

***Brookfield Town House***

***Route 109***

***Brookfield, New Hampshire***

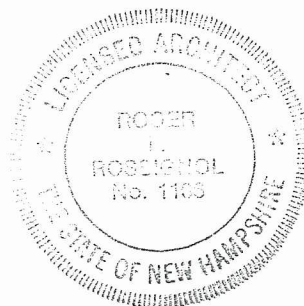
***Critical Needs Assessment***

***Prepared By:***

***Salmon Falls Architecture, Inc.***

***312 Elm St.***

***Biddeford, Maine***



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## *Introduction*

This report is a critical needs assessment of the existing Brookfield Town House originally constructed about 1822, along with the attached 1801 Churchill School House. The Architects and Engineers conducted a non-destructive visual inspection of the building to form the contents of this report. The building in general is in good condition, but has some building code issues that will need to be addressed, as well as a structural issue with the School House portion that needs immediate attention. We have prepared a set of measured, as-built, floor plans and elevations noting some of the major issues and also could be used in future renovations of the building. Photographs have been taken to document the existing conditions. The bulk of the report is outlined in the Recommendations portion, which lists the items of concern and the recommended priority of each item along with a cost estimate to address each of the items in the list. During our review we were able to access most of the spaces in the building, but were not able to access the crawl space under the Town House portion, but indications were that the floor framing was in good condition. We will still need access to this space to verify.

































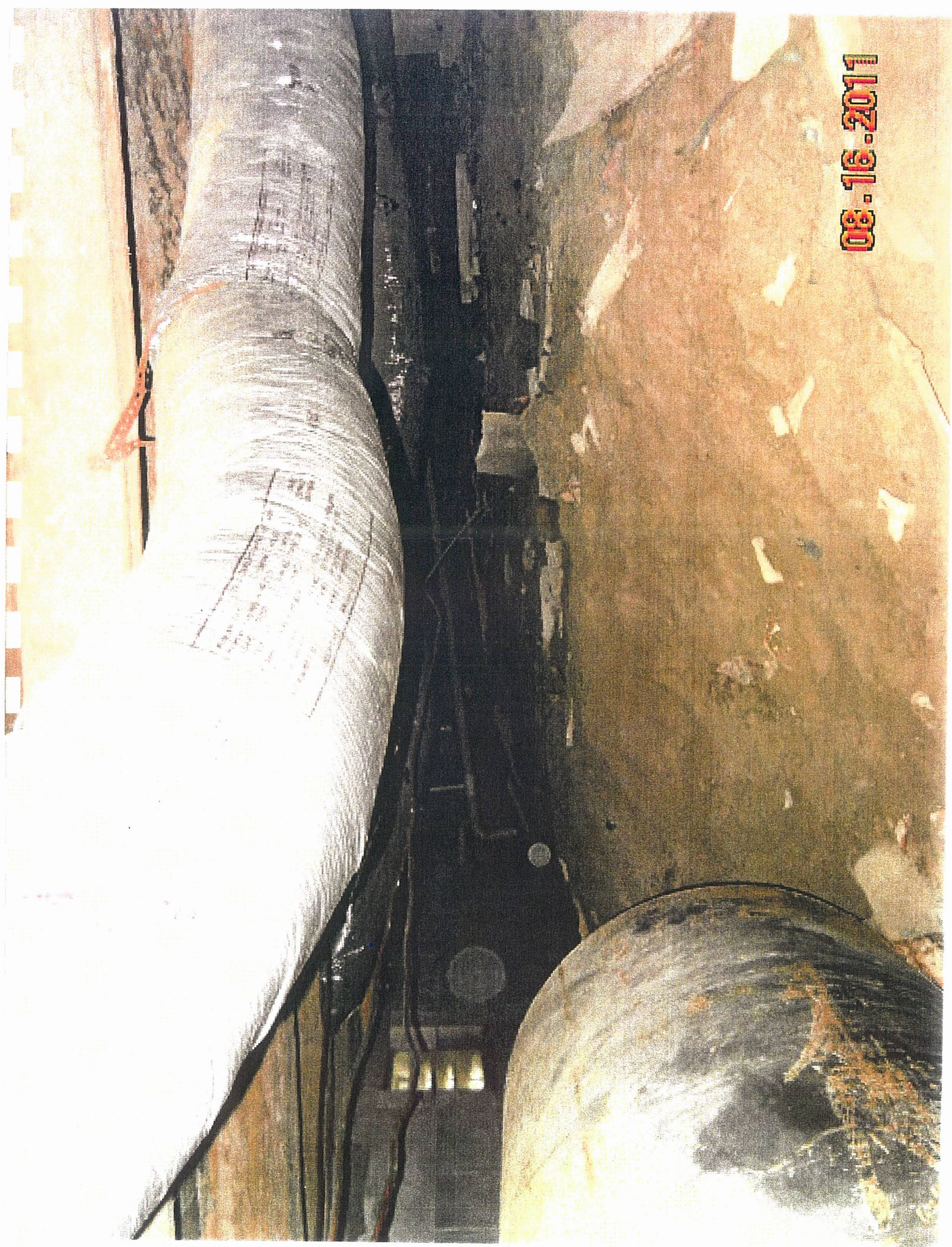




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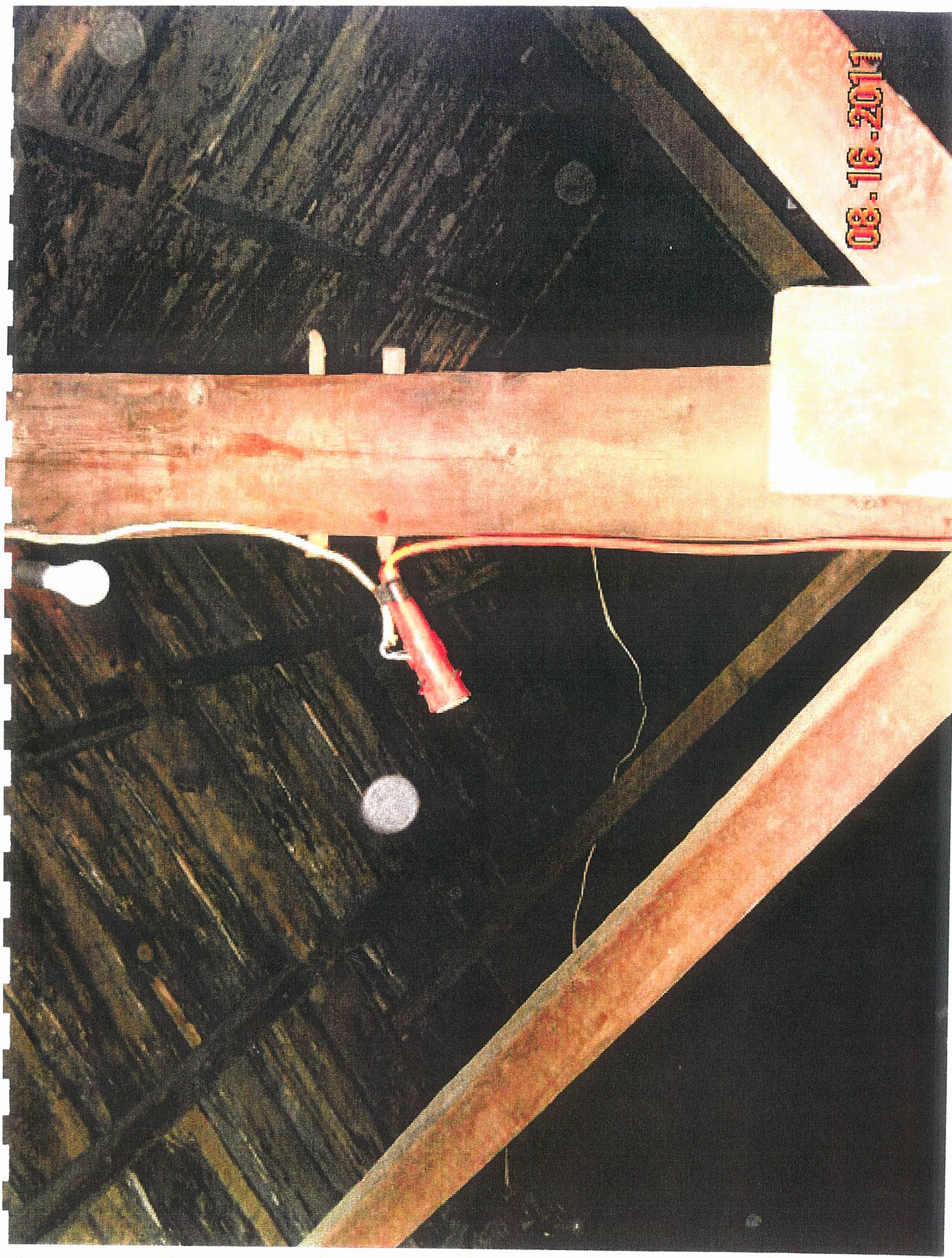




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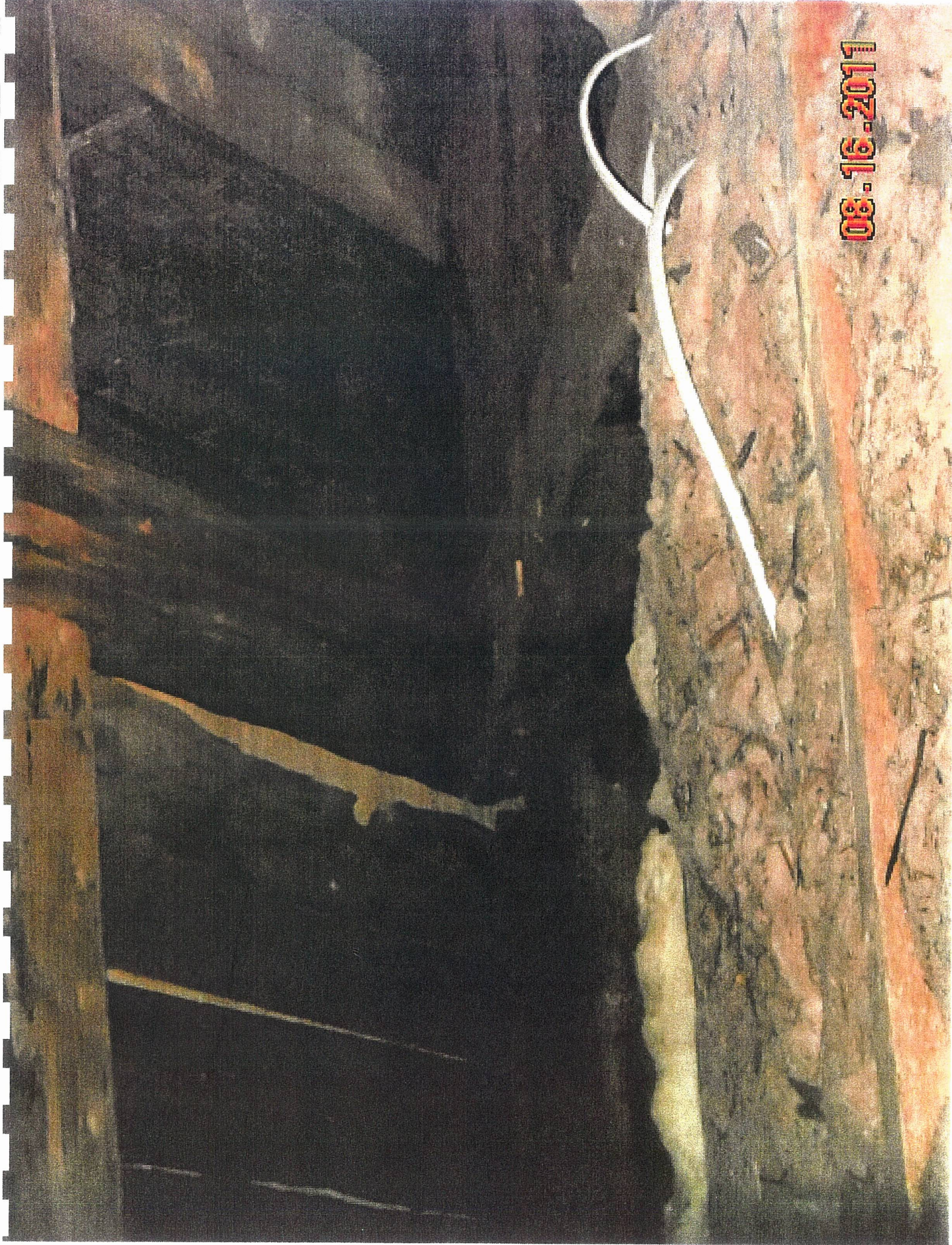


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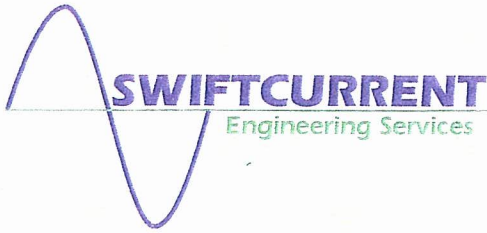




08-18-2011







Brookfield Town Hall  
Brookfield, NH  
Electrical Existing Conditions Report

On Tuesday August 16<sup>th</sup>, I visited the Old Town Hall Building in Brookfield, NH for the purpose of observing the existing conditions of the electrical systems. This is a historic building includes the Old Town Hall and a school building that has been connected to the rear of the structure. These buildings appear to have been retrofitted with modern electrical systems over the years.

#### Electric Service:

The electrical service for this building is fed from the new Town Offices that were built next door. The main service panel is fed from a 120/240 Volt, 100 Amp, 2-Pole breaker in the electrical panel. In addition there appears to be a 120/240 Volt, 30 Amp, 2-pole breaker that feeds the old generator panel in the Old Town Hall. The new Town offices have a generator and automatic transfer switch that currently back up that entire building as well as the Old Town Hall building.

In the Old Town Hall building the electrical service enters into a main panel board located in the kitchen. Although this panel is rated for 200 Amps, as noted above it is fed from a 100 Amp service, which based on the equipment located in the building is probably adequate. The main panelboard primarily feeds lights, receptacles, kitchen equipment and a heater in the office. This panel also feeds one 60A subpanel in the school building and a 30A subpanel for the old generator panel. This panel was manufactured by Wadsworth Electric a company not currently in business and appears to be past its expected life. It should also be noted that the location of the main panel and the generator panel are located behind the refrigerator, which must be moved in order to access the panels. This is an electrical code violation that should be addressed by either relocated the refrigerator or the panels. The National Electrical Code (NEC) requires 36" of clear access space in front of these panelboards.

The school panel is located in the boiler room of the school building and feeds lights and receptacles in the school and bathrooms, as well as the water pump and a hot water heater in the boiler room. This is also a Wadsworth Electric panelboard.

The generator panel is located in the kitchen adjacent to the main electrical panel. This is fed via two 30 amp breakers furnished with an interlock that only allows one breaker to be closed at a time. These breakers allow the panel to be fed from either the main panel or from an alternate source which is believed to have been a generator receptacle at one time, and is currently believed to be wired to a 30 Amp, 2P breaker in the New Town Office Building. This configuration allows for the option to manually shed the loads on the main panelboard in the Old Town Hall and power the generator panel only, if sufficient capacity does not exist for the New Town Office generator to supply the entire load demand for both buildings. This panel feeds only the two furnaces and the side lights to navigate between the



furnace rooms. The generator panel is more modern than the other panels and is a Square D, QO load center.

It should be noted that the wiring that could be observed in the main areas was in EMT Conduits or MC cable assemblies where exposed. There was observed to be a number of extension cords in the attic space that were used for wiring to temporary lighting. It also appeared that in one location romex cable had been plugged directly into a receptacle on the extension cord without a plug. This is an Electrical Code violation.

#### **Lighting:**

Lighting in this facility is minimal. Many of the decorative and historic looking fixtures are incandescent type. Some fluorescent fixtures exist in the kitchen, office, boiler room and a single fixture in the school. These fluorescent fixtures use 40 Watt, T12 lamps.

There was no exterior light installed outside of the door of the school building.

It should also be noted that the amount of emergency lighting did not appear to be adequate for an assembly occupancy in the Old Town Hall, nor to illuminate the cardboard exit signs. Emergency lights were also not installed outside of the building egresses.

#### **Fire Alarm:**

The fire alarm system for this building, like the electrical service, is wired from the new Town Offices. Zones exist in the Honeywell/Silent Knight fire alarm control panel located in the Town Office to monitor devices in the Town House, School House, Combined attics, as well as a low temperature alarm located in one of the bathrooms.

Smoke detectors, horn strobes, and pull stations appeared to be adequately placed, however, it was noted that there were no strobes located in the bathrooms as required by the American Disabilities Act (ADA).

#### **Recommendations:**

Based on the observations noted above we make the following recommendations:

- Address the panel access situation in the kitchen. These must be accessible.
- Depending on how critical it is to have power in this building I would recommend replacing the Wadsworth panels sometime in the future to avoid having to replace these due to failure.
- It is assumed that lighting for this facility is a balance between looking historical and being efficient. I would recommend that the existing fixtures at least be supplemented with additional more energy efficient fixtures if these areas are to be renovated.

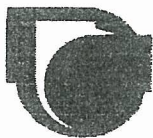
- Install some type of lighting fixture, perhaps something historic looking, outside of the school side exit.
- Provide additional life safety lighting and the installation of internally illuminated exit signs in the building and remote exterior heads outside the exits powered from the exit signs, for compliance with NFPA 101 - Life Safety.
- Remove the temporary wiring and lighting in the attic and install a couple of fluorescent strip lights with MC cable for wiring.

Respectfully submitted,

Swiftcurrent Engineering Services, Inc.

Timothy D. Matthews, P.E.

# ***Mechanical Engineering Report***



## **MECHANICAL SYSTEMS ENGINEERS, INC.**

Royal River Center, Unit #10  
10 Forest Falls Drive, Yarmouth, Maine 04096  
Tel. (207) 846-1441 \* Fax. (207) 846-1443  
mechsyst@maine.rr.com

10/22/2011

Salmon Falls Architecture  
312 Elm Street  
Biddeford, Maine

### **Plumbing, Fire Protection, Heating and Ventilation Town House – Brookfield New Hampshire**

The following observations, comments and recommendations are based on my site visit of August 16<sup>th</sup>, 2011. I have also reviewed The Energy Efficiency Opportunities Report prepared by Peregrine Energy Group.

#### **Observations**

- 1) Heating and Ventilation Observations
  - a) The School Room portion of the building is heated by one Williamson T165-16-1 downflow oil-fired furnace, total heating capacity of 119,000 BTUH. The furnace is in relatively good condition and can continue in use.
  - b) The Hall portion of the building is heated by one Williamson T-185-18-2 downflow oil-fired furnace, total heating capacity of 225,000 BTUH. The furnace is in relatively good condition and can continue in use.
  - c) The plywood floor that the downflow furnaces are set on does not meet the minimum clearances from combustibles that is recommended by the manufacturer. Also, the plywood floor is saturated with fuel oil. This is not necessarily an emergency concern; however, it should be corrected.
  - d) The flues from the furnaces also do not meet all the requirements for clearance from combustibles. This also is not necessarily an emergency concern; however it should be corrected.
  - e) The combustion air for the furnaces is provided by grills that directly communicate with the School Room. This is a code compliant arrangement.
  - f) A 275 gallon oil tank is located in the crawl space. The tank is showing signs of rusting and is setting on a dirt floor. I did not observe any oil leaking from the tank; however, the condition and location of the tank are a concern.



- g) The heating is distributed through insulated ductwork in the crawl space. The condition of the ductwork is fair and can continue to be reused. The ductwork is not supported in enough locations and would need additional hangers.
  - h) The bathrooms have Penn Zephyr ceiling-mounted exhaust fans that can continue in use.
  - i) The kitchen range exhaust hood does not meet NFPA (National Fire Protection Association) Standards and does not meet the clearance standards for a commercial kitchen range exhaust hood.
  - j) The Office has supplemental heat from electric baseboard.
- 2) Plumbing Observations
- a) There is a new Branford White M240S6DS electric hot water heater with two 4500 watt elements. This hot water heater is in good condition and can continue in use.
  - b) The plumbing fixtures are in fair condition. They do not comply with ADA Handicap Accessible requirements.
- 3) Fire Protection (sprinklers) Observations
- a) The building does not have a sprinkler system.
  - b) The kitchen hood does not have a chemical fire suppression system.

### **Comments and Recommendations**

- 1) Heating and Ventilation Comments and Recommendations
- a) All of the safety concerns I expressed above, as well as, the oil tank concern could be addressed by changing to LP gas-fired furnaces. Advantages of the LP gas-fired furnaces include quieter operation and a reduced carbon footprint for the building. The issue with LP gas is that the operating cost of LP gas has historically been approximately 15% more than oil. My opinion is that the advantages of the LP outweigh the disadvantage. The furnaces could be replaced as a stand-alone project. I would estimate the installed cost for this project to be approximately \$12,000.00.
  - b) The ductwork in the crawlspace can continue in use until a major renovation is undertaken. Because floor framing will need to be replaced in a major renovation the ductwork would need to be removed. During the renovation it would make sense to replace (not repair) the ductwork. The new ductwork could be insulated and sealed to a higher standard than it presently is. Estimated installed cost to replace the ductwork is approximately \$16,000.00.
  - c) If a major renovation is undertaken it may be required by Authorities-Having-Jurisdiction, or it may be the Town's preference, to install a NFPA 96 compliant kitchen exhaust hood. An estimated installed cost for a NFPA 96 hood with fire suppression is \$15,000.

- d) The bathroom exhaust fans can continue in use.
  - e) The electric heat in the office can continue in use and is normally a good energy saving strategy if the office is occupied at times the rest of the building is not occupied.
- 2) Plumbing Comments and Recommendations
- a) The existing plumbing fixtures can continue in use until it is required by Authorities-Having-Jurisdiction, or the preference of the Town, to install ADA Handicap Accessible fixtures.
  - b) The Kitchen fixtures do not meet the standards for a commercial kitchen in either quality or quantity and will need replacement in a major renovation.
  - c) I cannot estimate the cost of changing fixtures to the above requirements because there are a wide range of options available.
- 3) Fire Protection Comments and Recommendations
- a) During a major renovation it may be required by Authorities-Having-Jurisdiction, or it may be the Town's preference, to add a NFPA 13 Automatic Sprinkler System to the building. Estimated installed cost is \$10,000.00.
  - b) The chemical fire suppression for the Kitchen hood is included in the hood estimated installed cost approximated above.

#### **Comments Concerning Energy Use**

- 1) Presently the Town House requires an average of 1,269 gallons of fuel oil per year for heating. This is an average of 0.50 gallons per ft<sup>2</sup> of heated space. This is a normal energy use for a poorly-insulated, "leaky" building that is used intermittently.
- 2) I estimate that the insulating and air sealing that Salmon Falls Architecture is proposing will reduce your oil consumption to 0.30 gallons per ft<sup>2</sup>. LP-gas consumption will be 0.33 gallons per ft<sup>2</sup>.
- 3) The present oil furnaces are approximately five times larger than they need to be. This oversizing has a detrimental effect on operating costs. New LP gas-fired furnaces would be sized much more closely to the actual heating load.

Respectfully Submitted



Kurt Magnusson, P.E.

# ***Electrical Engineering Report***

## *Recommendations*



## ***Recommendations:***

*(These recommendations are listed in order of priority)*

1. **School House floor:** The floor of the school house is framed with some sawn lumber and some hand hewed timbers. There is a significant amount of rot and the floor is structurally unsound. I would recommend that there be no large gatherings in that space. We have designed a framing plan and details to correct this situation. In order to re-frame this floor, it will be required to remove the ductwork, and possibly some piping and wiring to properly access the area. Also, the floor of the crawl space should be excavated lower and the grade evened out, if possible, to allow work access and to provide a suitable sub-grade for installation of a poly vapor barrier. After this work is complete then the mechanical and electrical equipment can be replaced. **This work is considered a High Priority.**
  - The cost to perform this work is estimated at: \$18,600.
2. **Crawl space insulation, dampproofing, and ductwork:** After the re-framing of the floor is complete, we recommend that the earth floor of the crawl space be encapsulated with a poly vapor barrier (see specification attached) to prevent dampness from causing problems with the new and existing floor framing. This encapsulation is recommended for the school house addition, as well as the main town house portion. The concrete block walls of the School House addition should be coated on the inside with a fiber reinforced parge coat, similar to "Structural Skin". This work was done to the outside of the wall, but the manufacturer of the product recommends application to both faces of the wall. The ventilation louvers should be blocked in to seal the space. After the wall is coated and earth floor is encapsulated, we recommend the application of closed cell, polyurethane, spray foam, "Icynene", insulation providing a thermal R value of 10. This will improve the thermal properties as well as form an air infiltration barrier to the crawl spaces. When the work to seal the crawl space is completed, we recommend that the duct work be replaced with new ductwork that is properly sealed and supported. In addition, we recommend the installation of a mechanical ventilation duct for the spaces that is controlled by a humidistat. **This work is considered a High Priority.**
  - The cost to perform this work is estimated at: \$47,400.
3. **Kitchen:** The kitchen is used as a commercial kitchen, but is constructed with residential cabinets and appliances, with the exception of a commercial range. The range hood is a residential hood, which is a code violation. The electrical panel is situated on the side wall next to the refrigerator, without adequate clearance, this is a code violation. We recommend that the code violations be corrected, at a minimum. The proper direction should be to re-design the kitchen with commercial grade equipment, install a code compliant exhaust hood for the range and replace the electrical panel so that it is accessed from the front entry hall, rather than from the kitchen. **The work to correct the code violations is considered a High Priority; the equipment upgrade is of a lesser priority.** (Please refer to the Mechanical and Electrical Engineering reports attached.)
  - The cost to correct the code violations and upgrade the equipment is estimated at: \$42,400.

4. **Electrical:** The electrical panel in the kitchen is a code violation as noted above, and must be replaced. The electrical panels should be replaced to avoid problems. Lighting upgrades should be done. Provide life safety lighting where noted. This is a code violation. (Please refer to the Electrical Engineering report attached.) **This work is considered a High Priority.**
  - The cost to perform this work is estimated at: \$17,100.
5. **Attic Insulation:** The existing attic is currently insulated with fiberglass batt insulation. We recommend that additional insulation be added to increase the R value to 49. To achieve best coverage and air sealing, it is recommended to use blown-in cellulose insulation. **This work is considered a Priority, as it will have a short payback.**
  - The cost to perform this work is estimated at: \$3,700.
6. **Attic Scuttle:** The existing attic scuttle is not insulated, creating a large void in the attic insulation envelope. We recommend installing an insulated attic access panel to improve this situation. There are manufacturers that supply highly efficient attic access doors (see specification attached). **This work is considered a Priority, as it will have a short payback.**
  - The cost to perform this work is estimated at: \$600.
7. **Windows:** The existing windows are historic wood, single glazed, double hung windows with aluminum triple track, storm windows installed at the exterior. They appear to be in satisfactory condition for their type. The crack (looseness) around the windows probably attributes for the greatest amount of air infiltration in the building. We recommend that the windows be re-fitted so they are as tight as possible, while still allowing proper operation and the exterior re-caulked to minimize air infiltration. **This work is considered a Priority, as it will have good payback.**
  - The cost to perform this work is estimated at: \$14,500.
8. **New Handicap Bathroom:** This building is a public building. The building allows access to handicap persons, and when in the building, they have no access to bathrooms. We recommend that one of the bathrooms be converted to an accessible bathroom. The State building code requires that all public buildings have an accessible route, and if provided, accessible bathrooms be provided. **This work is considered a Priority, as it is a Code violation.** (Refer to the Floor Plan for the design of the accessible bathroom)
  - The cost to perform this work is estimated at: \$6,700.
9. **Existing Railings @ Ramp:** The handicap ramp has railings that do not meet building code requirements. Balusters need to be added so that the space between the balusters does not allow a 4" diameter object to pass through. Railings at mid height to allow a wheelchair user to grasp are required on both sides of the ramp. Railings at the top of the rail need to be added on both sides of the ramp for ambulatory persons to use. **This work is considered a Priority, as it is a Code violation.**
  - The cost to perform this work is estimated at: \$6,900.
10. **Furnaces:** The existing oil fired furnaces are in relatively good condition and can continue in use, although there are some safety concerns. We recommend that the furnaces be replaced with high efficiency LP gas furnaces. If the furnaces cannot be



replaced at this time, the safety concerns need to be addressed. (Refer to the Mechanical Engineering Report attached).

- The cost to perform the recommended work is estimated at: \$12,000.

**11. Roofing:** The roof is covered with asphalt three tab shingles that appear to be in good condition. The useful life of these shingles is about 25 years. The date of installation is not known at this time. There appear to be some small areas showing wear or damage. We would recommend that the roof be inspected yearly to determine the next course of action. I would estimate that replacement will need to be done within 10 years. A maintenance reserve should be considered.

- The cost to perform this work that should be placed in reserve is: \$18,700.

**12. Chimney at School House Addition:** The chimney at the School House addition serves the woodstove that is in the middle of the space. I must recommend that the woodstove be removed as I consider it a safety hazard. I would also recommend that the local Fire Chief be consulted as to the continued use of the stove. There is no need to keep the stove, as the furnaces are very adequately sized to handle the heating load. I therefore recommend that the stove be removed and the chimney be removed and the roof patched with matching asphalt shingles.

- The cost to perform this work is estimated at: \$500.

**13. Exterior Paint:** The exterior paint is in good condition, with only a few areas noticed that require some maintenance. I would place this item of work on an annual inspection schedule. I would estimate that the useful life of the paint surface is about 5 years. A maintenance reserve should be considered.

- The cost to perform this work that should be placed in reserve is: \$33,800.

**14. Plaster patching at the Town House Meeting Room:** There are cracks in the curved wall / ceiling line. There doesn't appear to be any structural issue causing these cracks. It is supposed that the cracks appeared before the work to the foundation was done in 2003. I would recommend that the cracks be patched with appropriate plaster and the finish touched up. The paint work in the room is unique and should be preserved. A maintenance reserve should be considered for future painting of the interiors.

- The cost to perform this work is estimated at: \$1,000.

**15. Chimney sealing:** The chimney on the Town House portion of the building is inactive, but an integral part of the historic structure. I would recommend that any pointing of bad mortar joints be done with appropriate mortar and a clear masonry sealer be applied to the chimney.

- The cost to perform this work is estimated at: \$400.

**16. Exterior wall insulation:** At this time, I would not recommend insulating the exterior walls of the building, because of the fragile condition of the clapboards and the plaster finishes. In order to blow-in insulation, clapboards would need to be removed and replaced with the same size as species clapboards and the entire wall would have to be re-painted. If the work to improve the air infiltration to the crawl space and the windows is performed, and the attic insulation is installed, I feel that the building will perform remarkably better. The wall insulation cost and the damage to the finishes would not in

my opinion be cost effective. If however, decided to insulate the wall, I would recommend an infrared scan of the building during the winter months, to identify the location of the framing members so that an effective insulation job can be done.

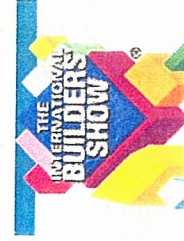
- 17. School House Walls:** The exterior bearing walls of the school house addition are bowed out beyond the wall line of the foundation. It is our opinion that these walls were bowed when the building was placed on the concrete block foundation and have not moved since. The roof of the addition was reinforced at some time in the past and the work is done well. The ridge does not sag, nor does the top plate appear to be bowing. The floor framing does not appear to be coming apart at the rim joist. We recommend performing the work to re-frame the floor and while this is being done, further investigation could be performed.

## *Recommended Products*

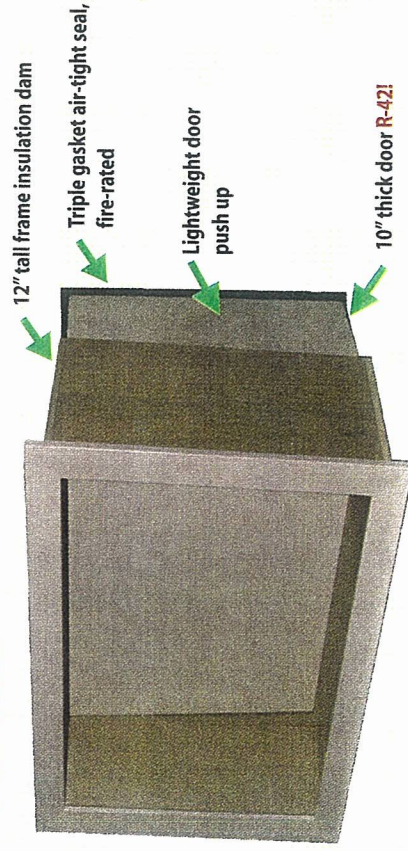


# NEW! ATTIC ACCESS DOOR

## Model 22x30 - R42 - Quick & Easy Install



**For NEW & Existing Construction**



- ★ Gloss white pre-finished door face & trim
- ★ Wood frame fits between 16" x 24" o.c. joists or trusses
- ★ Triple-sealed door provides air tight seal
- ★ Meets ENERGY STAR Thermal Bypass Requirements
- ★ Exceeds code requirements, CSI specifications
- ★ Alternative to pull down attic stairs
- ★ DEALERS / DISTRIBUTORS WANTED

**GREEN ENERGY CONSERVATION PRODUCTS**

**BUY FACTORY DIRECT**

**Ask for Builder Discount**

Energy Efficient Alternative to Pull Down Ladders

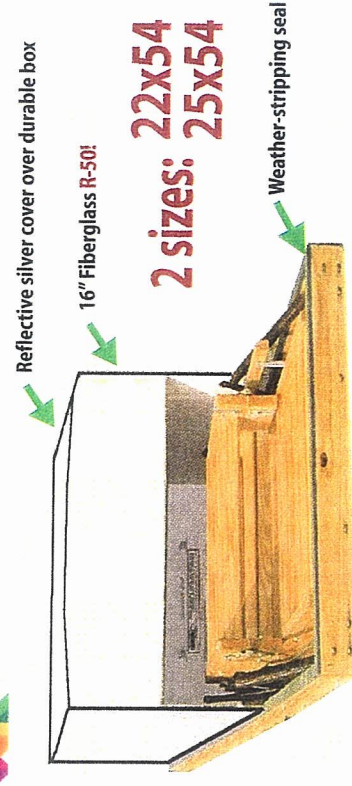
Battic Door Energy - [www.batticdoor.com](http://www.batticdoor.com) - 508.320.9082

# NEW! ATTIC STAIR COVER

## Model R50 - Quick & Easy Install



**For NEW & Existing Construction**



- ★ Insulating cover for pull down attic stairs
- ★ 2 sizes to fit 22x54 and 25x54 rough openings
- ★ Kit includes durable reflective box cover, weather-stripping and insulation
- ★ Meets ENERGY STAR Thermal Bypass Requirements
- ★ Exceeds code requirements
- ★ Installs in minutes with NO tools
- ★ Preferred by contractors
- ★ DEALERS / DISTRIBUTORS WANTED

**GREEN ENERGY CONSERVATION PRODUCTS**

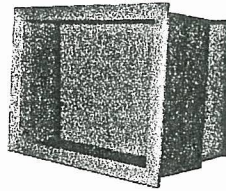
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**SECTION 08310**  
**ACCESS DOORS AND FRAMES**

**PART 1 GENERAL**

**1.1 RELATED SECTIONS**

- A. Section 06100 - Rough Carpentry: Roof framing and opening support.

**1.2 SUBMITTALS**

- A. Submit under provisions of Section 01300.
- B. [ Product Data ]: Manufacturer's data sheets, including:
  - 1. Energy Star Brochure.
  - 2. Installation Instructions.

**1.3 DELIVERY, STORAGE, AND HANDLING**

- A. Store attic access door hatch in manufacturer's unopened packaging until ready for installation.
- B. Store attic access door hatch until installation inside under cover in dry area out of direct sunlight.

**1.4 WARRANTY**

- A. Limited Warranty: One year against defective material and workmanship, covering parts only, no labor or freight. Defective parts, if deemed so by the manufacturer, will be replaced at no charge, freight excluded, upon inspection at manufacturer's plant which warrants same.

**PART 2 PRODUCTS**

**2.1 MANUFACTURERS**

- A. Acceptable Manufacturer:  
Battic Door Energy Conservation Products  
Box 15, Mansfield, MA 02048-0015 U.S.A.  
Phone: (508) 320-9082; Fax: (508) 339-4571  
e: [info@batticdoor.com](mailto:info@batticdoor.com); i: [www.batticdoor.com](http://www.batticdoor.com)

**2.2 FABRICATION**

- A. Manufacture each access panel assembly as an integral unit ready for installation.



## 2.3 OVERVIEW OF PRODUCT

- A. Standard Model 22 x 30 Attic Access Door System is an R-42 insulated and triple-gasketed access door that installs in minutes and provides an air sealed, insulated access opening to residential attic space.
- B. Deluxe Model is same as above and comes with 2 recessed handles and a 4 point, keyed, locking latch designed for when handles and / or security is desired. Also may be used in knee wall applications.

## 2.4 MATERIALS

- A. Wood frame and door. Unit installs into a 22-5/8" x 30-1/2" framed opening. Fits within the standard space between trusses spaced 24' o.c. or joists 16" o.c. to simplify installation. Pre-painted white door face and trim. R-42 insulated door core is Extruded Polystyrene (EPS). Door face is gloss white mineral board. Triple rubber gaskets provided for air tight seal. Solid wood frame and trim. Deluxe Model includes two recessed handles and a 4 point, keyed, locking latch.

## 2.5 ACCESS DOOR AND FRAME FOR ATTIC ACCESS IN RESIDENTIAL APPLICATIONS

- A. Non-rated attic access doors and frames.
  - 1. Door: Fabricated using white mineral board face, extruded polystyrene (EPS) core, and fire rated rubber sealing gasket over top of EPS core.
  - 2. Frame: Plywood frame is installed into a wood framed 22-1/2" x 30-1/2" rough opening. Frame is 12" tall and provides insulation dam. Wood trim is pre-secured to frame. Rubber gasket is installed on trim on each side of frame.
  - 3. Finish: Pre-finished white painted wood door and trim.
  - 4. Lock (Deluxe Model Only): A 4 point, keyed, locking latch system is incorporated into the door. 4 keys included with each door.
  - 5. Handles (Deluxe Model Only): Two recessed handles painted white to match the door face.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- B. Examine materials upon arrival at site. Notify the carrier and manufacturer of any damage.

### 3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

### 3.3 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION



## CertaSpray® Closed Cell Foam

### 1. PRODUCT NAME

CertainTeed CertaSpray®  
Closed Cell Foam

### 2. MANUFACTURER

CertainTeed Corporation  
P.O. Box 860  
Valley Forge, PA 19482-0105  
Phone: 610-341-7000  
800-233-8990  
Fax: 610-341-7571  
Website:  
www.certainteed.com/insulation

### 3. PRODUCT DESCRIPTION

**Basic Use:** CertaSpray Closed Cell Foam is a two-component closed cell spray foam with a zero-ozone-depleting HFC blowing agent. When CertaSpray A-side closed cell is mixed with CertaSpray B-side closed cell under pressure in a 1:1 volumetric ratio, they react and expand into a medium-density closed cell foam with an in-place core density of 1.9-2.4 pcf.

**Benefits:** CertaSpray Closed Cell Foam provides thermal insulation for the interior of the home and reduces air infiltration through the building envelope.

**Applications:** The closed cell 2-pcf foam can be spray-applied into open wall cavities, perimeter joists, cathedral ceilings, garage ceilings, attics and crawlspaces. Product can be installed up to 12" thick in ceilings and 8" thick in walls when covered with a code approved 15-minute thermal barrier. Product is meant for interior applications. Product must be finished according to local code, and must be applied by a qualified applicator.

**Composition and Materials:** CertaSpray Closed Cell Foam is a medium-density, MDI-based polyurethane thermoset rigid foam.

**Limitations:** *Foam Plastic Insulation:* CertaSpray Closed Cell Foam is defined by the building codes as a foam plastic insulation.

**Thermal Barrier:** Many building codes require that foam plastic insulation be covered with an approved 15-minute thermal barrier. Consult local building code officials to ensure the application meets local building codes and regulations.

**Vapor Retarder:** CertaSpray Closed Cell Foam must be installed at a thickness of at least 1.75" to be considered as a vapor retarder. Check local building code for climate-specific vapor retarder requirements.

**Lighting Fixtures:** The National Electrical Code prohibits installation of any insulation over or within 3" (76 mm) of recessed light fixtures, unless approved insulated ceiling (IC) light fixtures are used.

**Maximum Use Temperature:** CertaSpray foam should not be in contact with equipment or materials that have operating temperatures greater than 180°F.

### 4. TECHNICAL DATA

CertainTeed CertaSpray Closed Cell foam has achieved ICC-ES approval. The evaluation report number is ESR-2669.

#### Chemical Properties

	CertaSpray A	CertaSpray B
Viscosity at 25°C, cps	150-250	1400
Specific Gravity at 25°C, g/ml	1.23	1.14

#### Fire Performance\*\*

	TEST METHODS	RESULT
Flame Spread Index, 6***	ASTM E84	< 25
Smoke Index, 6***	ASTM E84	< 450
≤ 12" in ceilings	NFPA 286	Pass when covered with a 15-minute thermal barrier
≤ 8" in walls	NFPA 286	

\*\*The results of the test method may not be indicative of real-life fire performance. All plastic insulation must be separated from the interior building by an approved thermal barrier of 1/2" gypsum wallboard or equivalent thermal barrier material as required by the building code.



#### Physical and Mechanical Properties\*

PROPERTY	ASTM METHOD	VALUE
Core Density, pcf	D1622	1.9-2.4
Thermal Resistance (aged) at 75°F, (h-ft²·°F)/Btu	C518	5.8 ≤ 2" 6.4 ≥ 2"
Thermal Resistance (initial) at 75°F, (h-ft²·°F)/Btu	C518	6.7
Closed Cell Content, %	D2842	88-95%
Compressive Strength, psi	D1621	> 25
Tensile Strength, psi	D1623	60
Water Absorption, % by volume	D2842	< 2%
Dimensional Stability, 75°F/95% RH, 28 Days, vol%	D2126	< 9%
Water Vapor Transmission (Permeability), perm-inch	E96	1.51
Permeance (perms)	E96	1.51@1" 0.76@2" 0.50@3" 0.38@4" 0.30@5" 0.25@6"
Air Permeability, at 1" thickness, L/sfm²	E283	0.013
Fungi Resistance	C1338	Pass, with no growth

\*The typical properties were obtained on samples produced with a Gusmer/Greco H25 spray machine using an air-purged Fusion spray gun. The foam was sprayed at a thickness of approximately 4", in two passes of 2" each. Please see Recommended Processing Conditions for additional information.



## Recommended Processing Conditions

	VALUE
Preheater Temperature, °F	120-135
Hose Temperature, °F	≤ 135
Pressure, psi	1100-1500
A/B Volumetric Ratio	1/1
Cream Time*, sec	1-2
Tack-free Time*, sec	4 - 7
Maximum Thickness per Pass, inches	2
Maximum Installed Thickness, inches	See Applications Section

THERMAL PERFORMANCE			
THICKNESS		AGED R-VALUE*	
inches	mm	(h-ft <sup>2</sup> -°F)/Btu	(m <sup>2</sup> -°C)/W
1	25	5.8**	1.02
1½	38	8.7**	1.53
2	51	11.6**	2.04
2½	64	16.0	2.82
3	76	19.2	3.38
3½	89	22.4	3.95
4	102	25.6	4.51
4½	114	28.8	5.07
5	127	32.0	5.64
5½	140	35.2	6.20
6	152	38.4	6.76
7	178	44.8	7.89
8	203	51.2	9.02
9	229	57.6	10.14
10	254	64.0	11.27
11	279	70.4	12.40
12	305	76.8	13.53

Tested in accordance with ASTM C518 and/or C177 at 75°F (24°C) mean temperature.

\*Aged 90 days at 140°F.

\*\*When applied at a thickness > 2", aged R-Value is 6.4 per inch. When applied at a thickness ≤ 2", aged R-Value is 5.8 per inch.

## 5. INSTALLATION

All application surfaces must be free of oil, grease, dust and debris. Surface must be dried prior to application of spray foam. Excess humidity may cause poor adhesion, and result in product failure. To avoid overspray, product should not be applied when conditions are windy.

Substrate temperature must reach 40°F prior to application.

The final product yield is dependent on spray conditions and spray techniques.

**Typical End Use Properties:** The thermal performance values depicted in the chart at left are achieved at the thickness specified when installed as recommended.

**CAUTION:** CertainTeed recommends that you consult an HVAC expert and comply with guidelines established by applicable building codes prior to using any closed or open cell spray foam insulation product in an attic retrofit application. If not installed correctly, adding spray foam to a vented attic may significantly impair the performance of the HVAC system and may cause other damage to the building. CertainTeed will not assume any liability or responsibility for any personal injury or property damage occurring as a result of the improper installation of spray foam insulation that is not in accordance with the instructions accompanying the product, that is not in conformance with any applicable building codes, or that is contrary to the advice given by a duly qualified HVAC expert.

## 6. HANDLING AND STORAGE

**Storage:** It is recommended that the CertaSpray-B and CertaSpray-A drums should be stored between 55-80°F. Keep containers tightly closed and store in a dry, well-ventilated area protected from

freezing, rain, direct sunlight and excess heat. The storage life of chemicals is up to 6 months when stored according to the recommended conditions.

**Handling:** When opening the drums, loosen the cap slowly to release pressure in the drum. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing aerosols, vapor or mist. Wash skin thoroughly after handling.

The MSDS for CertaSpray-A and CertaSpray-B closed cell must be read before using this product.

## 7. HEALTH AND SAFETY

The health and safety information in this data sheet does not contain sufficient detail for safe handling in all cases. For detailed safety and health information refer to the Material Safety Data Sheet for this product.

## 8. AVAILABILITY AND COST

Distributed and sold throughout the United States. For availability and cost contact your local Territory Manager, contractor or distributor, or call CertainTeed Sales Support Group in Valley Forge, PA at 800-233-8990.

## 9. WARRANTY

Refer to CertainTeed's Lifetime Limited Warranty for CertaSpray® Foam Insulation (30-50-012).

## 10. MAINTENANCE

No maintenance required.

## 11. TECHNICAL SERVICES

Technical assistance can be obtained either from the local CertainTeed sales representative, or by calling CertainTeed Sales Support Group in Valley Forge, PA at 800-233-8990.

## 12. FILING SYSTEMS

CertainTeed Pub. No. 30-50-011. Additional product information is available upon request.



PARTNER OF THE YEAR

## EMERGENCY CALLS:

CertainTeed Emergency Response Center  
800-424-9300

CHEMTREC—Spills, Leak, Fire  
800-424-9300 (in USA and Canada)

## ASK ABOUT OUR OTHER CERTAINTEED PRODUCTS AND SYSTEMS:

EXTERIOR: ROOFING • SIDING • WINDOWS • FENCE • RAILING • TRIM • DECKING • FOUNDATIONS • PIPE  
INTERIOR: INSULATION • GYPSUM • CEILINGS

CertainTeed Corporation  
P.O. Box 860  
Valley Forge, PA 19482

Professional: 800-233-8990  
Consumer: 800-782-8777  
[www.certainteed.com/insulation](http://www.certainteed.com/insulation)

**CertainTeed**  
SAINT-GOBAIN





# CleanSpace®

## Crawl Space Encapsulation System®

PROPERTIES	TEST METHOD	SPECS
Appearance		White/Blue
Thickness, Normal		20 mil max/16mil min.
Weight per MSF		83 lbs
Construction		7 layer extrusion laminate w/2 layers polyester reinforcement
* 1" Tensile Strength	ASTM D751	105 lbf
* Grab Tensile	ASTM D751	150 lbf
* Elongation at Peak Strength	ASTM D751	20%
Trapezoid Tear	ASTM D4533	110 lbf
Maximum Use Temp.		180 F
Minimum Use Temp.		~70 F
Perm Rating	ASTM E96	0.023

\* Tests are an average of Diagonal Directions

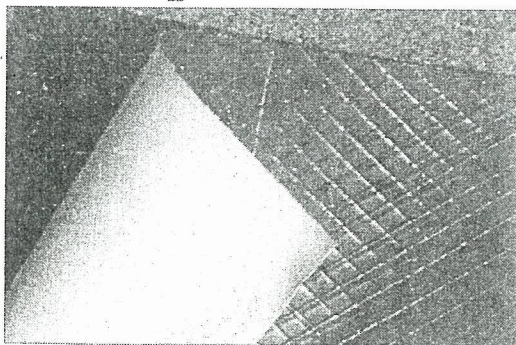
CleanSpace Liner is a white/blue seven layer reinforced laminate containing no adhesives. The outer layer consists of high strength polyethylene film manufactured using virgin grade resins and containing UVI and thermal stabilizers. CleanSpace is reinforced with two separate plies of a 900 denier polyester reinforcement laid in a diagonal pattern spaced 3/8" apart with an additional machine direction polyester every 3" across the width. The individual plies are laminated together with molten polyethylene.

NOTE: To the best of our knowledge, these are typical property values and are intended as guides only, not as specification limits.



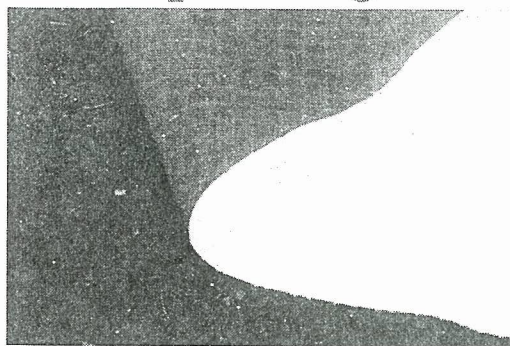
# The CleanSpace® Product Line

## CleanSpace®



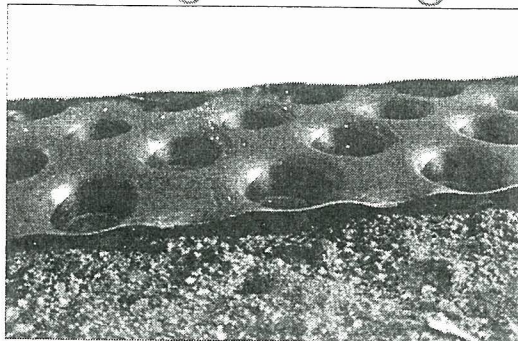
- 20 mil thick
- Our heaviest liner
- UltraFresh® antimicrobial protection
- Blue/white
- 25-year warranty\*

## CleanSpace® Light



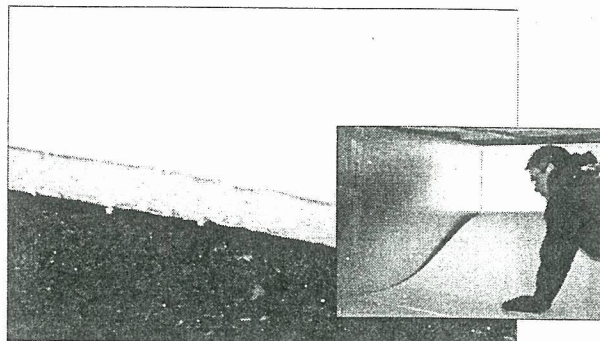
- 10 mil thick
- UltraFresh® antimicrobial protection
- Use over **Drainage Matting** and **TerraBlock™**
- Green/white

## Drainage Matting



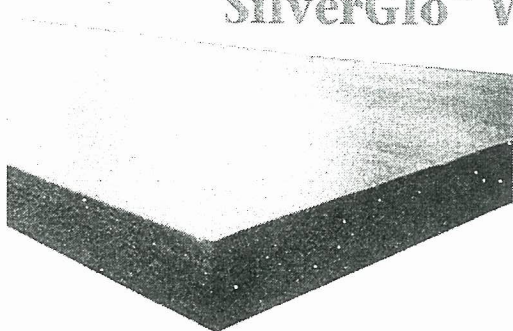
- Creates a drainage space under CleanSpace® for water to flow beneath.
- Adds durability, puncture resistance, and a thermal break.

## TerraBlock™

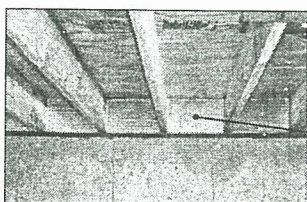
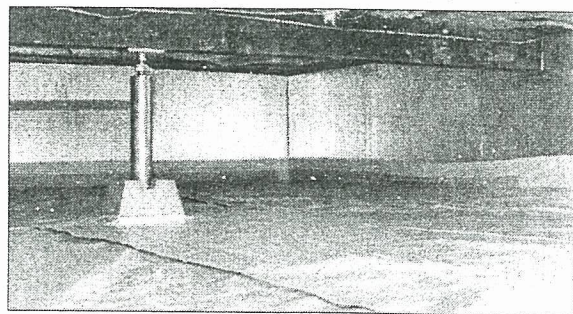


- ¾" Flexible foam insulation with vapor barrier on both sides.
- Insulates your crawl space floor beneath CleanSpace®.

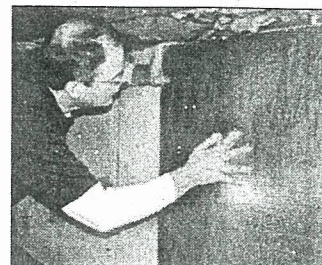
## SilverGlo™ Wall Insulation



**SilverGlo™** panels look different because they ARE different. Tiny graphite particles permeate its foam insulation to give it that silver/gray shine. These tiny particles reflect heat and lower the material's conductivity for superior **R value** per inch. In addition to resisting heat conduction, **SilverGlo™** boasts a radiant barrier, which reflects heat back into your crawl space for ultimate energy savings.



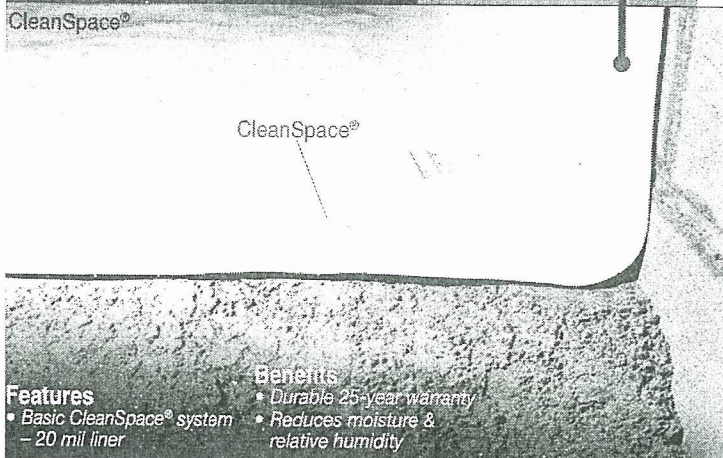
**SilverGlo™** can also be installed on the perimeter of your floor framing system (rim joist) for maximum energy savings.



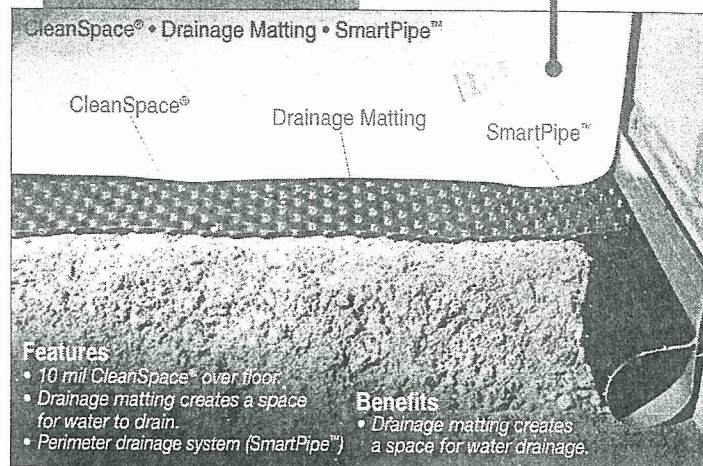


## BASIC Product +Combinations

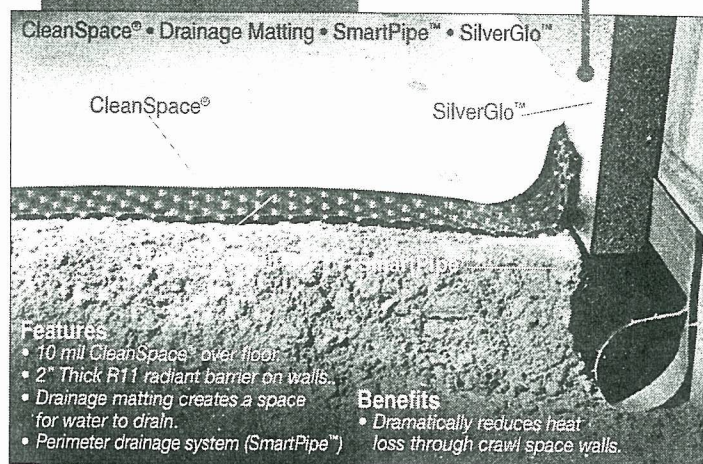
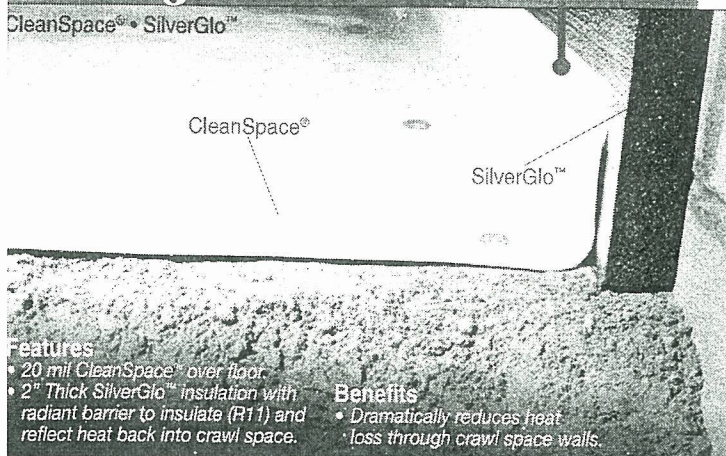
crawl spaces  
**WITHOUT**  
water leakage



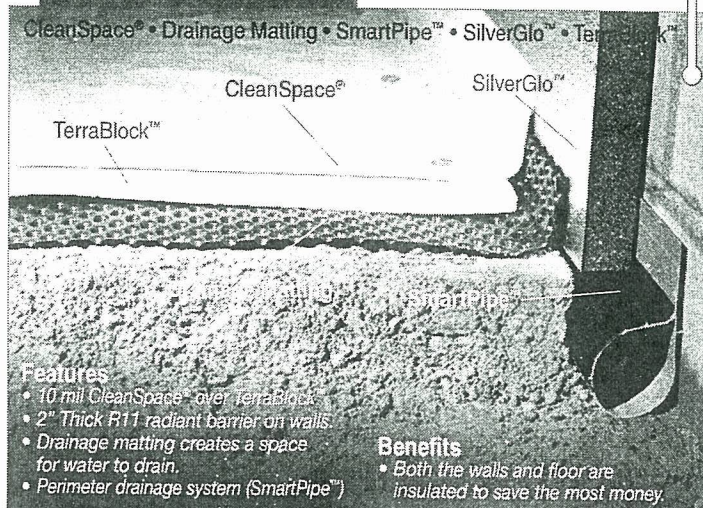
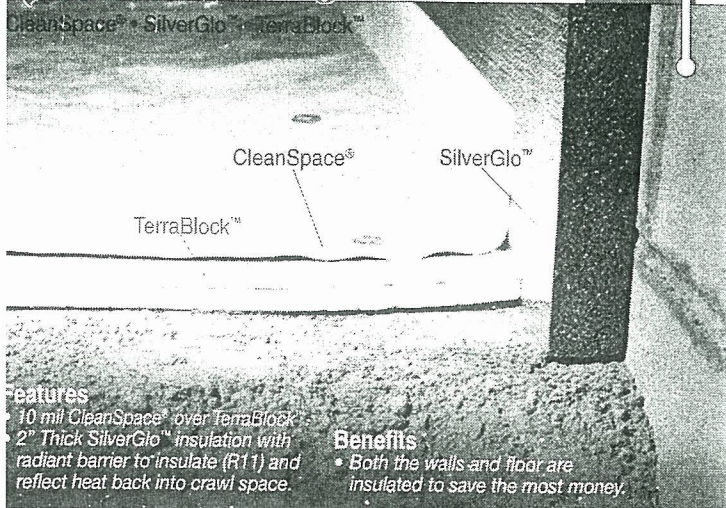
crawl spaces  
**WITH**  
water leakage



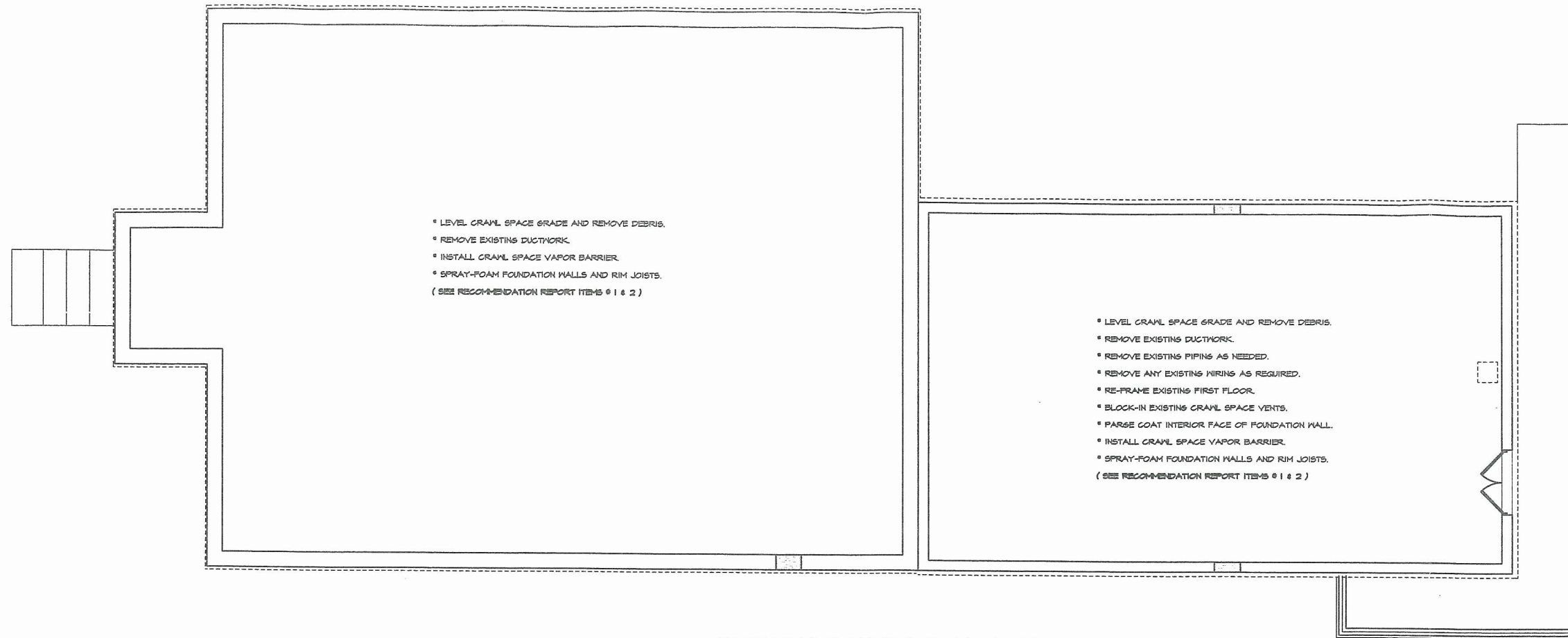
## ENERGY Saving +Combinations



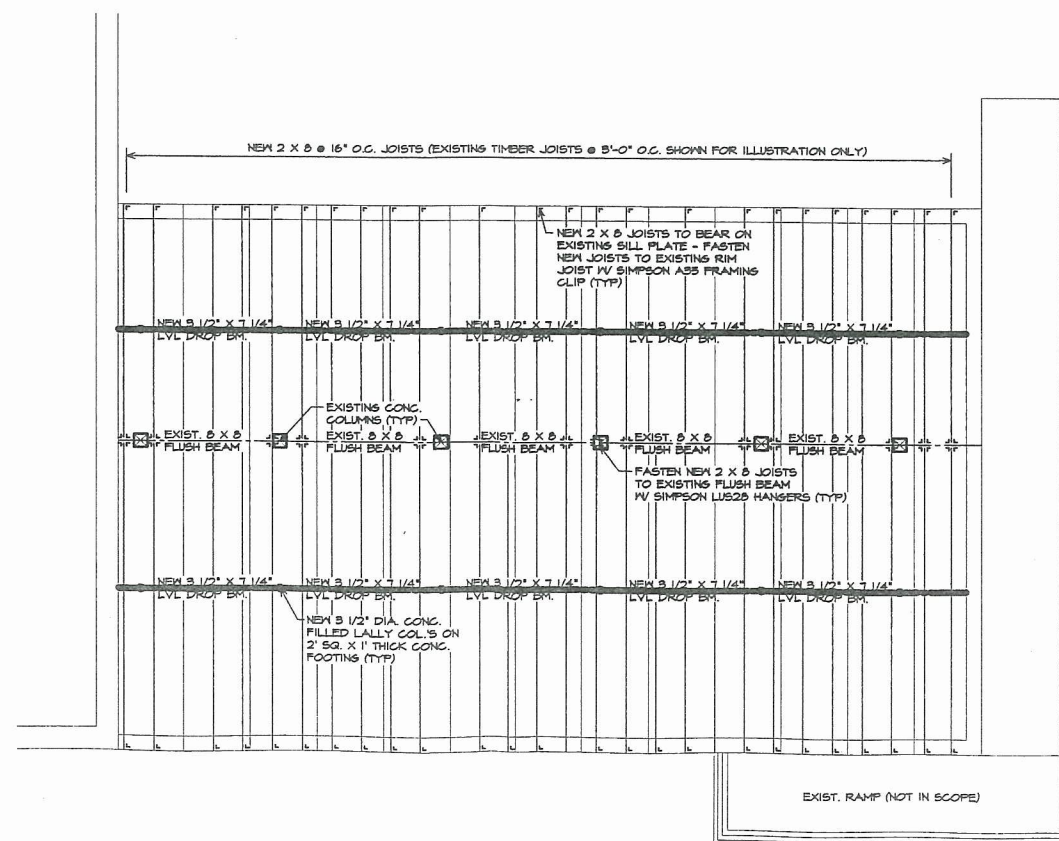
## Ultimate ENERGY Saving +Combinations



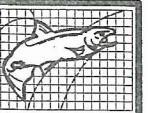




EXISTING FOUNDATION PLAN  
SCALE: 1/4" = 1'-0"



PROPOSED FIRST FLOOR FRAMING PLAN  
SCALE: 1/4" = 1'-0"



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Architecture

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(207) 284-4546 (FAX)

DRAWN:  
RNF, MRB, PJM  
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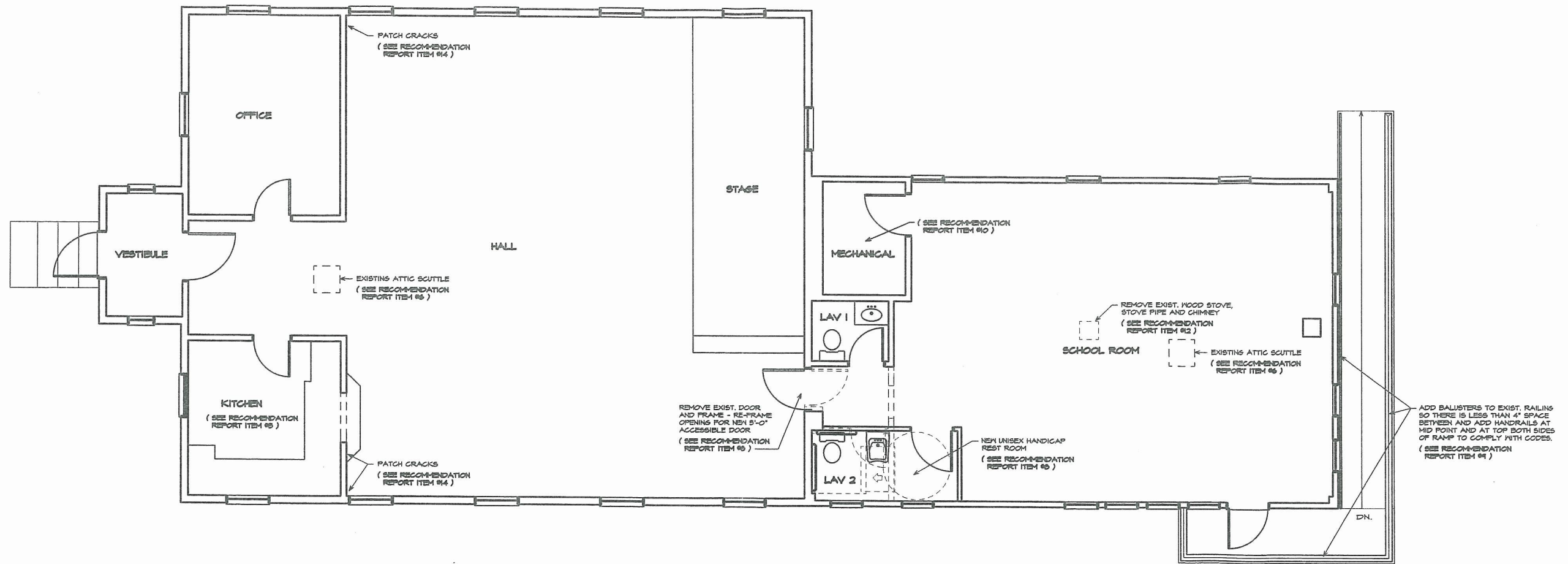
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10-27-11  
PROJECT NO.  
1113

Brookfield Town House  
Study  
Brookfield, New Hampshire

EXIST. FOUNDATION PLAN  
& PROPOSED FIRST  
FLOOR FRAMING PLAN  
SCALE: 1/4" = 1'-0"

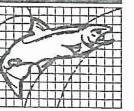
A-1





FLOOR PLAN  
SCALE: 1/4" = 1'-0"

REVISIONS



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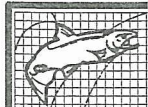
Brookfield Town House  
Study  
Brookfield, New Hampshire

FLOOR PLAN  
SCALE: 1/4" = 1'-0"

A-2

1113 DESIGN





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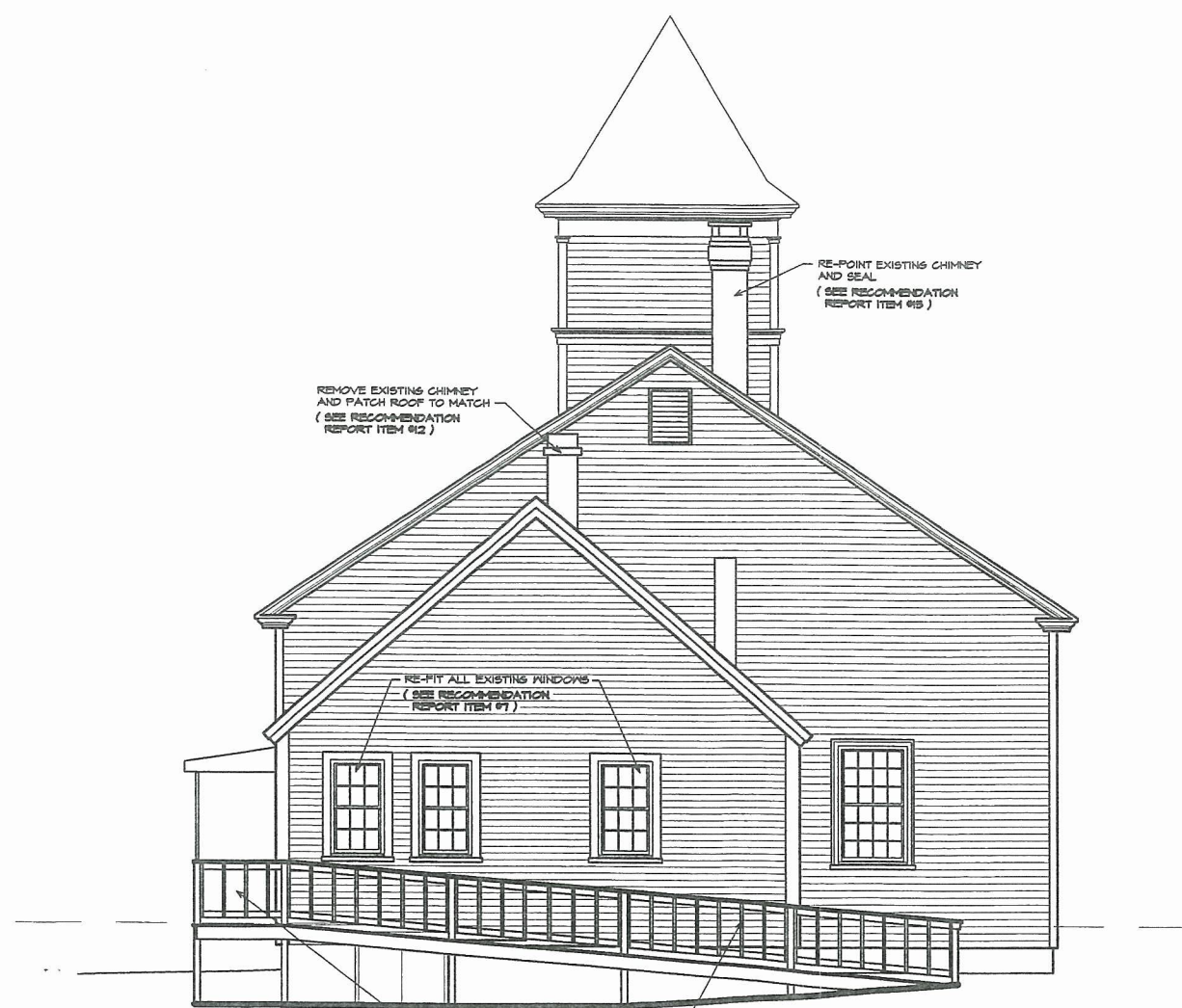
1113

Brookfield Town House  
Study  
Brookfield, New Hampshire

FRONT & REAR  
ELEVATIONS  
SCALE: 1/4" = 1'-0"

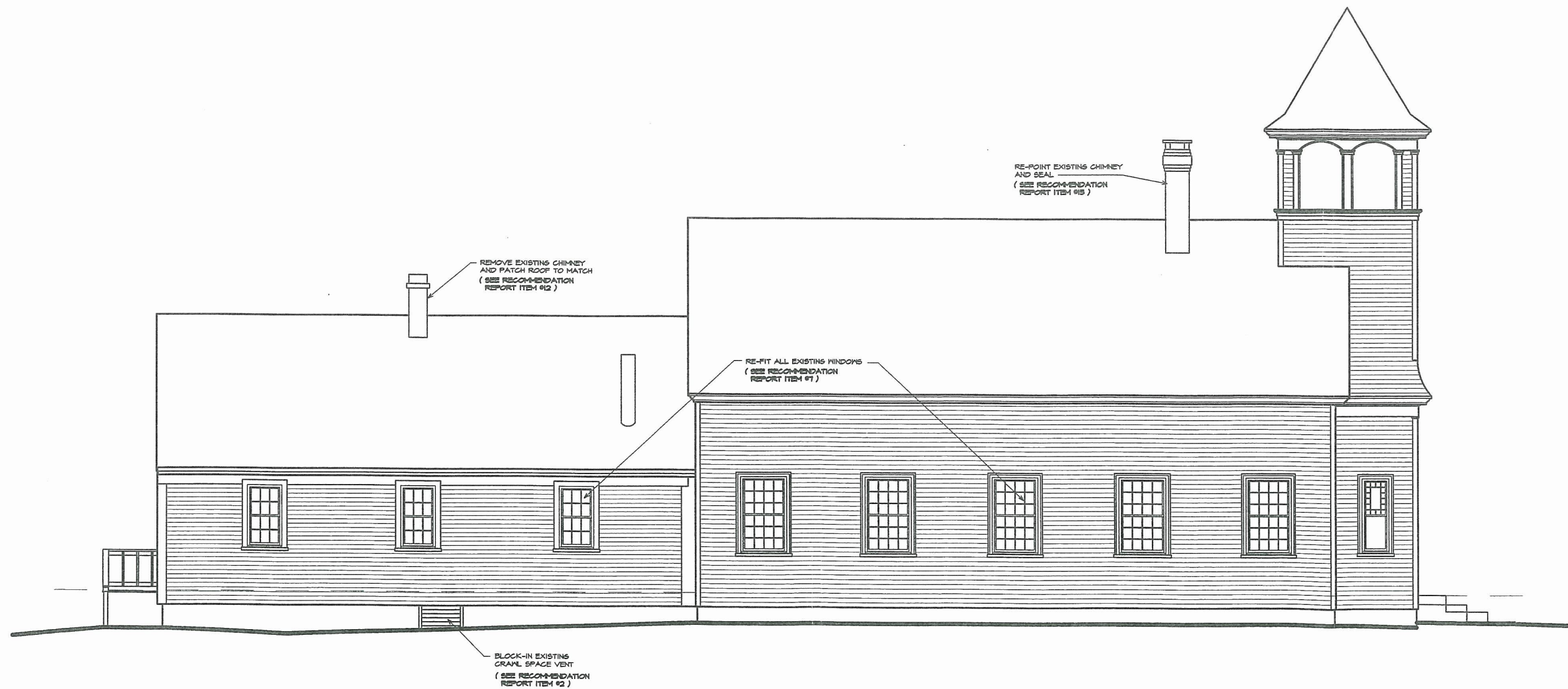


FRONT ELEVATION  
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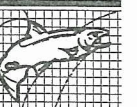
REAR ELEVATION  
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LEFT SIDE ELEVATION  
SCALE: 1/4" = 1'-0"

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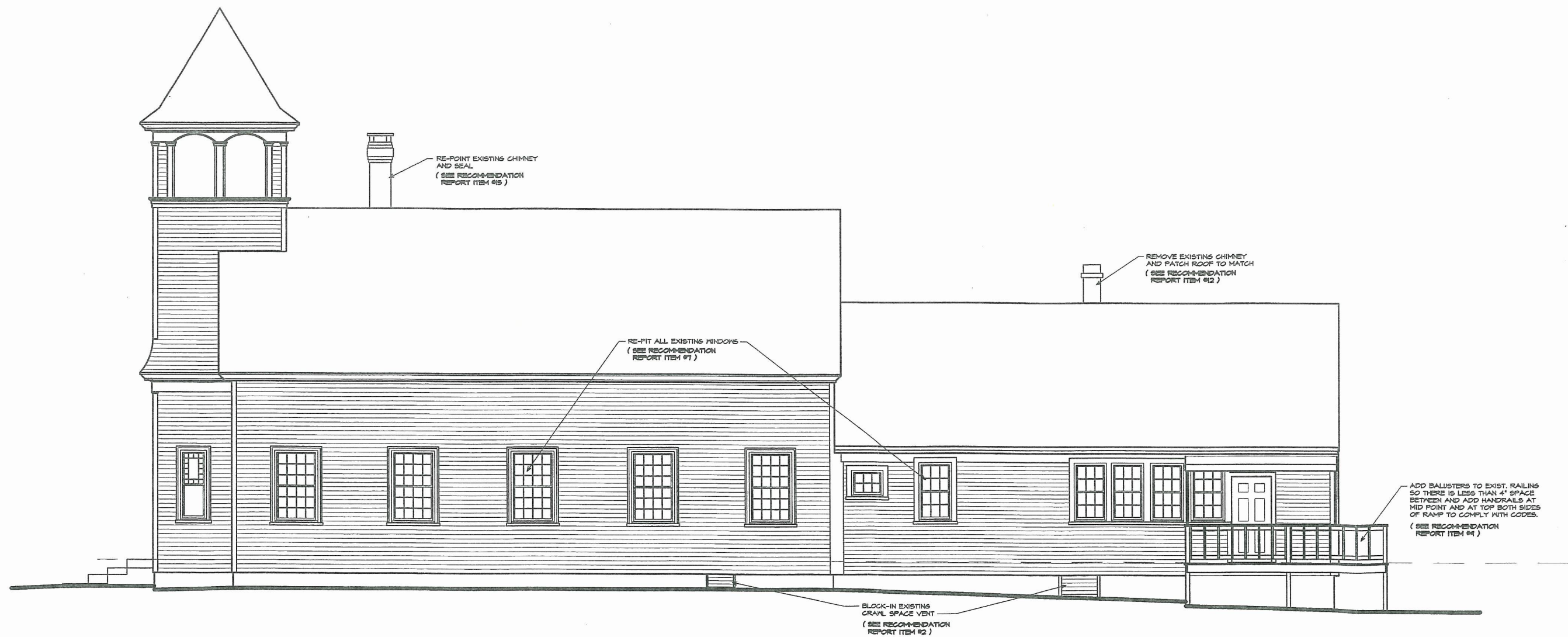
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Study  
Brookfield, New Hampshire

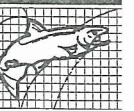
LEFT ELEVATION  
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RIGHT SIDE ELEVATION  
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Brookfield, New Hampshire

RIGHT ELEVATION  
SCALE: 1/4" = 1'-0"

A-5

XXXX01