Exhaust hood for gas cooktops/stove and vented to the outside

Action Recommended

- The existing kitchen fan moves an impressive 250+ cfm of air! However, the fan is not positioned well to draw off odors, gases and moisture from cooking. And the fan exhausts into the attic, moving insulation and allowing moisture to condense inside the attic.

When the kitchen is remodeled, a vent hood should be installed above the stove and its exhaust should be vented to the outside through a proper exterior, dampered vent.

4.8 Modify Attic Ventilation

Action Recommended

- Ventilation of the attic is important for two reasons, temperature and moisture control. During the summer, ventilation reduces heat that builds up in the attic during the day. Ventilation also manages moisture produced within the home that moves into the attic through gaps in the ceiling air barrier, removing it before it can condense and cause damage.

The attic currently does not contain vent chutes wind baffles. Recommended to install vent chutes with wind baffles between each rafter and seal the perimeter top plates with 2-part foam. This will halt wind washing through the insulation and ensure a clear ventilation space. Sealing the wind baffles at the perimeter wall will also seal the leakage gap between the inside brick and the plaster walls. **See Item 6.5**

4.9 Pests In Attic

Action Recommended

- Evidence of mice or other small rodents, including tunnels, trails and debris, can be found throughout the attic. Rodents bring disease and waste into a home which adversely affects Indoor Air Quality. Recommend a qualified individual determine if this is an active issue and exterminate or remove the pests.

Alternately, the existing insulation may be vacuumed out of the attic, removing the pests, soiled insulation and debris. This also provides a clean 'pallet' for installing attic vent chutes at the eaves, sealing the air gap at the perimeter brick wall and air sealing the ceiling before re-insulating the attic

4.10 Other Safety Items

Action Recommended

- There is no bonding wire across the copper pipe section above the water meter. The dielectric unions effectively break the 'ground' that water pipes generally provide. A bonding wire, similar to that attached across the water meter should be installed across the copper pipe, from the galvanized pipes above and below. Recommend a qualified electrician complete this and inspect the rest of the electrical system for any other grounding or bonding issues. This may be coordinated with the relocation of the electrical service during the addition project.

6. Air Control Layers

6.1 Air seal the attic top plates, electrical and plumbing penetrations

Repair or Replace

- As the framing in a home dries over the years, the top plates of both interior and exterior walls allow large amounts of air to leak from the wall cavity and up into the attic. Recommend that these areas be sealed with a 2-part foam spray.

6. Air Control Layers

Penetrations in the form of plumbing penetrations, electrical conduit, boxes and fixtures should be exposed and sealed before additional insulating. The tops of pocket doors should also be air sealed from the attic above.

6.2 Soffits below non-conditioned space

Repair or Replace



The top of the soffit should be covered with foam board and sealed to the framing and drywall to create a continuous air tight sealing, the air barrier between the conditioned space and the unconditioned attic. Recommend having a qualified contractor air seal, and insulate the soffit.

6.3 Seal/Insulate Attic Access

Repair or Replace



The attic hatch should be air sealed and insulated. The casing should be fastened securely to the ceiling and caulked at all corners & seams. Weather strip should be installed where the cover sits on the casing. The cover should have 8" of foam board fastened to the top, resulting in an R-40 assembly.

The 1% of uninsulated attic hatch area degrades the overall performance of the attic insulation by more than 30%.

6.5 Thermal bypasses (between floors)

Repair or Replace



The home is double wythe brick construction with a 3/4" furring strip interior upon which the sheetrock and plaster wall is attached. These furring strips create continuous cavities from the basement to the attic, through which air enters and leaves the home, resulting in heat gain or heat loss. The space is too small to cost effectively insulate but can be sealed with expanding foam at the attic or basement (or both) to stop this uncontrolled air flow. This bypass is the single largest air leak in the home.

Considering the basement is largely finished, this area is best accessed from the attic, along the exterior wall and may be sealed as part of installing and sealing vent chutes with wind baffles into place. **See Item 4.8**

6.6 Walls as an Air Control Layer (paneling, beadboard, etc.)

Repair or Replace



The pass through mail box is a significant source of leakage in the home and should be insulated, sealed off and removed (interior door at least). An exterior mounted mailbox would need to be installed in its place.

7. Thermal Layer

7.1 Recommended additional attic insulation

Repair or Replace



The attic currently has blown fiberglass insulation at about R - 10-15, below the current code minimum of R-38. Recommend the attic be insulated to a more cost effective R 50-60 with blown cellulose (settles to an air-impermeable mass - unlike fiber glass), **only after air sealing and attic ventilation** issues have been completed.

The high seasonal electric bills are largely the result of heat gain from the under ventilated and poorly insulated attic. Proper ventilation limits the heat gain of the attic during the day and allows the heat to dissipate more quickly at night. Increasing insulation to R-50+, using a non-air permeable insulation (cellulose or spray foam) will halt the transfer of heat from the attic to the conditioned space below.

7. Thermal Layer

Considering the front of the home faces West, integrating plantings and/or window shades will help limit the solar heat gain from the late day sun.

Building Analysts are not required to report on the following: Life expectancy of any component or system; The causes of the need for a repair; The costs of corrections; Any component or system that was not observed; The presence or absence of pests such as wood damaging organisms, rodents, or insects; or Cosmetic items, underground items, or items not permanently installed. Building Analysts are not required to: Offer warranties or guarantees of any kind; Calculate the strength, adequacy, or efficiency of any system or component; Enter any area or perform any procedure that may damage the property or its components or be dangerous to the Building Analyst or other persons; Operate any system or component that is shut down or otherwise inoperable; Operate any system or component that does not respond to normal operating controls; Disturb insulation, move personal items, panels, furniture, equipment, plant life, soil, snow, ice, or debris that obstructs access or visibility; Determine the presence or absence of any suspected adverse environmental condition or hazardous substance, including but not limited to mold, toxins, carcinogens, noise, contaminants in the building or in soil, water, and air; Determine the effectiveness of any system installed to control or remove suspected hazardous substances; Predict future condition, including but not limited to failure of components.

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Workscope Phase 2

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6. Air Control Layers

6.7 Air seal Baseboards

Repair or Replace

Some air leakage was detected along the baseboards. Air sealing wall air bypasses at the attic and/or basement will likely halt most of this baseboard leakage. Any remaining leakage after air sealing may be sealed with a clear, paintable caulk.

6.8 Windows: Air leakage, seals and caulking

Inspected

The older windows in the home have some air leakage where the sashes meet in the middle and in some areas around the casing. New weather strip and clear, paintable caulk would halt this leakage. Recommend major air sealing work and the addition be completed before a follow up leakage test is performed and remaining leaks be identified & sealed.

The new windows show no leakage and seem to have been installed well.

1. Owner/Occupant Interview

Styles & Materials

Are you able to provide Insight with floor plans of your home?:

Yes

How many people live in your home?:

1

What structural changes have been done and about when?:

No

Are there any hot spots in the home? Where?:

Yes

Have you ever noticed ice damming or icicles?:

Unknown

Are there any open fireplaces gas logs or un-vented appliances in the home?:

No

Does anyone in your home have frequent headaches?:

Yes

Extra Info : When first moved in - had air ducts cleaned - better now

Do you humidify your home in winter?:

Yes

Extra Info : Aprilaire

Do you have any existing mold mildew or excessive moisture concerns?:

Yes

Extra Info : bathroom over shower - no fan.

Approximately how old is your home?:

1955

How many bedrooms and bathrooms?:

3 bed
2 bath

Do you plan on any extensive remodeling or additions to the home?:

Yes

Description : Addition

Are there any cold spots in the home? Where?:

Unknown

Do you have pets indoors?:

None

Do you smoke tobacco products indoors?:

No

Do you feel like you have excessive dust in your home?:

Yes

Extra Info : ...but having work done as well.

Do your windows sweat in summer or winter?:

Unknown

What issues have the highest priority for improvement/resolution?:

Utility bills

Extra Info : Lower electric bill

Approximately how long have you lived in your home?:

less than 1 year

Number of years : since July 22

Do you plan to stay in your home for 5 years or more?:

Yes

Do you have any energy bill concerns?:

Yes

Cooling during summer

Do you feel like your home is drafty? Where?:

Yes

Windows

Are there pet access doors to the outside?:

No

Do you sometimes smell sewer soil or musty odors?:

No

Does anyone in your home experience dry sinuses in winter?:

Unknown

Have you noticed any additional (non-window) condensation in your home?:

Unknown

Items

2. Combustion Appliance Zone CAZ

Styles & Materials

CAZ Location (s):

Basement

Outside Temperature:

50 degrees F

Minimum Draft Pressure:

-1.5 pascals

CAZ Depressurization Limit (BPI Table):

-2 pascals

Worst Case CAZ Depressurization:

-1.6 pascals

Worst Case Depressurization Factors:

Exhaust fans
Hood vent (to outside)
Dryer near the CAZ
Air handler ON

Water Heater Temperature at Steady State:

310 degrees F

Water Heater CO ppm at Steady State:

5 ppm

Water Heater Draft Pressure Reading:

-1.8 pascals

Heat System Temperature at Steady State:

96 degrees F

Heat System CO ppm at Steady State:

8 ppm

Items

2.0 Baseline CO (outside main entrance of home)

Inspected

The baseline test for **carbon monoxide outside** your home was **0 ppm**.

2.1 Measurement of CO (ppm) upon entering home

Inspected

The baseline test for **carbon monoxide inside** your home was **0 ppm**.

2.2 Combustion appliance minimum required Draft Pressure

Inspected

This test is conducted indoors but is based on the outside temperature and determines a minimum draft test limit for the venting capability of the combustion appliances inside at the CAZ (Combustion Appliance Zone). The Minimum draft test limit used on this home at time of inspection is **-1.5 (Pa)**.

2.3 CAZ Depressurization limit

Inspected

The Depressurization Limit of your Combustion Appliance Zone (CAZ) is **-2 Pa**. This number is determined by the type or types of combustion appliances in your home and how they are currently vented. Using BPI Standards (Building Performance Institute), the number given (in units of air pressure called Pascal or Pa) is the maximum depressurization allowed in the combustion appliance zone under a worst case scenario. The Building Analyst, using the home's exhaust fans, air handler and doors, created a scenario that generated the most negative pressure possible near the gas appliances in order to determine if your appliances will continue to remove their toxic exhaust to the outdoor air, or if they will spill exhaust and CO back into your home.

2.4 CAZ Base Pressure (WRT outside)

Inspected

The base (starting) pressure for this Combustion Appliance Zone (CAZ) test is **-1.3 Pa**. This number was obtained by using the Manometer in the CAZ with reference to the outside. This number is used to determine the Net Worst Case Depressurization.

2.5 Worst Case Depressurization using the home's mechanical ventilation equipment

Inspected

Atmospherically vented combustion appliances are susceptible to exhaust spillage because they do not create a strong draft. A strong negative pressure (ie. air being sucked into the return ducts at the open filter slot) can draw air down the flue causing its exhaust to spill into the home. We created a Worst Case Depressurization of

-1.6 Pa by using the home's exhaust fans & air handler and closing certain doors. This is within the limit of **-2 Pa**. A follow-up Combustion Safety Test should be completed after any air sealing work or changes to the mechanical or ventilation systems.

2.6 Water Heater Spillage Test

Unsafe

+ **Spillage Test Results:** A spillage test was conducted on the water heater under Worst Case Depressurization. According to BPI Technical Standards, combustion appliances may spill fumes for up to 60 seconds upon start up. **Your water heater vent spilled beyond 60 seconds and "Failed" the spillage test.** The spillage was off to the right side and stopped soon after a minute. This is likely due to an obstruction in the exhaust flue and air flow from duct leaks nearby.

2.7 Water Heater Draft Test

Unsafe

+ **Minimum Draft Pressure Test:** This test is to determine if there is enough "draw" or negative pressure that will remove the toxic exhaust fumes in the flue of the water heater to the outdoor air. **The Draft Pressure reading on the water heater during "Worst Case Depressurization" was -1.8 Pa.** This number should be more negative than the Minimum Required Draft Pressure of **-1.5 Pa**.

Even though the draft pressure was more than the minimum, it is not strong enough to draw away all the exhaust gases resulting in partial exhaust spillage. Recommend the flue and chimney be inspected, cleared of any debris and a liner installed to foster stronger draft. A Combustion Safety Test should be performed after repair are made.



2.7 Picture 1

2.8 Water Heater CO at Steady State

Inspected

CO Output Test: The CO output of the water heater at steady state temperature was measured at **5 ppm**. CO less than 25 ppm is ideal. 26-100 ppm recommends a cleaning and adjustment. 100+ ppm requires the unit be thoroughly serviced, cleaned and adjusted by a qualified technician.

2.9 Heat System CO at Steady State

Inspected

CO Output Test: The CO output of the at steady state temperature was measured at **8 ppm**. **CO less than 25 ppm is ideal.** 26-100 ppm recommends a cleaning and adjustment. 100+ ppm requires the unit be thoroughly serviced, cleaned and adjusted by a qualified technician.

2.10 Summary: Did this home pass the BPI Combustion Appliance Safety Test?

Unsafe

- + No, this home did not pass due to the exhaust spillage of the water heater. While there is not evidence of any immediate danger, these problems should eventually be addressed due to the increased risk of safety concerns of the occupants of the home. It is recommended these repairs be performed by a qualified contractor. Please contact me with any questions you have.

2.11 Gas Meter/Pipe leaks (outside)

Inspected

2.12 Gas Meter/Pipe leaks (inside)

Unsafe

- + Gas leaks were detected and tagged near the water heater and furnace. A qualified individual should repair and re-test the gas leaks as soon as possible.



2.12 Picture 1



2.12 Picture 2

2.13 Chimney, Flue & Vent Piping (gas water heaters or heat systems)

Unsafe

- + The water heater flue and chimney should be cleared of debris and a continuous liner should be installed. This will keep the flue clear of debris and foster a stronger draft for the water heater.

2.14 Duct Leakage Effecting CAZ Pressures (Filter Covers, Return/Supply Grills, Leaks, etc)

Inspected

2.15 Identify any fire hazards and/or VOC pollutants in the CAZ

Inspected

2.16 Change gas dryer vent pipe to metal (solid, flexible)

Unsafe

- + The dryer vent pipe is made of vinyl and can burn. Recommend upgrading to metal duct, solid or flexible.

2.17 Smoke Detector

Inspected

The average service life of a smoke detector is 10 yrs. Be sure to replace batteries yearly and replace the units entirely after 10 years. Recommend one smoke detector per floor and one within 15 feet of the bed rooms.

2.18 CO Detector

Unsafe

+ The average service life of a carbon monoxide detector is 2-3 yrs. Be sure to replace batteries yearly and replace the units entirely after 3 years. Recommend one CO detector near each CO source (**water heater / furnace, kitchen**) and one within 15 feet of the bed rooms.

3. Heating / Cooling Performance

Styles & Materials

Number of Heat Systems (excluding wood): One	Heating System Type(s): Forced Air	Heating System Energy Source(s): Natural gas
Heating System Brand (Model & Age): LENNOX Model #; Age(MFR Date) : G32Q3752; 2001	Heating System Efficiency (AFUE): 93%	Heating System Capacity (Btu): 75,000
Heating System AGA Venting category: Sealed Combustion (gets air from outside) 4 (+ pressure, condensing, mfr-special vent, over 93% efficient)	Filter Type: Disposable	Filter Size: 21x24x7.5
Ductwork: Non-insulated	Cooling Equipment Type: Forced air - split system	Cooling Equipment Energy Source: Electricity
Central Air Manufacturer (Model & Age): LENNOX Model #; Age(MFR date) : HS29-030-2P; ~2003	Central Air Capacity (Tons of AC): 2.5 Ton SEER (efficiency) : 10	Water Heater Location: Basement
Water Heater Power Source: Gas (quick recovery)	Water Heater Manufacturer (Model & Age): GE Model #; Age(MFR Date) : SG04T12AA01; 1/2003	Water Heater Capacity (Volume): 40 Gallon (1-2 people)
Water Heater Capacity (Btu): 40,000	Water Heater AGA Venting category: Open Combustion (gets air from the CAZ) 1 (- pressure, non-condensing, standard venting, 56% or less efficient)	Number of Operable Fireplaces: None

Items

3.0 Heating Performance

Inspected

The furnace is about 10 years old, 93% efficient and seems to be functioning well. Recommend the filters be changed regularly (as often as once a month with pets in the home) and the unit be serviced regularly (twice a year) to ensure continued proper function.



3.0 Picture 1



3.0 Picture 2

3.1 Cooling Performance

Inspected

The air conditioner is at least 8 years old, of an estimated life span of 20 yrs. The unit would benefit from regular cleaning and service. Debris and lint hinder airflow and increase the load on the unit, resulting in decreased efficiency and service life of the units. Recommend the unit be cleaned by a qualified HVAC technician before the air conditioning is used next summer.



3.1 Picture 1

3.2 Water Heater Performance

Inspected

The existing water heater is 8 years old of a typical life span of 12-15 years. Should a repair costing more than \$200 be needed or the unit starts to leak, strongly recommend upgrading to a power vented, tanked water heater. These units provide greater efficiency and combustion safety for a marginally greater cost. Sealed combustion, tank-less units can supply an 'endless' stream of hot water, although their greater initial cost results in a longer payback period. Both types of water heaters are more energy efficient and they eliminate combustion safety risks due to exhaust spillage.



3.2 Picture 1

3.3 Normal Operating Controls

Inspected

3.4 Automatic Safety Controls

Inspected

3.5 Filter Effectiveness

Inspected

3.6 Duct Leaks (Outside of Conditioned Space)

Inspected

3.7 Duct Issues

Not Present

4. Building Enclosure Performance/Ventilation

Styles & Materials

Conditioned Space Volume (ft3):

20,670 Cubic Feet

Conditioned Space Floor

Area (ft2):

2,584 Square Feet

Blower Door

Diagnostics:

Measurement at CFM50=

3,800

Air Changes per hour

ACH50= 11.03

Natural Air Changes per hour= 0.6 CFMn

Hours per Air Change =

1.68 hours

MVR Minimum Ventilation Requirement

ASHRAE 62.2- 2007:

Option 1: CFM Fan Flow using MVG 56 CFM

Total Mechanical Exhaust

Capacity CFM:

Mechanical Exhaust Capacity = 313

CFM

Range Hood Exhaust:

Exhausts to Attic

Attic Ventilation:

Soffit Vents

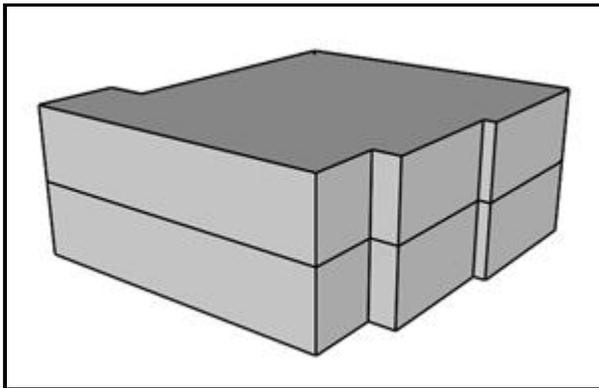
Fixed ("mushroom") vents

Items

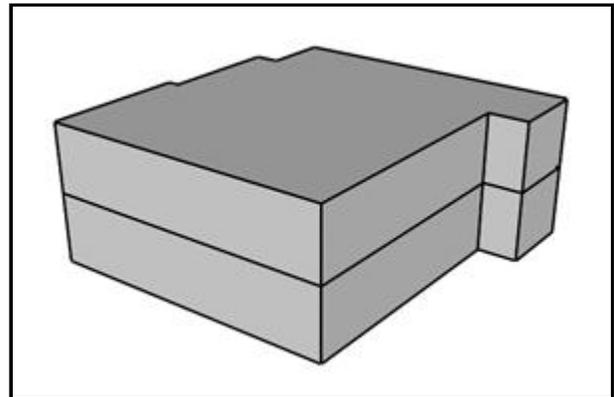
4.0 Rough outline of Air/Thermal boundary

Surveyed

The "Thermal Boundary" of your home is what separates the conditioned air inside from the outside air, attic or attached garage. Typically the thermal boundary is made up of an air control layer (like gypsum board) and a thermal control layer (insulation). A thermal boundary has 6 sides (top, bottom, front, back and two sides). Anywhere along the thermal boundary that is not aligned properly (gaps or missing areas), energy loss can occur. Summer heat gain and winter heat loss can result from uncontrolled heat flow and air flow through these breaks in the thermal boundary. It is important to preserve and complete the air & thermal boundary by air sealing and insulating when remodeling.



4.0 Picture 1 NW

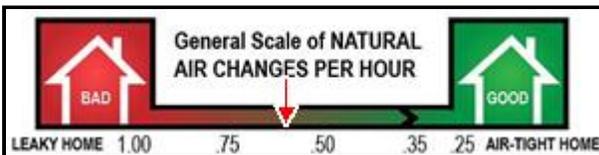


4.0 Picture 2 SE

4.1 Home Air Leakage measurement (CFM@50)

Action Recommended

The blower door measured 3,800 CFM50 of air being pulled in through air leaks in your home's Building Envelope. This air is coming in through gaps, cracks, cavities in and around the components that make up the home's Building Envelope (which is typical of all homes that have not been air sealed). A conversion calculation was done to estimate your home's "Natural" Air Changes per Hour of 0.6 ACHn. The entire volume of air in you home is exchanged approximately once every 1.68 hour(s). The goal is 1 air change every 3 hours or .35 ACHn.



4.1 Picture 1



4.1 Picture 2

4.2 Minimum Ventilation Requirement (MVR) - Safety Concerns

Surveyed

MVR for this building = 56 cfm of continuous air flow

The Minimum Ventilation Requirement (MVR) is a number of cubic feet per minute (cfm) of air the building needs to be safe and habitable for the occupants. It is derived from a formula based on several factors such as the volume of the home; number of occupants, geographic area, exposure to wind etc. and the larger cfm number is used as the MVR. A home can be sealed as tight as possible as long as you have continuous mechanical ventilation of at least the minimum CFM as described above.

4.3 Air Sealing and Mechanical Ventilation

Surveyed

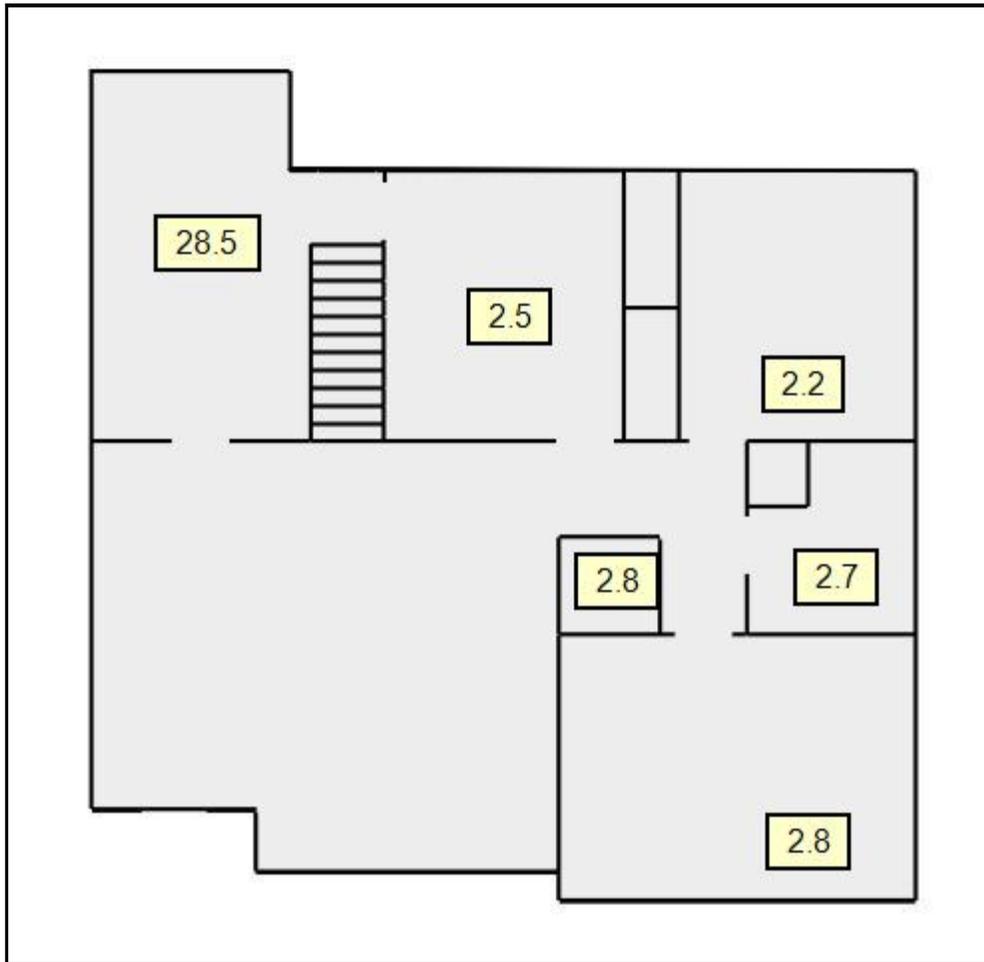
Currently the home experiences good air exchange rates through air leakage. For energy efficiency and comfort improvement, air sealing should be done. This will result in a reduction in natural ventilation which can be made up by mechanical means. Running a bath fan for some portion of the day would satisfy the ventilation requirements. The exact amount of ventilation needed will be determined by how successful air sealing efforts are.

4.4 Room Pressure Test (leaks to outside) during Blower Door test

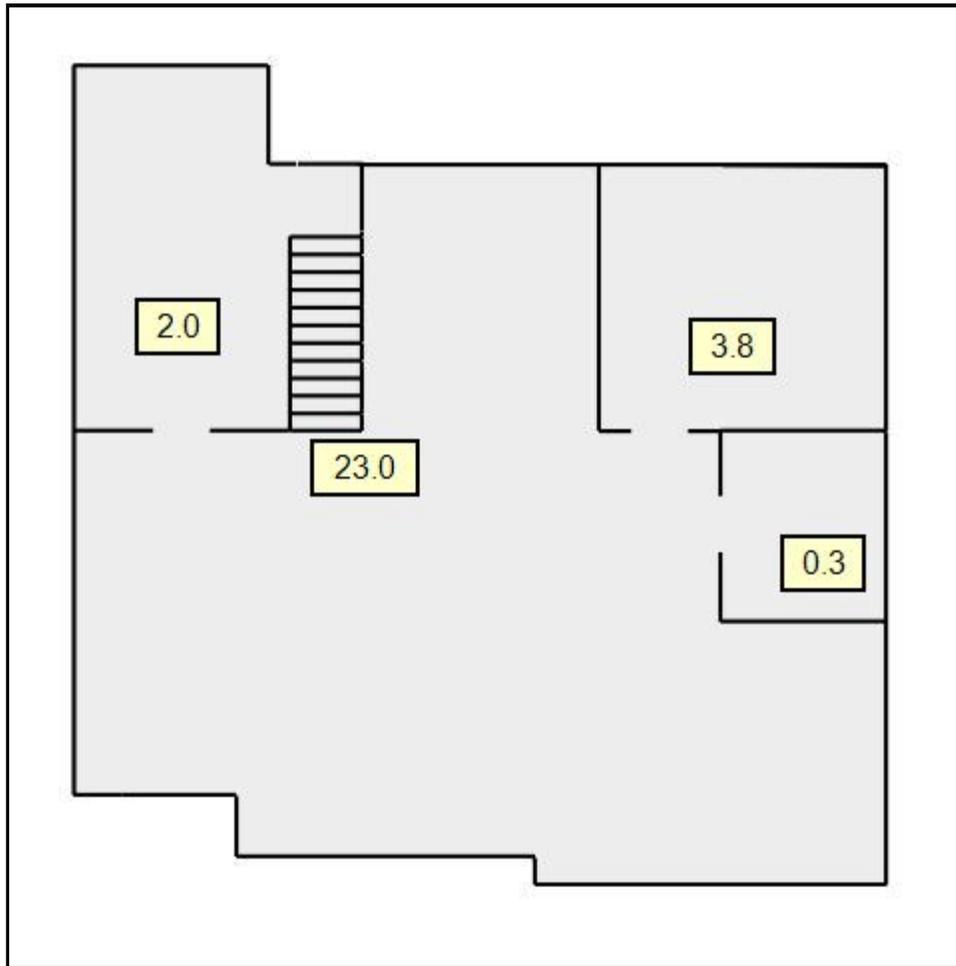
Action Recommended

 With the home depressurized to -50 Pa, rooms were closed and the pressure difference measured tells how much pressure relief is resulting from leaks to the outside. 0 is no leaks. 50 is "open door" leaky.

The basement leakage was a very significant 23 Pa, much of it coming by way of the exterior wall cavities and other bypasses leading to the attic. (28.5 Pa measured in the kitchen was largely from the open door to the basement.)



4.4 Picture 1 1st Floor Air Leakage



4.4 Picture 2 Basement Air Leakage

4.5 Room Pressure test with Air handler

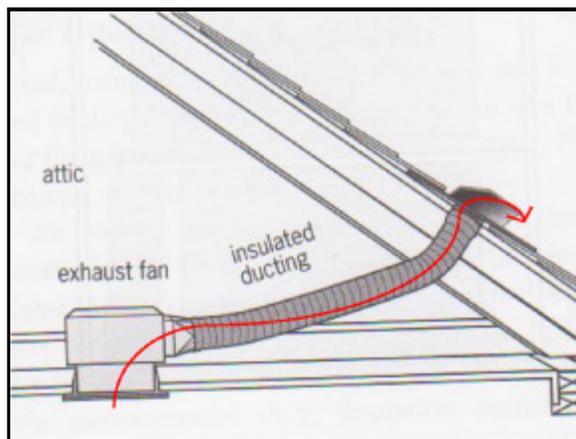
Surveyed

No significant pressure imbalances were found in the rooms while the air handler was running.

4.6 Exhaust Fans (bathroom, dryer, etc.) and venting

Action Recommended

- It is recommended that every bathroom with a tub or shower have a high-quality, quiet (<1.5 sones), 80+cfm exhaust fan installed. These fans should be exhausted to the outdoors by way of insulated ducting through a roof mounted, dampered vent. A fan should be installed in the 1st floor bathroom before any insulation is added to the attic.



4.6 Picture 1

4.7 Exhaust hood for gas cooktops/stove and vented to the outside

Action Recommended

- The existing kitchen fan moves an impressive 250+ cfm of air! However, the fan is not positioned well to draw off odors, gases and moisture from cooking. And the fan exhausts into the attic, moving insulation and allowing moisture to condense inside the attic.

When the kitchen is remodeled, a vent hood should be installed above the stove and its exhaust should be vented to the outside through a proper exterior, dampered vent.



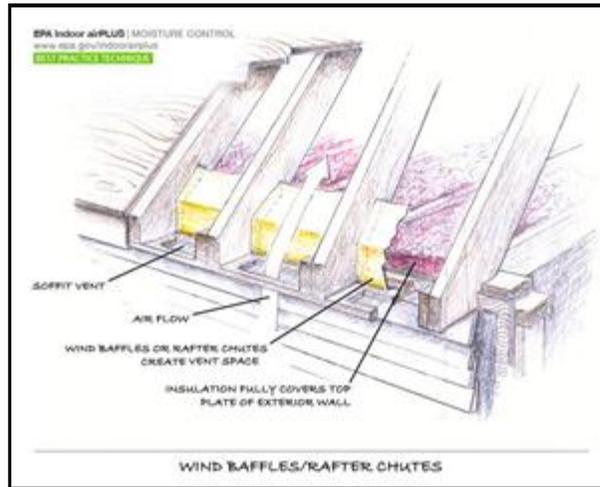
4.7 Picture 1

4.8 Modify Attic Ventilation

Action Recommended

- Ventilation of the attic is important for two reasons, temperature and moisture control. During the summer, ventilation reduces heat that builds up in the attic during the day. Ventilation also manages moisture produced within the home that moves into the attic through gaps in the ceiling air barrier, removing it before it can condense and cause damage.

The attic currently does not contain vent chutes with wind baffles. Recommended to install vent chutes with wind baffles between each rafter and seal the perimeter top plates with 2-part foam. This will halt wind washing through the insulation and ensure a clear ventilation space. Sealing the wind baffles at the perimeter wall will also seal the leakage gap between the inside brick and the plaster walls. **See Item 6.5**



4.8 Picture 1

4.9 Pests In Attic

Action Recommended

Evidence of mice or other small rodents, including tunnels, trails and debris, can be found throughout the attic. Rodents bring disease and waste into a home which adversely affects Indoor Air Quality. Recommend a qualified individual determine if this is an active issue and exterminate or remove the pests.

Alternately, the existing insulation may be vacuumed out of the attic, removing the pests, soiled insulation and debris. This also provides a clean 'pallet' for installing attic vent chutes at the eaves, sealing the air gap at the perimeter brick wall and air sealing the ceiling before re-insulating the attic

4.10 Other Safety Items

Action Recommended

There is no bonding wire across the copper pipe section above the water meter. The dielectric unions effectively break the 'ground' that water pipes generally provide. A bonding wire, similar to that attached across the water meter should be installed across the copper pipe, from the galvanized pipes above and below. Recommend a qualified electrician complete this and inspect the rest of the electrical system for any other grounding or bonding issues. This may be coordinated with the relocation of the electrical service during the addition project.



4.10 Picture 1



4.10 Picture 2

5. Exterior Moisture Management

Styles & Materials

Viewed roof covering from:
Ground

Roof Covering:
3-Tab fiberglass

Roof Covering Color:
Medium

Chimney (exterior):
Brick

Siding Style:
Brick

Siding Material:
Full brick

Foundation:
Poured concrete

Items

5.0 Roof Covering and Penetrations

Inspected

5.1 Flashings, Gutters and Drainage

Inspected

The gutters are in fair condition and seem to be managing rain water effectively. Recommend monitoring during rain events to determine whether additional downspouts are needed (wherever rain is spilling over gutters).

5.2 Grading not directing water away from structure

Inspected

5.3 Roof/Wall Junctions (Kick-out flashing)

Not Present

5.4 Siding and Trim

Inspected

5.5 Porch Stoop/Flooring or Steps allowing water to enter the building

Inspected

5.6 Foundation/Slab showing evidence of ground water intrusion

Inspected

6. Air Control Layers

Styles & Materials

Ceiling Materials:
Sheetrock

Wall Material:
Sheetrock

Floor Material:
Concrete Slab (Lower Level)

Items

6.0 Recessed lights (regarding safely insulating, air sealing or replacing with IC Rated)

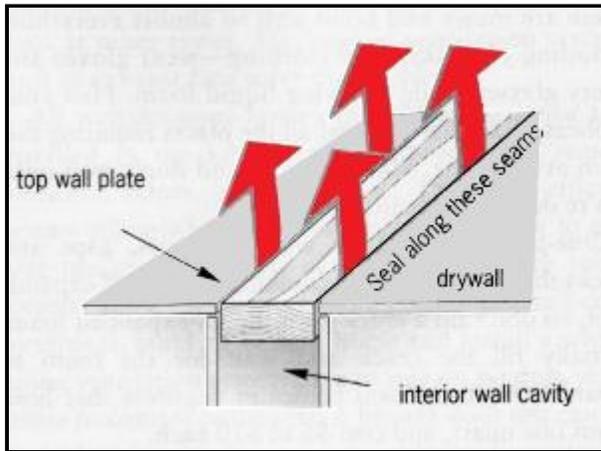
Not Present

6.1 Air seal the attic top plates, electrical and plumbing penetrations

Repair or Replace

 As the framing in a home dries over the years, the top plates of both interior and exterior walls allow large amounts of air to leak from the wall cavity and up into the attic. Recommend that these areas be sealed with a 2-part foam spray.

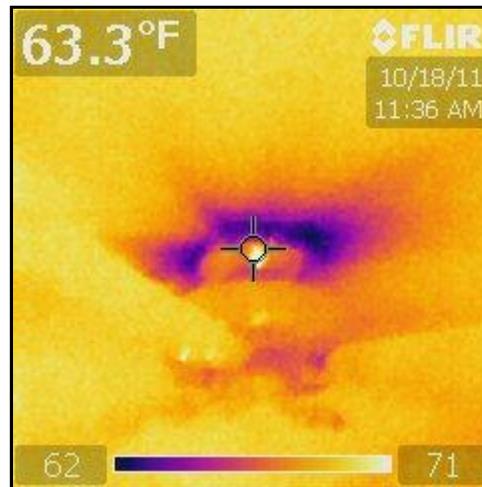
Penetrations in the form of plumbing penetrations, electrical conduit, boxes and fixtures should be exposed and sealed before additional insulating. The tops of pocket doors should also be air sealed from the attic above.



6.1 Picture 1



6.1 Picture 2

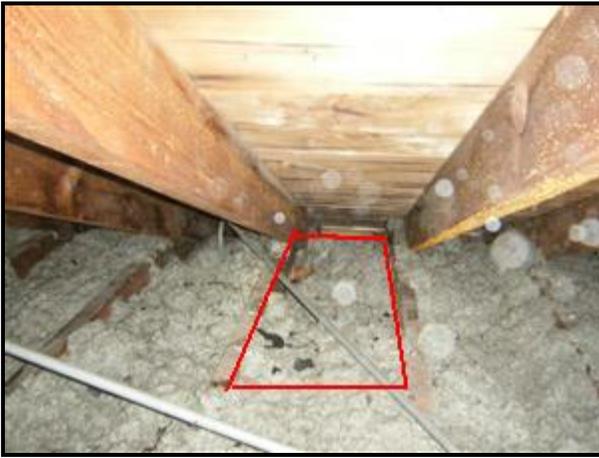


6.1 Picture 3

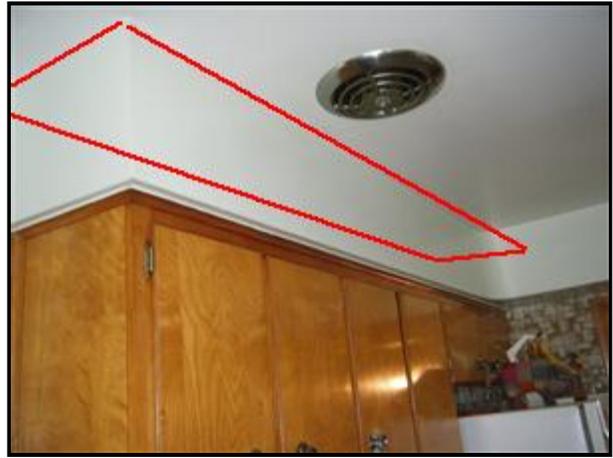
6.2 Soffits below non-conditioned space

Repair or Replace

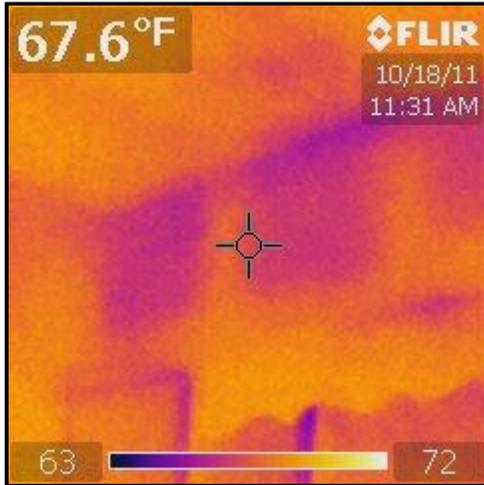
- The top of the soffit should be covered with foam board and sealed to the framing and drywall to create a continuous air tight sealing, the air barrier between the conditioned space and the unconditioned attic. Recommend having a qualified contractor air seal, and insulate the soffit.



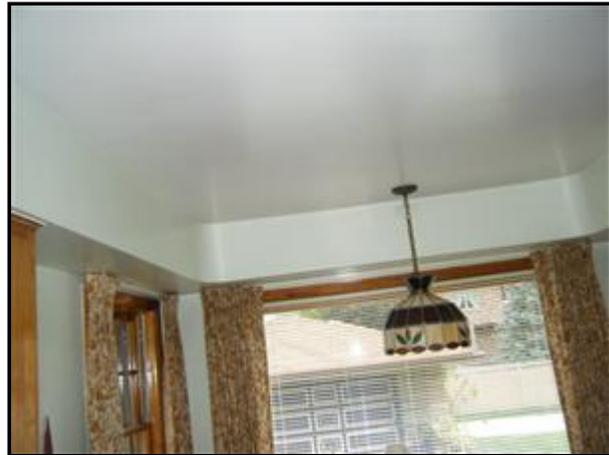
6.2 Picture 1



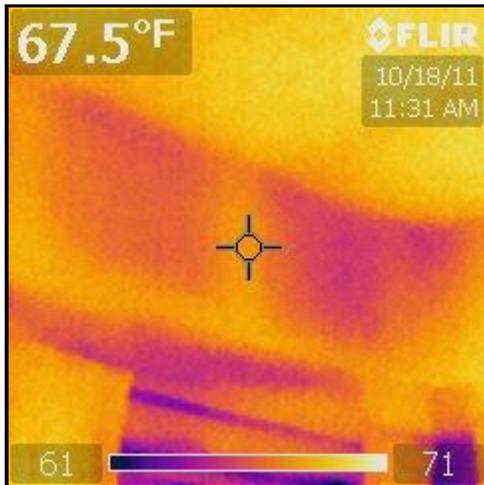
6.2 Picture 2



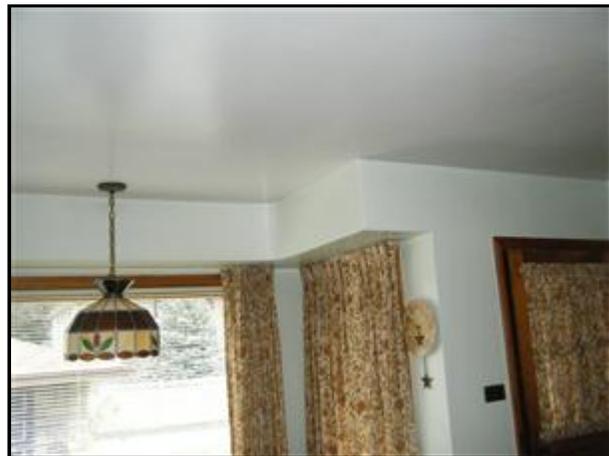
6.2 Picture 3



6.2 Picture 4



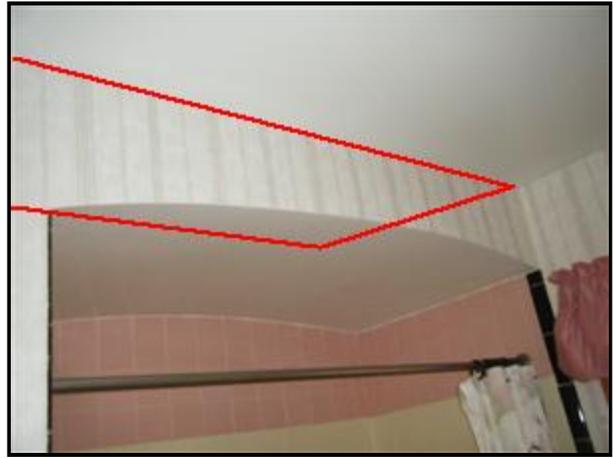
6.2 Picture 5



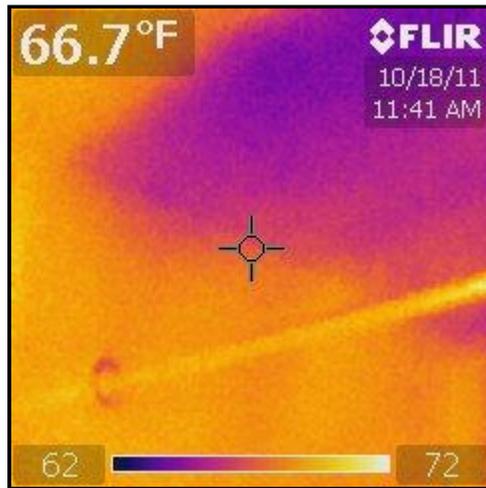
6.2 Picture 6



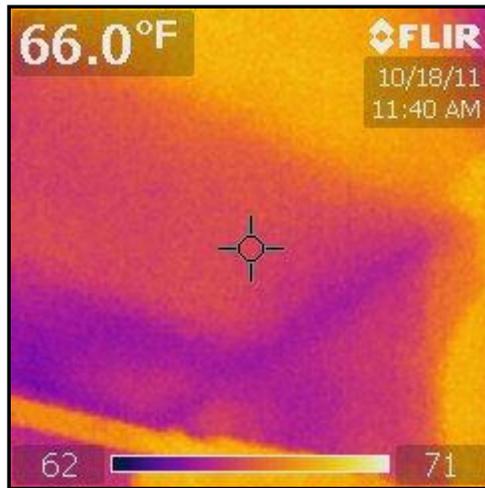
6.2 Picture 7



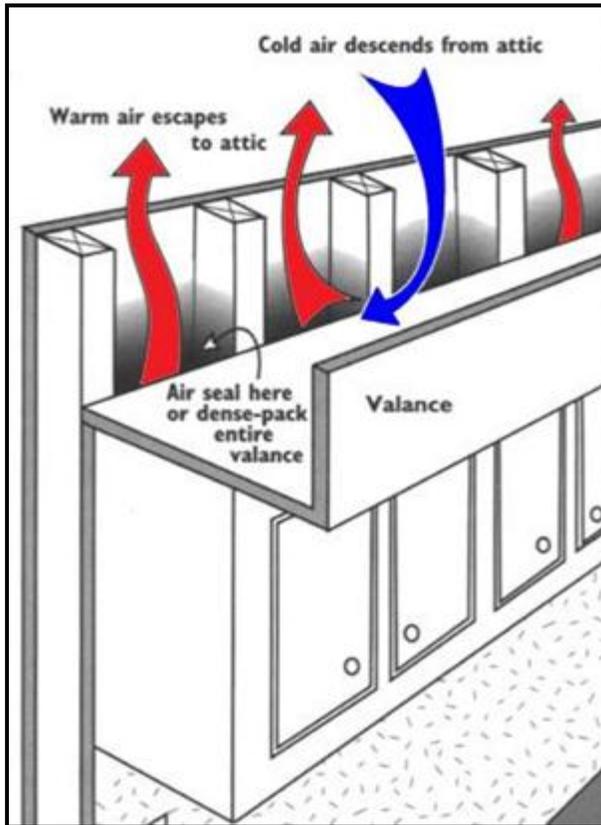
6.2 Picture 8



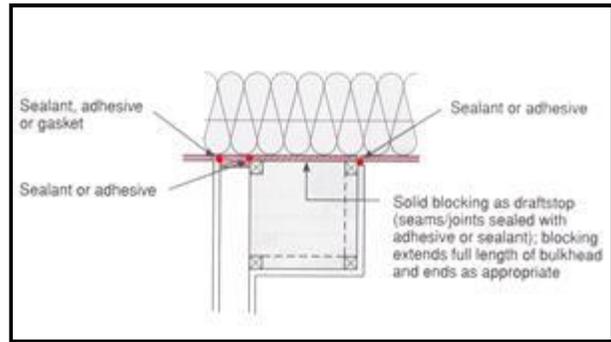
6.2 Picture 9



6.2 Picture 10



6.2 Picture 11



6.2 Picture 12

6.3 Seal/Insulate Attic Access

Repair or Replace

 The attic hatch should be air sealed and insulated. The casing should be fastened securely to the ceiling and caulked at all corners & seams. Weather strip should be installed where the cover sits on the casing. The cover should have 8" of foam board fastened to the top, resulting in an R-40 assembly.

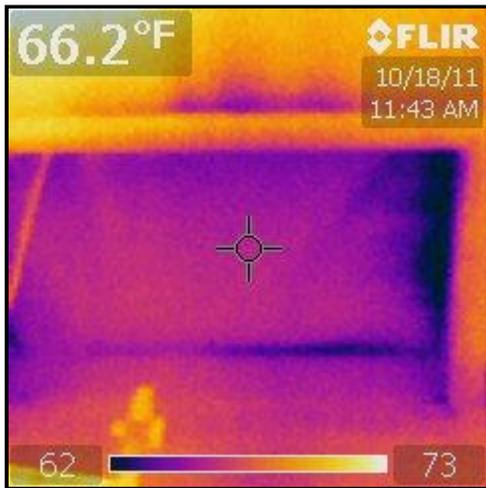
The 1% of uninsulated attic hatch area degrades the overall performance of the attic insulation by more than 30%.



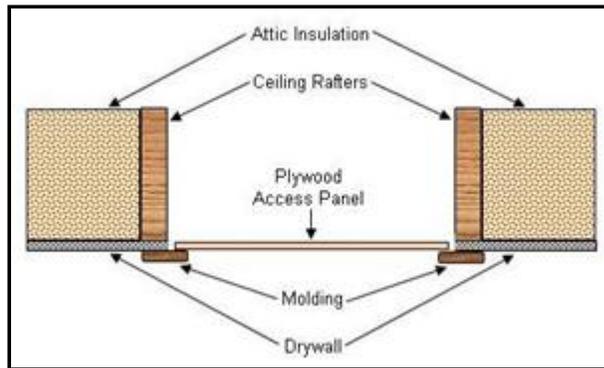
6.3 Picture 1



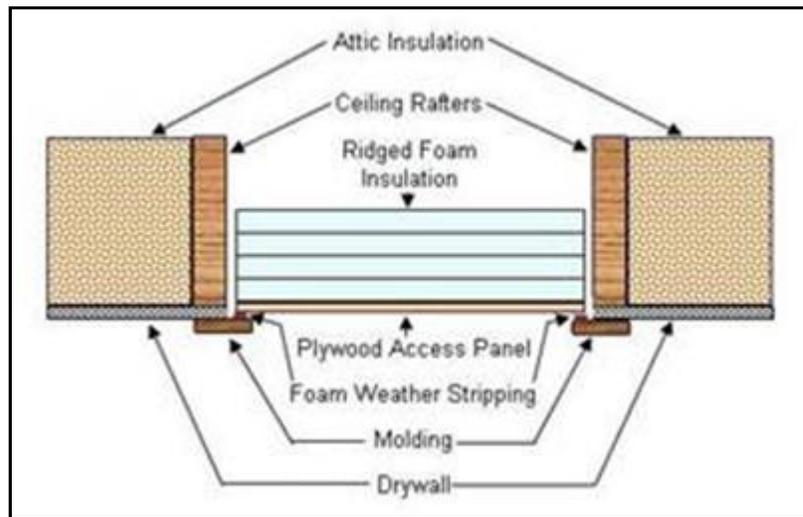
6.3 Picture 2



6.3 Picture 3



6.3 Picture 4



6.3 Picture 5

6.4 Air/thermal boundary alignment issues (i.e. cantilevered floors)

Not Present

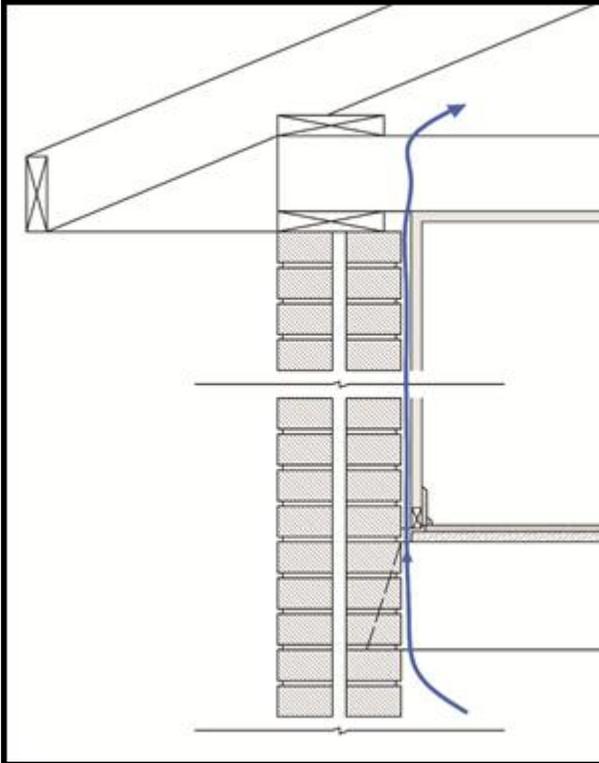
6.5 Thermal bypasses (between floors)

Repair or Replace

The home is double wythe brick construction with a 3/4" furring strip interior upon which the sheetrock and plaster wall is attached. These furring strips create continuous cavities from the basement to the attic, through

which air enters and leaves the home, resulting in heat gain or heat loss. The space is too small to cost effectively insulate but can be sealed with expanding foam at the attic or basement (or both) to stop this uncontrolled air flow. This bypass is the single largest air leak in the home.

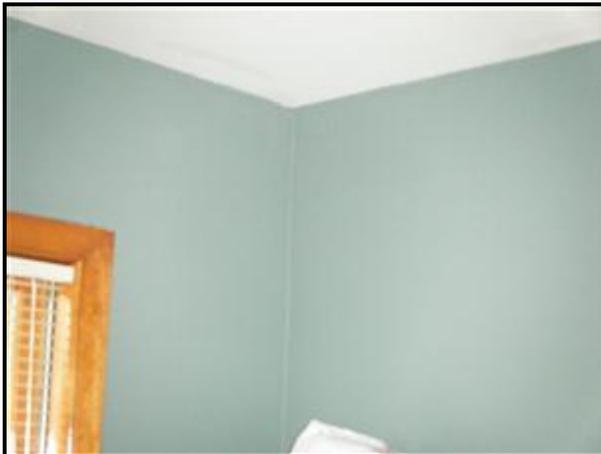
Considering the basement is largely finished, this area is best accessed from the attic, along the exterior wall and may be sealed as part of installing and sealing vent chutes with wind baffles into place. **See Item 4.8**



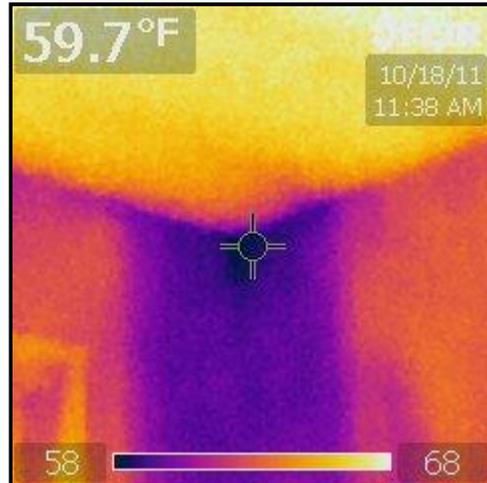
6.5 Picture 1



6.5 Picture 2



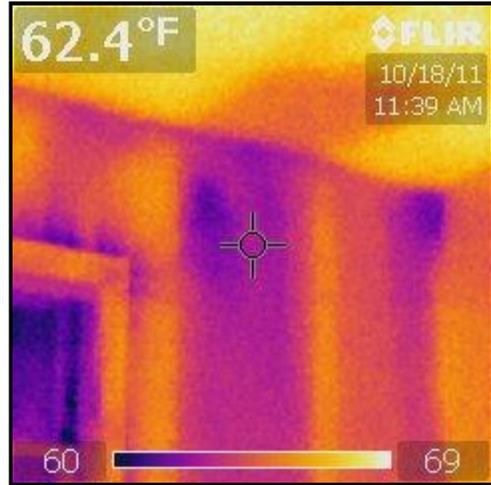
6.5 Picture 3



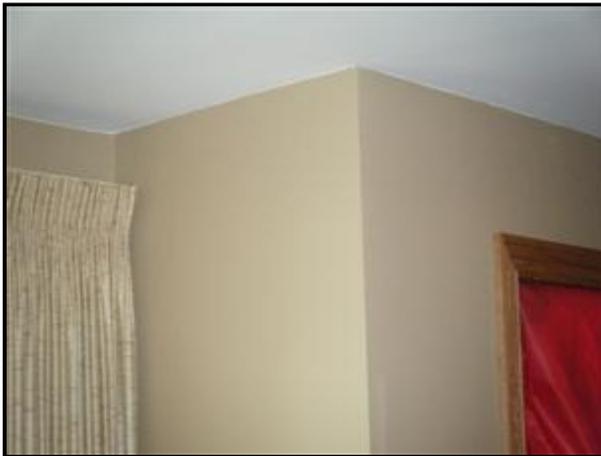
6.5 Picture 4



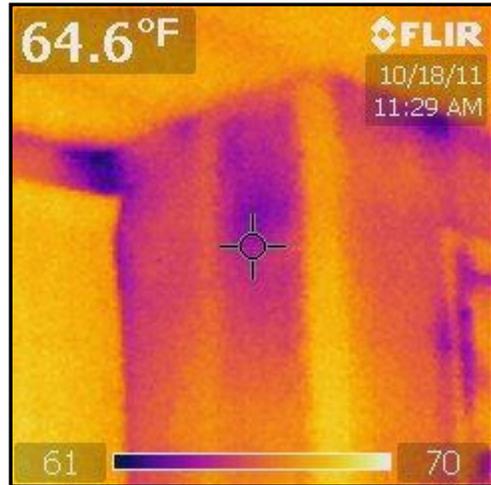
6.5 Picture 5



6.5 Picture 6



6.5 Picture 7



6.5 Picture 8

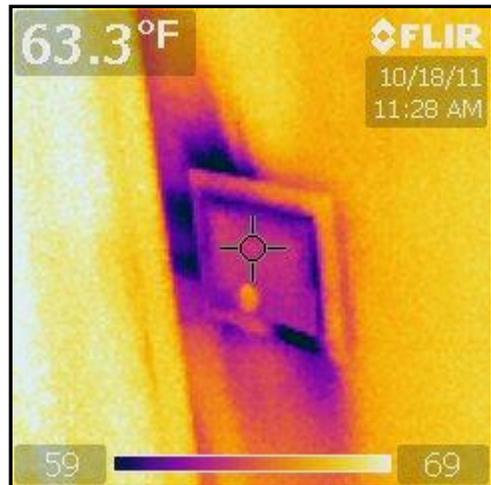
6.6 Walls as an Air Control Layer (paneling, beadboard, etc.)

Repair or Replace

- The pass through mail box is a significant source of leakage in the home and should be insulated, sealed off and removed (interior door at least). An exterior mounted mailbox would need to be installed in its place.



6.6 Picture 1

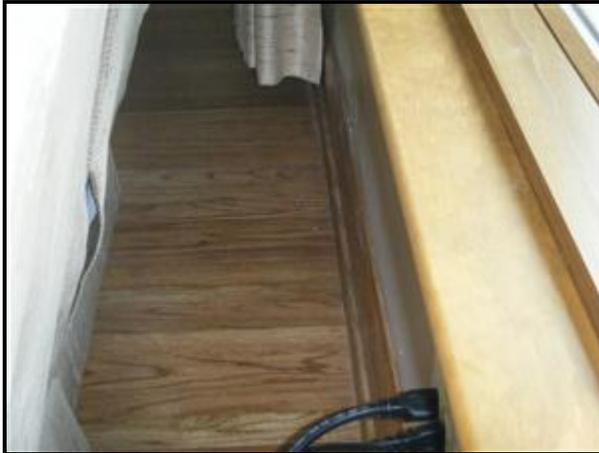


6.6 Picture 2

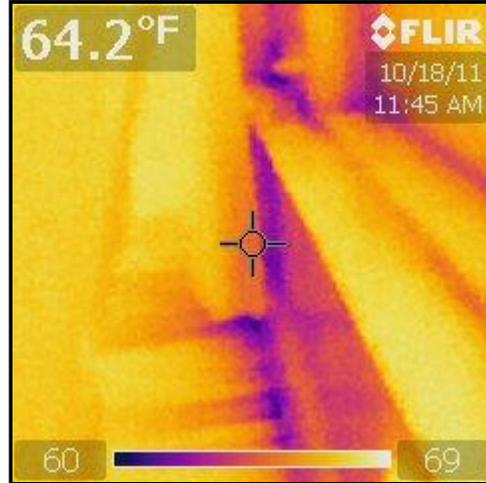
6.7 Air seal Baseboards

Repair or Replace

Some air leakage was detected along the baseboards. Air sealing wall air bypasses at the attic and/or basement will likely halt most of this baseboard leakage. Any remaining leakage after air sealing may be sealed with a clear, paintable caulk.



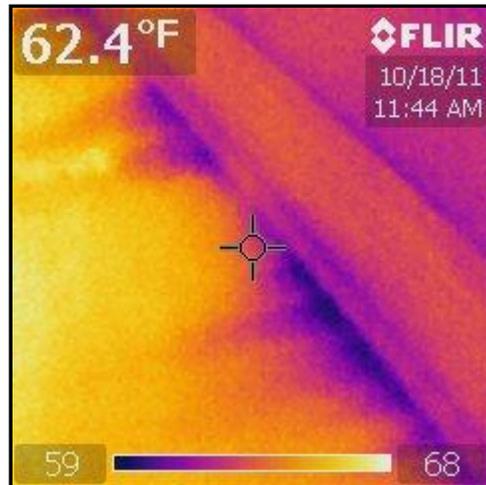
6.7 Picture 1



6.7 Picture 2



6.7 Picture 3



6.7 Picture 4

6.8 Windows: Air leakage, seals and caulking

Inspected

The older windows in the home have some air leakage where the sashes meet in the middle and in some areas around the casing. New weather strip and clear, paintable caulk would halt this leakage. Recommend major air sealing work and the addition be completed before a follow up leakage test is performed and remaining leaks be identified & sealed.

The new windows show no leakage and seem to have been installed well.

6.9 Minor air sealing (caulking)

Inspected

6.10 Seal and insulate wall switch and outlet boxes

Inspected

Moderate leakage was detected from switches & outlets and may be eliminated by air sealing electrical penetrations in the attics. Should any leaks remain, they may be sealed at the outside fixture or by caulking the electrical box to the drywall and installing foam pads before replacing the wall plates.

7. Thermal Layer

Styles & Materials

Attic Insulation/Effective R-Value:

Blown
Fiberglass
Fair condition
R 5-10

Floor System Insulation R-Value:

None

Window Types:

Single pane
Double pane
Double-hung
Casement
Wood
Storm Windows/
Aluminum
Glass block
Aluminum Flashed Casing

Exterior Entry Doors (non-glass portion):

Wood Panel door 7/16" panels R-value 1.85

Wall Assembly Materials:

Plaster
3/4" Air Space
Clay Brick & Concrete Block
4" Brick

Items

7.0 Identify presence of knob and tube wire in attic and/or walls

Not Present

7.1 Recommended additional attic insulation

Repair or Replace



The attic currently has blown fiberglass insulation at about R - 10-15, below the current code minimum of R-38. Recommend the attic be insulated to a more cost effective R 50-60 with blown cellulose (settles to an air-impermeable mass - unlike fiber glass), **only after air sealing and attic ventilation** issues have been completed.

The high seasonal electric bills are largely the result of heat gain from the under ventilated and poorly insulated attic. Proper ventilation limits the heat gain of the attic during the day and allows the heat to dissipate more quickly at night. Increasing insulation to R-50+, using a non-air permeable insulation (cellulose or spray foam) will halt the transfer of heat from the attic to the conditioned space below.

Considering the front of the home faces West, integrating plantings and/or window shades will help limit the solar heat gain from the late day sun.



7.1 Picture 1



7.1 Picture 2



7.1 Picture 3



7.1 Picture 4

7.2 Wall cavity insulation (need for dense pack cellulose)

Not Present

The existing wall assembly has no space available for the cost effective addition of insulation. Halting air leaks is the most cost effective measure to reduce heat loss. In order to increase the R-value, however, insulation would have to be added over the existing drywall or the exterior brick.

7.3 Foundation/Crawlspace wall insulation

Inspected

7.4 Window Repair or Replacement

Inspected

7.5 Window condition/integrity

Repair or Replace

The new double pane windows have been installed well and show no sign of air leakage. There are a few minor gaps in the exterior caulk that should be filled to ensure no moisture enters the wall assembly.



7.5 Picture 1

7.6 Exterior door condition/integrity**Repair or Replace**

The exterior doors are wood paneled doors with a low R-value and poor weather strip. Recommend the doors be weather stripped to minimize drafts this winter. The doors should be replaced when the addition is added in the spring.



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