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NYSERDA Deep Energy Retrofits: House 2 Report

Exterior Rigid Foam Retrofit Strategy

Prepared by:
Anastasia Herk

In collaboration with:
Richard Baker, Dave Abrey, and Jason Todd

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2214 Liberty Avenue
Pittsburgh, PA 15222
www.ibacos.com
1-800-611-7052

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Background of the NYSERDA Deep Energy Retrofit Project

The purpose of this project for the New York State Energy Research and Development Authority (NYSERDA) is to find new or improved strategies for exterior building solutions in regard to insulation that will provide extensive energy-savings benefits for homeowners. Deep energy retrofits (DER) is one of the solutions. In the past, DERs have been expensive and hard for the average homeowner to budget. The DER solutions proposed by IBACOS and GreenHomes America (GHA) are intended to be market friendly, affordable, and easily repeatable. The insulation strategies that will be used on nine test homes include the following:

- **Rigid foam insulation** – Four homes will have approximate center-of-wall R-values of R-28, including furring strips for siding, with additional systems approach work to supply the complete integrated DER solution.
- **Spray foam insulation** – Four homes will have approximate center-of-wall R-values of R-30, with additional systems approach work to supply the complete integrated DER solution.
- **HPwES upgrade** – One home will include criteria from the Home Performance with ENERGY STAR® (HPwES) program, including dense pack walls and window upgrades for this retrofit strategy.

In addition to the insulation, the strategies will include treatment where needed in the attic, mechanical systems, ventilation and basement band joist, walls, and floors.

This report focuses on the second test home, [House 2](#), for the NYSERDA DER project. The report walks through a timeline of preconstruction efforts, the construction process, and post-construction activities for House 2, highlighting key areas.

Overview

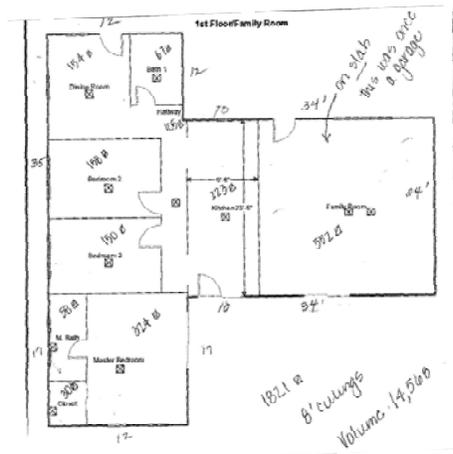
House 2 Existing Conditions

House 2 is the second of nine test homes participating in the DER project for NYSERDA. The home is in a residential neighborhood in Baldwinsville, New York, located at 8453 River Road. Three occupants currently reside in this single-story, ranch-style home, which was built in 1975 and has a finished floor area of approximately 1,821 ft². Figure 1 shows the floor plan for House 2.

Prior to construction, GHA assessed the existing conditions of House 2. There was prior work done by the homeowner to upgrade the house. Appendix A shows the Home Screening Worksheet produced by GHA. The existing home had whole-house air conditioning and natural gas with metal, insulated ducts for heating and appeared to have no leaks in the roof. The interior of the home included a mix of double-hung and casement windows as well as 18 inches of fiberglass and cellulose insulation in the attic. The walls of the home consisted of 3½ inches of fiberglass insulation. The dry, unfinished basement with walls made of block included 2-inch foam board on the crawlspace walls and 2-inch closed cell foam on tall rim joists. A geothermal system had been installed by GHA in 2010; therefore, the electric water heater is a desuperheater. Existing exterior conditions of the home included vinyl siding, one chimney, one deck in the back of the home, five exterior lights, and a small bush that would need to be trimmed or removed so that it would not interfere with the DER work. Some of these conditions are shown in the photos on the right.



Figure 1. Preliminary sketch of the House 2 floor plan.



Planned Approach

Strategies for House 2

Once the existing conditions of House 2 were assessed, a workscope was created. This workscope described all of the renovations and updates that were to be done at this residence. Demolition of the following items occurred:

- Removal of existing vinyl siding and one chimney by GHA
- Removal of one deck in the back of the home by the homeowners

House 2 was to receive the rigid foam strategy, and the construction included the following:

- Installation of Mastic Quest[®] vinyl siding in the Harbor Grey color, 4.5-inch width, on all elevations
- Installation of CertainTeed vinyl soffit material for overhangs
- Application of white trim to the fascia, 13 windows (OKNA U-19), and 4 doors
- Addition of a dryer vent in stainless steel, provided by the homeowners
- Moving a rear lamp light to the corner and replacing it with motion sensor lighting

See Appendix B for the workscope that explains the DER strategies for House 2.

Preconstruction Process

Home Energy Assessment

GHA conducted an energy assessment of House 2 prior to doing any work on the home. GHA was able to conduct blower door testing in House 2, and the results were 1670 CFM50 with the basement door closed and 1810 CFM50 with the basement door open. The energy assessment also revealed to the team that House 2 had central air conditioning as well as a geothermal system that had been installed in 2010.

See Appendix C for the energy assessment of House 2.

Homeowner Approval

After discussing the workscope as previously described, the homeowners agreed on the DER construction strategy, timeline, and process. The agreement states that the homeowners will pay \$52,302, which includes a down payment of \$8,000 for the work. In addition to that amount, NYSERDA will contribute \$35,000 from the DER program toward the DER installation.

See Appendix D for the homeowner construction agreement for House 2.

Permitting

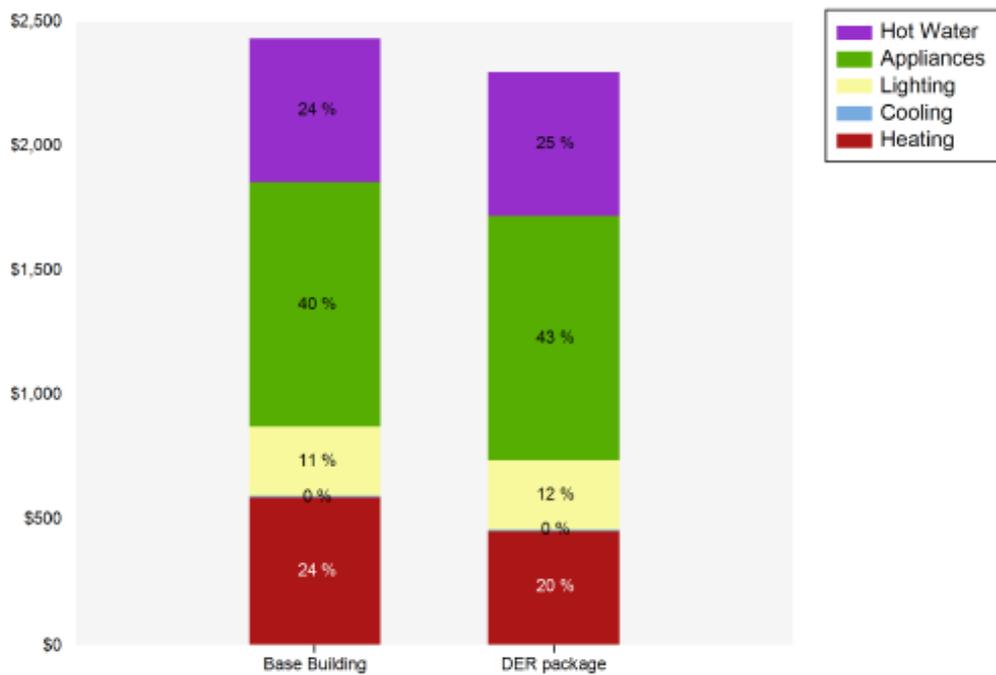
There were no permitting problems or issues with this house. Construction was able to start immediately with verbal approval from the local governing offices.

Modeling

GHA performed Targeted Retrofit Energy Analysis Tool (TREAT) modeling for House 2. TREAT modeling involves entering and analyzing utility bill information, weather data, and building modeling information. The output report shows calculated energy savings for improvements made to the home through the DER. Figure 2 shows the source energy use for the existing House 2 prior to the DER.

See Appendix E for the TREAT modeling outputs for House 2.

Figure 2. TREAT modeling output for House 2.



IBACOS also used Building Energy Optimization (BEopt) software to model the current conditions of House 2. Created by the National Renewable Energy Laboratory (NREL), BEopt is a software program that finds the least-cost solution to designing a zero-energy house. Table 1 shows the energy consumption table for House 2.

Table 1. House 2 Energy Consumption Table from BEopt.

End Use	Estimated Annual Source Energy		Source Energy Savings	
	Pre-Retrofit (Mbtu/yr)	Post-Retrofit (Mbtu/yr)	Percent of End Use	Percent of Total
Space Heating	61.75	34.31	44%	21%
Space Cooling	1.58	0.36	77%	0%
HVAC Fan/Pump	15.86	8.23	48%	5%
DHW	41.42	41.42	0%	25%
Lighting	18.16	18.16	0%	11%
Appliances	22.15	22.15	0%	14%
Ventilation Fan	0.25	0.25	0%	0%
Miscellaneous	38.19	38.19	0%	23%
Total Usage	199.36	163.07	18%	100%
Site Generation	0	0	0%	0%
Net Energy Use	199.36	163.07	18%	100%

Construction Process

Gathering of Trades

Most of the trades with which GHA works on a regular basis are up to speed on current retrofit solutions. These subcontractors do home performance updates on other homes, so GHA was able to use subcontractors that it typically uses to do this DER work on House 2. The project details were given to the subcontractors, and a meeting was held among IBACOS, GHA, and the subcontractors during the mock-up phase to work through any questions the subcontractors might have had.

Construction Schedule

GHA created the project schedule based on its prior knowledge of energy upgrades to homes. During the first week of construction two days were spent on the walls but weather impeded additional days so no other work was done. The second week of construction was spent on putting the walls together as well as rough openings for the windows. Week three consisted of finalizing the walls and installing windows. Siding was scheduled to start during week four and wrapped up by the end of the week. Also during week four, the ERV was installed and GHA tested the home's ductwork. The final week of construction, week five, consisted of the addition of new siding on top of the DER system.

Construction Process Photos

This photo shows the front of House 2 before any DER work was done. The removal of the front deck by the homeowners can be seen on the right side of the photo.



This view shows the back of the house before any DER work was done. Notice the removal of the back deck (center of photo) by the homeowners.



This view shows the removal of the chimney before any DER work was done.



Removal of existing siding is shown here. The Tyvek® building wrap shown here was original to the construction of the house and was kept where it was still intact.



This view shows the energy recovery ventilator (ERV), model number Renewaire EV130, that had been installed in the basement.



All HVAC equipment was existing as well as insulation and duct sealing. Geothermal is a Hydron Module heat pump supplying FHA and cooling. There is a 80 gallon storage tank connected to a desuperheater, an auxiliary heat-recovery system providing some of the domestic hot water. The rest is done with a standard 40 gallon electric water heater.



This view shows the first layer of rigid foam insulation that was installed horizontally and the beginning of the installation of the second layer, which is vertical. Vertical strapping in the form of 2x4s was inset into the second layer to allow for the fastening of siding.



This picture shows the start of a rough opening for a window. Refer to the construction details for the sequencing of materials.



A contractor frames out the rest of the rough opening with the first layer of insulation applied.



A close-up view of the rough opening pictured previously. The rigid foam in view is the first layer of insulation. Additional strapping will be installed adjacent to the opening and flush with the second layer of rigid foam.



This picture shows the flex wrap flashing that was applied on the exterior of the rough opening to create a pan flashing.



This is a full view of the entire rough opening from the exterior.



This is a view of the installed window from the interior of the house, showing the thickened exterior wall.



This picture shows the newly installed window from the exterior.



This rear view of the house shows the completed installation, of foam board prior to the installation of the tape of the vertical strapping.



This front view of the house shows that both layers of insulation have been installed. Construction tape was installed over the vertical strapping so the second layer of foam could act as a continuous drainage plane.



Here the siding is being installed around the new front door.



This photo shows the home with the new siding and downspout installation complete.



Lessons Learned

The rigid foam board approach used on House 2 is fairly straightforward. This job had greater overall square footage to install versus that of the first home, yet its construction seemed to progress more rapidly. With House 2, we moved two windows and closed up one patio door, converting it to a window, at the homeowners' request.

Although the team possibly could attribute the ease of installation on House 2 to GHA's familiarity with the work that had to be done on House 2, this project was notably different from House 1. Application of spray foam on House 1 is easy to understand, but House 1 required more layout and consideration in starting construction.

The most difficult or awkward part of the work done on House 2 was installing the bottom ledger. Sections of walls were different depths away from the foundation below them. As the contractors were wrapping insulation over tall, exposed foundations, there was some calculating in installing the lowest part of the ledger. Shimming or adding material to make up the difference in depths was necessary at times.

Windows seemed easier to install on House 2 because the walls were relatively flat. Given that the siding was pulled, working from the sheathing made a difference. As with House 1, the windows were brought to the outside and trimmed on the inside.

At times, obtaining additional material from suppliers took extra time because no local, in-stock options were available (e.g., tape, in particular). This was a planning problem that was discovered in dealing with unconventional materials and local suppliers.

The mock-ups did not address all potential flashing details. The contractors followed the Dow straight flash tape specifications for housewrapped homes, even though our design does not include housewrap. In some areas, the contractors used Tyvek to cover broad spans of the rough opening where a drainage plane was needed for windows. Not wanting to span the entire area with tape, the contractors used Tyvek to cover the area and then followed with the initial indented tape flashing details.

Existing doors, not framed out as the windows were, also raised questions about flashing. A combination of tape and other sealants was used, as well as coil stock to protect the original door installation. To remove the door that the homeowners wished to keep, simply flashing is, at best, a risky affair. Based on the contractors' experience, reinstalling lesser-quality doors can cause the assembly to pull apart, making reinstallation more difficult or even breaking the new door. It would be preferred to start with a new door and to install the flashing properly. The contractor felt the flashing and sealant approach was second best.



Material List

The materials that were used on site included both donated and purchased materials. The donated materials were from some of the partnering companies for this DER project, including the following: Simpson Strong-Tie, Johns Manville, Dow, Bayer, and Carrier. In addition to donated materials, other materials were purchased to complete the project.

See Appendix F for a complete list of the material breakdown for this project.

Cost per Shell Square Foot

One of the main research questions in this DER project is to find a way to make these types of retrofits common and affordable for midstream homeowners. To prove that it is essential to provide costing for the entire project, prior to construction, it was estimated that the cost per shell square foot would be \$15.81, as detailed in Figure 4.

See Appendix G for initial costing information prior to construction of House 2.

After construction of House 2, once the material list was completed and included both donated and bought materials, the true costs were calculated. The costing for the new wall system included the following: removal of siding, new framing, removal of windows, window trim installation, foam board installation, T-ply installation, and bug screen bottom installation. That cost totaled \$11.02 per shell square foot (ssf). If the cost of the siding is added to that cost per shell square foot, the total is \$19.22 ssf.

See Appendix H for actual costing information for this House 2 project.

Figure 3. Initial costing for wall construction on House 2.

Deep Energy Retrofit Project Cost Estimate														
Insulation Board														
	Square Ft/ Units	Hours	Labor Costs	Material Costs	Donated Material	Donated By:	NYSERDA \$\$	GJGNY Audit	HP Loan	Customer Contribution	10% HEMI	Net Cost	Total Costs	Cost/ssf (Cost/Unit)
Walls														
Remove Siding and Dispose	1900	\$0	\$0	\$0	\$0		\$0	\$0	\$0	\$0	\$0	\$1,046	\$1,046	\$0.55
Remove existing window and dispose	14	0	\$0	\$0	\$0		\$0	\$0	\$0	\$0	\$0	\$700	\$700	\$50.00
Framing the new wall & RO for windows	2,270	0	\$0	\$0	\$443	Simpson	\$0	\$0	\$0	\$0	\$0	\$2,962	\$3,405	\$1.50
Trim interior window/door finishing	14	0	\$0	\$0	\$0		\$0	\$0	\$0	\$0	\$0	\$2,450	\$2,450	\$175.00
Install 3 1/2" of Spider	0	0	\$0	\$0	\$0	Johns Manville	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0.00
Install 3" of spray foam or 3" DOW Board	2,270	0	\$0	\$0	\$5,405	Bayer/Dow	\$0	\$0	\$0	\$0	\$0	\$6,448	\$6,853	\$3.90
Box bottom - include insect barrier *3.4	105	0	\$0	\$0	\$0		\$0	\$0	\$0	\$0	\$0	\$420	\$420	\$4.00
Install vinyl lineals to windows and doors 12/5	19											\$2,550	\$2,550	\$150.00
Install 3/8" OSB + Mastic Quest Siding/Trim	2,270	0	\$0	\$0	\$0			\$0	\$0	\$0	\$0	\$16,467	\$16,467	\$7.25
Total Wall Work	2,270	0	\$0	\$0	\$5,848		\$0	\$0	\$0	\$0	\$0	\$32,032	\$36,880	\$16.81

Testing and Monitoring

Testing Results

Blower door testing was conducted prior to construction and after the build-out. There was little opportunity to test in stages with House 2.

Table 2 describes these test results. The details used for House 2 include the following:

- Volume : 27,572 ft³
- Square feet of conditioned space : 1,804 ft²
- Square feet of basement/crawlspace : 1,804 ft²
- Perimeter of house : 200 ft
- Wall height : 8 ft
- Shell square footage (ssf) : 6,808 ssf

Table 2. DER House 2 Airflow Reductions by Stage.

Improvement Stage	CFM50	CFM50 Reduction from Start	% Reduction from Start	ACH50	CFM50/SSF
Start	1670	0	0%	3.6	0.25
Wall Build-Out (Including Windows and Foam, ERV)	1580	90	5%	3.4	0.23

No additional air sealing was performed on House 2. The leakage reduction shown in Table 2 is only from replacement of both walls and windows. There was little opportunity to record blower door testing in stages. The basement in House 2 was considered part of the enclosure from the beginning.

Future Monitoring

Further monitoring and testing for House 2 will include one full heating season of data collection after completion of the DER and will consist of the following:

- Indoor temperature and relative humidity in the main living space at the main thermostat, in one bedroom, and in conditioned basement area
- Run time of the space heating system
- Outdoor temperature and relative humidity for the Syracuse area in which House 2 is located
- Blower door tests designed to evaluate the impact of the exterior wall insulation strategy with respect to the other DER improvements
- Collection of homeowner utility bills for three months of the heating season prior to DER activity and one year following the DER

See Appendix I the homeowner monitoring agreement and Appendix J for the duct layout of House 2.

Location of House 2

House 2 is located at 8453 River Road, Baldwinsville, New York, 13027. See Appendix K for floor plans of House 2





Summary

Construction of House 2 was a success for the DER project and for the homeowners. The team learned valuable lessons during construction that it can apply on the next three homes that receive the same rigid foam application. Testing and monitoring will be telling on the success of the energy aspect of the project. After construction was completed, the material and cost analysis was beneficial to learning where there may be aspects of the project on which the team could improve. That includes the learning process for the contractors to build the wall system in a smooth and timely manner.

The testing, cost, and materials, among other things, will be improved for the construction of the next DER house due to the lessons learned on this House 2 project.



NYSERDA Deep Energy Retrofits:
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Appendix A – Home Screening Worksheet

Deep Energy Retrofit: Home Screening Worksheet

Customer and General House Information

Name: SETH & CAROLYN KRIESEL		Neighborhood of Home: _____	
Address: 8453 RIVER RD		Does the homeowner have a year's worth of utility information? (Y) N	
City: BALDWINVILLE NY	Zip Code: 13027	# of Occupants: 3	# of Stories (2.5 Max): 1
Phone 1: 315-9356009	Phone 2: 315-303-5685	Finished Floor Area (sq ft): _____	Structure: Sound <input type="checkbox"/> Damaged <input type="checkbox"/>
Heating Fuel: NGas <input checked="" type="checkbox"/> Oil <input type="checkbox"/> Propane <input type="checkbox"/> Other _____	Roof: No Leaks <input checked="" type="checkbox"/> Leaks <input type="checkbox"/> Pitch _____		
AC: Whole House <input checked="" type="checkbox"/> Window Units <input type="checkbox"/> # Units _____ None <input type="checkbox"/>	Ducts: Material: Metal Insulated.		
Footprint: Rectangle or with one addition or "L" shaped <input checked="" type="checkbox"/> "T" Shaped or More Complex <input type="checkbox"/>	Type of House: RANCH	Apx Age of home: 1975	

Interior

Windows	Type of Windows: Double Hung # 10 <input checked="" type="checkbox"/> Casement # 6 <input checked="" type="checkbox"/> Other # _____ <input type="checkbox"/> Apx Sq Ft 161.9
	General Condition: FAIR
Y <input type="checkbox"/> N <input checked="" type="checkbox"/> Are there any odd shaped windows or windows > 96 U.I.? If Yes, explain _____	

Attic	Y <input type="checkbox"/> N <input checked="" type="checkbox"/> Can the attic be accessed easily? If not, can a hatch be installed? _____
	Y <input type="checkbox"/> N <input checked="" type="checkbox"/> Is the attic insulated? Inches of Insulation: 18 Type of Insulation & Condition: Fiberglass Batt + cellulose
Notes: _____	

Basement	Dry & Accessible <input checked="" type="checkbox"/> Wet or Inaccessible <input type="checkbox"/> Finished <input type="checkbox"/> Unfinished <input checked="" type="checkbox"/> Block or Poured Foundation <input checked="" type="checkbox"/> Fieldstone or Irregular Foundation <input type="checkbox"/>
	Rim Joist Wood OK <input checked="" type="checkbox"/> Rim Joist Rotted <input type="checkbox"/> Type & Condition of Water Heater: GEO - SUPER HEATER - ELECTRIC Y <input type="checkbox"/> N <input checked="" type="checkbox"/> Direct Vent?
	Type & Condition of Heating: GEO THERMAL SYSTEM Y <input type="checkbox"/> N <input checked="" type="checkbox"/> Direct Vent?
Notes: 2" FOAM BOARD ON WALLS IN CRAWL SPACE 2" CLOSED CELL FOAM ON ALL RIM JOISTS.	

General	Y <input type="checkbox"/> N <input checked="" type="checkbox"/> Is there excessive paint chipping inside? If yes, where _____
	Y <input type="checkbox"/> N <input checked="" type="checkbox"/> Is the wiring in good condition? If No, explain _____
	Y <input type="checkbox"/> N <input checked="" type="checkbox"/> Is there existing Wall Insulation? If Yes, please describe 3 1/2 FIBERGLASS BATT'S
	Y <input type="checkbox"/> N <input checked="" type="checkbox"/> Are there any fireplaces? If Yes, how many/location _____
	Y <input type="checkbox"/> N <input checked="" type="checkbox"/> Is there any indication of mold issues? If yes, where _____
Y <input type="checkbox"/> N <input checked="" type="checkbox"/> Is there evidence of asbestos-like material in the home? If yes, where _____	
General Notes: _____	

Note any homeowner concerns: _____	Page 1 of 2
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Deep Energy Retrofit: Home Screening Worksheet

Customer Name **SETH & CAROLYN KRIESEL**

Exterior	
Siding	Type & Condition (no asbestos) Vinyl
Chimney	No. & Condition (2 MAX) BLOCK - WAS USED - NOW BEING REMOVED FOR DER.
Porch(es)	(And any Overhangs) No. & Condition No
Deck(s)	No. & Condition (2 MAX) DECK TO BE REMOVED FROM FRONT OF HOME TO BE REINSTALLED BY HOMEOWNER AFTER DER. BY HOMEOWNER
Utilities	No. & Condition 2 YEAR OLD GEO THERMAL SYSTEM INSTALLED BY GREEN HOMES AMERICA
Exterior Lighting	Amount & Where 5 EXTERIOR LIGHTS
Landscape	<input checked="" type="radio"/> Y <input type="radio"/> N Is there any landscaping that interferes with work that cannot be removed? If yes, explain below.
	<input checked="" type="radio"/> Y <input type="radio"/> N Are there any noticeable setback issues? If yes, explain below.
Notes:	BUSH ON REAR CORNER OF HOME TO BE TRIMMED OR REMOVED BY HOMEOWNER.

At a minimum, the following photographs should be taken:

- | | |
|--|---|
| <input checked="" type="checkbox"/> House Elevations- Front/Back/Sides | <input type="checkbox"/> Problems such as Damage |
| <input checked="" type="checkbox"/> Soffits | <input checked="" type="checkbox"/> Exterior Lighting |
| <input checked="" type="checkbox"/> Gables | <input checked="" type="checkbox"/> Electrical |
| <input checked="" type="checkbox"/> Roof Trim Details | <input checked="" type="checkbox"/> Plumbing |
| <input checked="" type="checkbox"/> Any Decks and/or Porches - Connection to House | <input checked="" type="checkbox"/> Utility Entrances (elec, gas, oil, propane) |
| <input checked="" type="checkbox"/> Chimney | <input checked="" type="checkbox"/> Roof/Wall Intersections |
| <input checked="" type="checkbox"/> Basement Interior Walls, including clutter | <input type="checkbox"/> General Picture of each Room |
| <input checked="" type="checkbox"/> Heating System and Ductwork | |
| <input checked="" type="checkbox"/> Damaged and Typical Window(s) | |



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Appendix B – Workscope



Green Homes
AMERICA

Siding Work Scope

801 Hiawatha Blvd. E., Syracuse, NY 13208 315-474-6549
New York State's Most Awarded Contractor

Homeowner: SETH & CAROLYN KRIESEL Date: 7/20/12
 Street: 8453 RIVER RD. City: BALDWINSVILLE NY Zip: 13027
 Home Phone: _____ Cell Phone: _____ Work Phone: _____
 Advisor: JOHN SCIPIONE 447-8276

Building Type: RANCH CAPE SPLIT BUNGALOW COLONIAL CONTEMPORARY TWO-FAMILY OTHER

Proposal to furnish and install the following:

Complete Siding Preparations

- Home exterior, shrubs, landscaping, trees to be protected from damage.
- Customer to take down pictures, mirrors, and/or delicate items from interior of wall.
- Site to be left in basic good order each day, debris removed at project completion.
- Remove existing siding (alum cedar shake, other VINYL) and haul away.
(1 2) Layers
- Existing eave soffit to be either opened completely or cut open as wide as possible to allow maximum ventilation.
- Remove frame in and side over following areas: EXTENSION 16-18" (2 BLOCKS LOWER ON EXPOSED BLOCK AREA)
- Apply 3/8" fanfold foam underlayment over area to be sided: REFRAME EXTERIOR w/ 2x4s AND
Style: (Standard High-R solid core) Brand INSULATE w/ 3" DOW STYROFOAM R-15 (DER)
- If sheathing is needed, it shall be added at \$45 per sheet.
- Apply house wrap over area to be sided. (Limited Applicability)
- For disposal purposes, a dumpster may need to be set in driveway. (SET CLOSE TO DECK ON PAVEMENT)

Siding

- Vinyl Siding to be applied over specified areas:
(House Attached Garage Detached Garage Other Exclusions)
Brand MASTIC Line QUEST Color HARBOR GREY Size 4 1/2 Profile: DUTCH LAP
- SPECIALTY Siding to be applied over specified areas:
Brand _____ Line _____ Color _____ Size _____ Profile: _____

Soffit & Trim

- Apply vinyl soffit material to: (INVISIBLE WHERE VENTILATION IS NEEDED)
(Overhangs Porch Ceiling(s) Inner skirting Other _____) Exclusions _____
Brand: (Universal Other CERTIFIED) Color WHITE
Rakes, ceilings & skirting to be solid. Eaves to be: (Solid Center vent Full vent)
- Trim to be applied to the following areas: 3 1/2 INCH VINYL LINIARS.
(Fascia Crown Freeze # 13 Windows # 4 Doors # _____ Garage Doors # _____ Posts # _____ Beams)
Brand MASTIC Color WHITE Profile: (Brick mold Other _____) (Smooth PVC)

Accessories

- Apply Shutters: Brand: Mid-America Quantity: # _____ pairs Style Code: _____ Color# _____
Locations: (As listed on measure sheet) N/A
- Gable end vents: (Trim around existing Replace with new Eliminate and side over)
If new, then: Quantity: # 2 Shape: SQUARE Color: WHITE Size: (H) 12 (W) 12 + 1 FLOOD LIGHT.
- Utility Blocks: Color: HARBOR GREY (# 2 Electrical # 2 Split spigot # 4 Other LIGHTS) LIGHT.
- Dryer vent: (Trim around existing Replace with new) FOR WHITE CUSTOMER TO PROVIDE NEW STAINLESS STEEL VENT.
If new, then: Quantity: # _____ Color: _____ Color: HARBOR GREY Size: (4" 6")
- Gutters: If new, then: Color: _____ Location(s): _____
(Remove and dispose of Remove and reset if salvageable Leave in place and trim up to Replace with new)

Comments: MOVE REAR LAMP LIGHT TO CORNER - WILL REPLACE w/ MOTION SENSOR LIGHTING.

J&S 7/20/12 SK CB 7/20/12

Client KRIESEL

Acct#

REPLACEMENT WINDOWS												
	Measurements W X H	Fl	Room	Old Style	New Style	Color E/I	Glass Type	Grids T/B	Alum Clad	Scrs H/F	New Mldgs	MFR / Model
119-1	40 x 24		BATH	AWN	AWN	WW		OO		HALF		OKNA "500"
119-2	38 x 57		D-RM	DH	DH					HALF		INSULTEK
119-3	38 x 57		"	DH	DH					"		
119-4	33 x 22		KIT	AWN	AWN					FULL		
119-5	32 x 53		MUSIC	DH	DH					HALF		
119-6	32 x 53		"									
119-7	32 x 53		BED.									
119-8	32 x 53		"									
119-9	24 x 38		BATH									
119-10	32 x 53		HSTR.									
119-11	32 x 53		"									
119-12	32 x 53		"									
119-13	X											
119-14	→ THIS IS NEW MODIFIED OPENING WHERE PATIO SLIDER EXISTS											
119-15	X											
119-16	X											
119-17	X											
119-18	94 x 48		FRONT FAM. ROOM			WW						
119-19	X											
119-20	(FROM EXISTING STOCK INVENTORY)											
119-21	X											
119-22	X											
119-23	X											
119-24	X											
119-25	X											

<p>R C I</p> <p>120. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Vinyl-coated coil exterior trim: Flat _____ Textured _____ Color _____</p> <p>121. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Dense pack casing w/ cellulose. Qty _____</p>	<p>R C I</p> <p>122. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Interior trim replaced. Vinyl stop pcs: _____ Wood stop pcs: _____</p> <p>Yes <input type="checkbox"/> No <input type="checkbox"/> Alarm System Present?</p> <p>Yes <input type="checkbox"/> No <input type="checkbox"/> Fire egress in all bedrooms?</p>
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Special Instructions / Custom Carpentry:
OKNA LIFETIME NON-PRORATED TRANSFERABLE LIMITED WARRANTY.
GREENHOMES AMERICA - 5 YR. LABOR WARRANTY TO ORIGINAL OWNER.

<input type="checkbox"/> Bay	Extension in Inches from wall	Profile	Top Finish	Top Color	Top profile	Operating
<input type="checkbox"/> Bow		<input type="checkbox"/> 30° <input type="checkbox"/> 45°	<input type="checkbox"/> Roof <input type="checkbox"/> Soffit		<input type="checkbox"/> 3-Tab <input type="checkbox"/> Arch Brand _____ <input type="checkbox"/> Soffit profile _____	____/____/____

Style: Double Hung=DH; Twin/Triple Double Hung=2DH/3DH; 2-Lite Slider=SL; 3-Lite Slider=EV; Operating Casement=CS; Fixed Casement=FX;
 Dead Lite=WDL; Awning=AW; Garden=GAR; Hopper=H; Picture w/ 2DH flankers=DHP; BAY; BOW
U-Values by Glazing Type: Dbl-Glazed Low-E (Climatech): .32; Dble-Glazed, Dble-Coated Low-E (Climatech 2): U= .30; Triple-Glazed Low-E: U=.26
GHA Colors: White=WH; Beige=BG; Cherry=CH; Light Oak=LO; Dark Oak=DO; American Brown=AB
GL & ACW Colors: White=WH; Colonial White=CW; Ivory=IV; Cherry=CH; Golden Oak=GO; Natural Oak=NO; Camel/Sandstone=C/S; Earthtone/Timbertone=E/T
Grids: Vertical=V; Horizontal=H; Williamsburg=W; Georgian=G; Standard=S; Euro=E; Regal Colonial=RC; Regal Florentine=RF
Aluminum Clad: Stops (Partial or L-Bend)=S; Full (C-Bend)=F; Brick Mold=BM; 5 Inches Wide=W; Crown=C **Molding:** Shingle Mold=SGM; Shoe Mold=Shoe
Manufacture: Alside=AL; SunRise=SR; Great Lakes=GL; **Glass Type:** low E Argon Gas=LEA; Triple Pane Argon / Krypton=3PA/ 3PK



NYSERDA Deep Energy Retrofits:
House 2 Report
Exterior Rigid Foam Retrofit Strategy
November 12, 2012

Appendix C – Energy Assessment

Advisor's Name: **SCIPIONE** Date: **7/20/2012**
 HomeOwner's Name: **KRIESEL, SETH & CAROLYN**
 Address: **8453 RIVER RD.**
 City: **BIVILLE** NY Zip: **13027**
 House Type: Cape Colonial Ranch Split Raised Ranch Bungalow
 Heated Floors: **ONE** Occupants: **3** Bedrooms: **3**
 Basement: Condition: **GOOD** Const. Year: **1975**
 Heated Basement: **NO** Moisture: Yes No Thermostat Prog: Yes No
 Exhaust Fans: **2**
 Fan Location 1: **BATH** Fan Location 2: **BATH** Fan Location 3:

Conditioned Area and Volume Calculations

	L	x	W	=	Area	x	H	=	Volume
Basement	17	x	12	=	204	x	7	=	1428
	24	x	23	=	552	x	7	=	3864
	12	x	12	=	144	x	7	=	1008
1st Floor	52	x	12	=	624	x	8	=	4992
	24	x	34	=	816	x	8	=	6528
2nd Floor	x	=				x	=		
	x	=				x	=		
	x	=				x	=		
	x	=				x	=		
	x	=				x	=		
	x	=				x	=		
3rd Flr	x	=				x	=		
	x	=				x	=		
	x	=				x	=		
TOTALS								2340 sf	17820

.35 X (**17820** Volume) / 60 X (**19** N Factor) = **1975** MVG
 MVG X .7 = **1382** MVG

HVAC & DHW	HV Unit 1	HV Unit 2	DHW Unit1	DHW Unit2	Baseline Reading: -0.5
Location	BASE				Worst case reading -1.5
Fuel Type	ELEC		ELEC		Adjusted WCD: -1
Year Installed	1975				Ambient CO: 0
BTU IN			4500		CAZ CO: 0
Condition			4500		Temp In: 75
Vent Type					Temp Out: 85
CO					Dishwasher: Make & Age GM2275XTVBI Old or <u>New</u>
Flue Press					Clothes Washer: Make & Age Old or <u>New</u>
Appl. Type					Refrigerator: Make & Age TF S8 BF Old or <u>New</u>
Pilot/ EIC					Elec or Gas Dryer Vented <u>Properly</u> <u>Improperly</u> <u>None</u>

FRIG. RF268ABBP
Whirlpool

Efficiency					
Spillage P / F	1				Gas or <u>Elec</u> Oven CO
DHW Orphan					Range Vented Yes <u>No</u>
DHW Size			40		
Central AC	AC Unit 1	AC Unit 2			Co Detector <u>Yes</u> <u>No</u>
Year Installed					Gas Leak Test <u>Passed</u> <u>Failed</u>
SEER					
BTU or TON					
Blower Door	HP	FP	Ring	CFM50	Basement Door
			None <u>(A)</u> B C	1670	Open or <u>Closed</u>
			None <u>(A)</u> B C	1810	Open or <u>Closed</u>

BPI Draft Requirements

0 °F -2.5	35 °F -1.9	70 °F -1.0
5 °F -2.5	40 °F -1.8	75 °F -0.9
10 °F -2.5	45 °F -1.6	80 °F -0.8
15 °F -2.4	50 °F -1.5	85 °F -0.6
20 °F -2.3	55 °F -1.4	90 °F -0.5
25 °F -2.1	60 °F -1.3	95 °F -0.5
30 °F -2.0	65 °F -1.1	100 °F -0.5

BPI Allowable Worst Case

Orphan Water Heater	-2
Boiler or Furnace w/DHW	-3
Boiler or Furnace w/D & DHW	-5
Boiler or Furnace Only	-5
MA Boiler or Furnace w/DHW	-5
MA Boiler or Furnace Only	-15
MA DHW Only	-15

Stories	N Factor	Appliance Type	Vent Type
1	19	WFA = Warm Forced Air	ATM = Atmospheric
1.5	16.8	= Gravity Air	ID = Induced
2	15.4	= Hot Water Boiler	DV = Direct Vent
2.5	14.4	= Steam Boiler	SC=Sealed Combustion
3	13.7	= Heat Pump	



NYSEERDA Deep Energy Retrofits:
House 2 Report
Exterior Rigid Foam Retrofit Strategy
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Appendix D – Homeowner Construction Agreement

This Agreement is made the 20th day of July, 2012 between GreenHomes America, LLC (the "Contractor") and the Client:

CLIENT NAME <u>SETH & CAROLYN KRIESEL</u>		HOME TELEPHONE	WORK TELEPHONE
ADDRESS <u>8453 RIVER RD.</u>		WORK SITE LOCATION IF DIFFERENT	
CITY <u>BALDWINVILLE, NY.</u>	STATE <u>NY</u>	ZIP <u>13027</u>	Site Phone: _____

Client is the: Homeowner Authorized Agent of Property Owner Cooperative Shareholder Owner

APPROX. 4-6 WEEKS

Starting Date _____ Substantial Completion Date _____ Completion Date _____

Work Description (attach additional sheets if needed): NYSERDA DER PROJECT WHICH INCLUDES DER WALL INSULATION, NEW VINYL SIDING, WINDOWS & DOORS. + MIX. ITEMS ALL PER WORKSCOPES ATTACHED

Guarantee: The work described above shall be covered by the following guarantee(s) as indicated below (for any guarantee to apply, the associated box must be checked and both parties must initial in the spaces provided):

25% Energy Savings Guarantee Total Comfort Guarantee Property Protection Guarantee
 HVAC Temperature Guarantee No Guesswork Guarantee Ultimate Assurance Guarantee

Payment: Client agrees to pay Contractor \$ 52,302 (Agreement price) FIFTY TWO THOUSAND THREE HUNDRED & TWO. for the materials, labor and services to be provided as described above.

Down Payment: \$ 8,000 upon approval of this agreement. *NOTE: Down-Payments Deposited at: Wachovia Bank, Charlotte, NC.

Full Payments: \$ 9,302 upon substantial completion of performance by Contractor.

Progress Payments: The Contractor shall be entitled to receive payment from client for the reasonable value of materials and labor to be provided and expenses incurred upon the Agreement in accordance with the following schedule:

\$ _____ as payment for the following materials, labor and services (identify the state of completion of the work to be performed): _____

\$ _____ as payment for the following materials, labor and services (identify the state of completion of the work to be performed): _____

NYSERDA DER TO CONTRIBUTE \$35,000.00

Notices:
 1. CLIENT MAY CANCEL THIS TRANSACTION ANY TIME PRIOR TO MIDNIGHT ON THE THIRD BUSINESS DAY AFTER THE DATE OF THIS AGREEMENT. SEE THE ATTACHED "NOTICE OF RIGHT TO CANCEL" FORM FOR AN EXPLANATION OF THIS RIGHT.
 2. Client and Contractor expressly agree that the contents of this Agreement, subject to the terms and conditions stated on the face, the back and any attachments to this document, comprise the complete, exclusive and mutual understanding of the corresponding obligations of the parties. No oral assertions, representations or descriptions of work to be performed shall be binding on either party. **THIS AGREEMENT SHALL NOT BECOME BINDING UPON THE CONTRACTOR UNTIL IT IS ACCEPTED BY AN AUTHORIZED MANAGER OF THE CONTRACTOR.** By executing this Agreement, Client acknowledges that Client has read its terms and conditions, and further understands and agrees to perform Client's obligations hereunder, and acknowledges that Client has received a true copy of this Agreement. In the event this transaction is financed, all financing documents shall be considered a part of this Agreement.
 3. Failure to tender payment to a performing Contractor or Subcontractor may subject Client's property to applicable liens by the Contractor or Subcontractor in order to enforce payments.

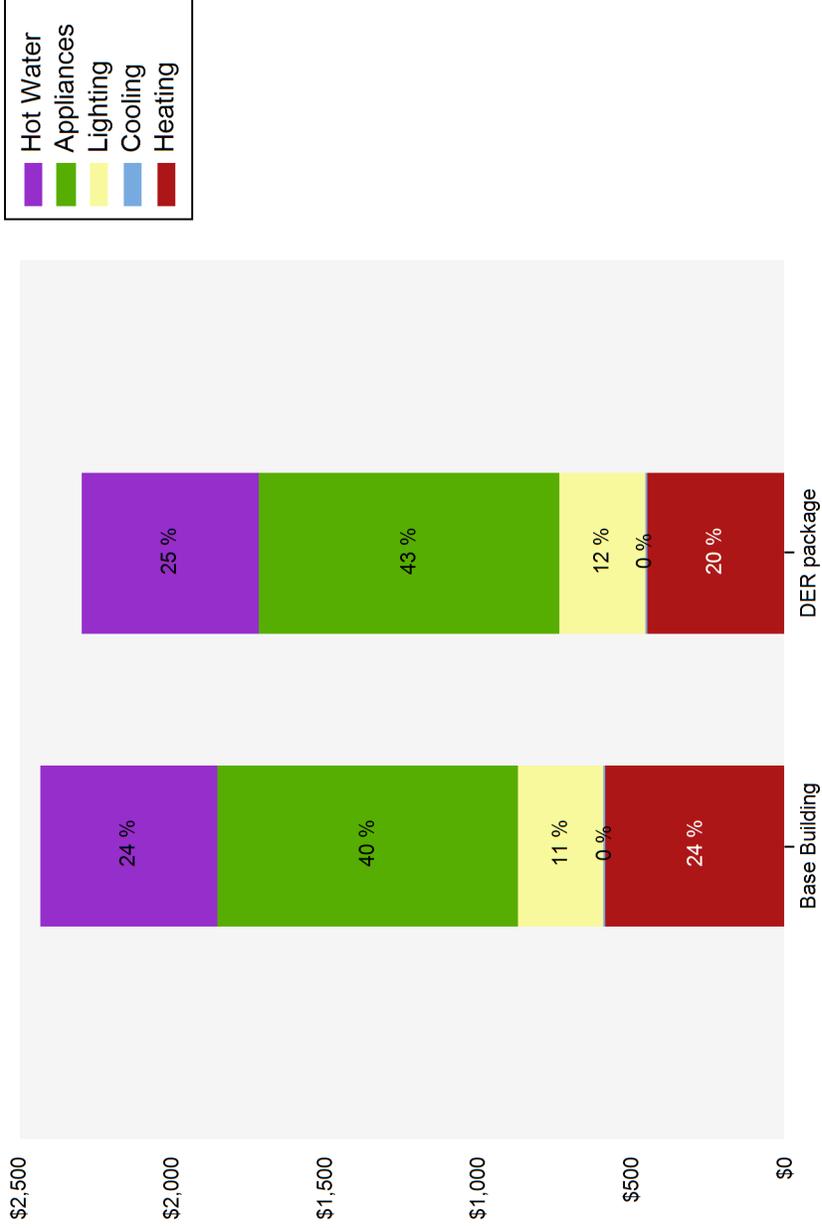
Client Acceptance		GreenHomes America, LLC Acceptance	
Client <u>Seth Kriesel</u> Date <u>7/20/12</u>		Advisor _____ Date _____	
Client <u>Carolyn Kriesel</u> Date <u>7/20/12</u>		Authorized Manager <u>[Signature]</u> Date <u>7/20/12</u>	



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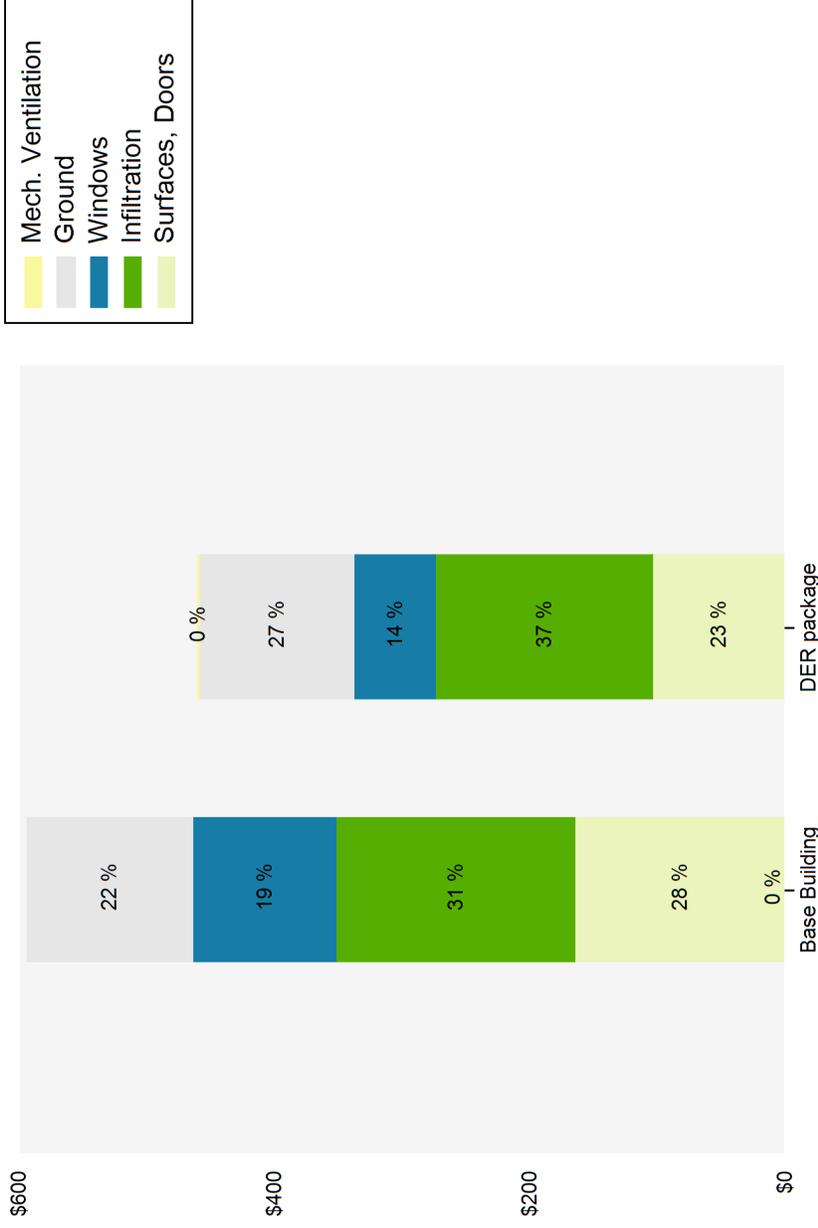
Appendix E – TREAT Modeling Report Results

Total Annual Energy Bill by Category



	Base Building	DER package	Savings
Heating	\$585	\$458	\$127
Cooling	\$10	\$2	\$8
Lighting	\$276	\$276	\$0
Appliances	\$984	\$984	\$0
Hot Water	\$577	\$577	\$0
Total	\$2,432	\$2,297	\$135

Annual Heating/Cooling Bill by Category



	Base Building	DER package	Savings
Surfaces, Doors	\$164	\$103	\$61
Infiltration	\$187	\$170	\$16
Windows	\$113	\$63	\$49
Ground	\$131	\$122	\$9
Mechanical Ventilation	\$0	\$1	(\$1)
Total	\$595	\$460	\$135

Notes:

1. Costs for annual heating/cooling bills are calculated by taking the combined heating and cooling loads and multiplying by the average cost per BTU of heating and cooling fuel use. Differences in load profile or HVAC system efficiencies are not accurately reflected in this report.



Appendix F – Material Costs

Kriesel Project Material Quantities & Costs

Project Summary

Purchased Materials	
WALL Construction Materials	\$5,453.25
WINDOW Construction Materials	\$7,825.47
ATTIC Construction Materials	\$0.00
BASEMENT Construction Materials	\$0.00
HVAC Construction Materials	\$5.54
ERV Construction Materials	\$1,092.92
TOTALS	\$14,377.18

Donated Materials	
WALL Construction Materials	\$3,995.00
WINDOW Construction Materials	\$0.00
ATTIC Construction Materials	\$0.00
BASEMENT Construction Materials	\$0.00
HVAC Construction Materials	\$0.00
ERV Construction Materials	\$0.00
TOTALS	\$3,995.00

Purchased & Donated Materials	
TOTAL Purchased Materials	\$14,377.18
TOTAL Donated Materials	\$3,995.00
TOTAL MATERIALS	\$18,372.18

WALL Construction Material Counts

Donated Materials	Donated By:	Units	Unit Cost	Quantities	Total Costs
1 1/2" DOW Brd 4' x 8' Sheets	DOW	EA	\$28.00	90	\$2,520.00
4" Dow Clear Construction Tape	DOW	EA	\$65.00	12	\$780.00
4" Screws	Simpson	EA	\$0.60	1,100	\$660.00
5" Screws	Simpson	EA	\$0.70	50	\$35.00
TOTALS					\$3,995.00

Purchased Materials	Donated By:	Units	Unit Cost	Quantities	Total Costs
4 Mill Poly		FT	\$0.02	0	\$0.00
Aluminum Vented Soffit		EA	\$23.22	0	\$0.00
CDX 1/2" 4Ply		PC	\$19.65	0	\$0.00
Fiberglass R-19		PC	\$4.62	13	\$60.06
Framing 2'x4'x10'		EA	\$4.37	31	\$135.47
Framing 2'x4'x12'		EA	\$5.83	0	\$0.00
Framing 2'x4'x8'		EA	\$3.55	7	\$24.85
Framing 2'x6'x10'		EA	\$6.96	15	\$104.40
1" Foamboard		EA	\$0.38	64	\$24.32
Misc Materials		EA	\$43.84	1	\$43.84
Fan Fold		SF	\$0.31	176	\$54.56
Foam - 2 Prt		LB	\$13.40	7	\$93.80
Nailing Lath		PC	\$0.22	0	\$0.00
OSB Board 7/16"		PC	\$11.00	0	\$0.00
Painters Masking Tape		EA	\$6.07	0	\$0.00
Pine 1"x3"x10' Furring		FT	\$0.17	0	\$0.00
Pine 1"x3"x12' Furring		FT	\$0.18	0	\$0.00
2 1/2" Red Venture Tape		EA	\$19.12	14	\$267.68
4" Dupont Flashing Tape		LF	\$0.78	300	\$234.00
6" Dupont Flex Tape		LF	\$1.99	65	\$129.35
9" Dupont Flex Tape		LF	\$2.55	70	\$178.50
Plastic Drop Cloths		EA	\$0.83	0	\$0.00
Select Pine 1x10x8		EA	\$2.12	0	\$0.00
Select Pine 1x12x14		EA	\$2.12	0	\$0.00
Sheetrock 1/2"		PC	\$17.98	3	\$53.94
Sheetrock 5/8" - 4'x10'		PC	\$13.48	0	\$0.00
Siding Materials		EA	\$4,048.48	1	\$4,048.48
Staples		BOX	\$48.00	0	\$0.00
Straight Flash Tape		FT	\$0.77	0	\$0.00
Thermax Tape		EA	\$22.63	0	\$0.00
Tite Bond Adhesive		EA	\$6.58	0	\$0.00
T-Ply Sheathing		EA	\$13.55	0	\$0.00
TOTALS					\$5,453.25

WINDOW Construction Material Counts

Purchased Materials	Donated By:	Units	Unit Cost	Quantities	Total Costs
1/2" CDX 4-ply		EA	\$19.65	4	\$78.60
Caulking - Boss White		EA	\$1.38	0	\$0.00
Colonial Casing		LF	\$0.71	288	\$204.48
Colonial Base		LF	\$0.87	15	\$13.05
Colonial Stop		LF	\$0.46	0	\$0.00
Coil Alcoa White		LF	\$1.85	50	\$92.50
Coil Grey		LF	\$1.96	20	\$39.20
Quad White Caulking		EA	\$5.67	8	\$45.36
Boss Clear Caulking		EA	\$1.38	3	\$4.14
Silicone Caulking		EA	\$3.38	3	\$10.14
DOOR - Okna		EA	\$586.33	3	\$1,759.00
DOOR - Okna		EA	\$0.00	0	\$0.00
DOOR - Precision		EA	\$902.79	0	\$0.00
DOOR - Precision		EA	\$0.00	0	\$0.00
Framing 2'x4'x8'		EA	\$3.55	23	\$81.65
Framing 2'x4'x10'		EA	\$4.15	180	\$747.00
Framing 2'x6'x10'		EA	\$6.71	51	\$342.21
Framing 2'x8'x8'		EA	\$6.42	0	\$0.00
Gable Vents		EA	\$26.94	2	\$53.88
Gutter Fillet		LF	\$0.43	0	\$0.00
Housewrap		EA	\$1.17	0	\$0.00
Misc Elec Boxes		MISC	\$30.00	0	\$0.00
Parting Stop		LF	\$0.35	0	\$0.00
Pine Common 1"x4"		FT	\$0.48	31	\$14.88
Pine Common 1"x6"		FT	\$0.75	24	\$18.00
Pine Common 5/4"x4"		FT	\$0.71	32	\$22.72
Pine Common 5/4"x6"		FT	\$1.05	31	\$32.55
Pine Common 5/4"x8"		FT	\$1.75	7	\$12.25
Pine Select 1" x 4"		LF	\$0.94	0	\$0.00
Pine Select 1" x 8"		LF	\$1.47	264	\$388.08
Pine Select 1" x10"		LF	\$2.12	124	\$262.88
Pine Select 1/2" x 8" x 12"		LF	\$1.48	12	\$17.76
PT 1"x6"x8'		EA	\$5.99	0	\$0.00
Ranch Base		LF	\$0.82	5	\$4.10
Ranch Casing		LF	\$0.49	48	\$23.52
Roofing Nails		EA	\$10.77	1	\$10.77
Tyvek Tape		EA	\$13.98	0	\$0.00
WINDOWS - Okna		EA	\$295.56	12	\$3,546.75
WINDOWS - Okna		EA	\$0.00	0	\$0.00
Wood Shims		EA	\$2.66	0	\$0.00
TOTALS					\$7,825.47

Basement Construction Material Counts

Donated Materials	Donated By:	Units	Unit Cost	Quantities	Total Costs
2" DOW Thermax 4' x 8' Sheets	DOW	EA	\$55.64	0	\$0.00
Bayer 2-Part Foam	BAYER	SF	\$65.00	0	\$0.00
DOW Tape	DOW	EA	\$37.95	0	\$0.00

TOTALS					\$0.00
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Purchased Materials	Donated By:	Units	Unit Cost	Quantities	Total Costs
Spray Foam - 1 Part - 24oz		EA	\$7.78	0	\$0.00
Adhesive - 32 oz		EA	\$6.58	0	\$0.00
Tapcons & Washers		MISC	\$58.50	0	\$0.00

TOTALS					\$0.00
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Attic Construction Material Counts

Donated Materials	Donated By:	Units	Unit Cost	Quantities	Total Costs
Climate-Pro Fiberglass	Johns-Manville	BAG	\$20.00	0	\$0.00

TOTALS					\$0.00
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Purchased Materials	Donated By:	Units	Unit Cost	Quantities	Total Costs
House Wrap - Typar		SF	\$0.13	0	\$0.00
Foam Board 1"x2'x8'		EA	\$6.12	0	\$0.00
Foam Board 2"x2'x8'		EA	\$13.09	0	\$0.00
Fanfold 3/8"		SF	\$0.31	0	\$0.00
Baffles 24"		EA	\$0.64	0	\$0.00
Insul Shield 14"x24'		FT	\$1.23	0	\$0.00
Cellulose - Fiber America		BG	\$6.99	0	\$0.00
Spray Foam - 2 Part		LB	\$13.40	0	\$0.00
CDX 1/2" 4Ply		PC	\$20.50	0	\$0.00
Plastic Drop Cloths		EA	\$0.83	0	\$0.00
Recessed Light Boxes		EA	\$6.99	0	\$0.00

TOTALS					\$0.00
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HVAC Construction Material Counts

Purchased Materials	Donated By:	Units	Unit Cost	Quantities	Total Costs
DHW Power Venter		EA	\$463.03	0	\$0.00
2" Pipe		EA	\$0.70	0	\$0.00
2" 90 Degree		EA	\$2.30	0	\$0.00
2" Street 90		EA	\$1.72	0	\$0.00
2" 45 Degree		EA	\$1.39	0	\$0.00
Tee Cap - 7"		EA	\$4.49	0	\$0.00
3" x 35 Alum Chimney Kit		EA	\$65.74	0	\$0.00
Mastic - 1 Gal		EA	\$11.07	1	\$5.54
TOTALS					\$5.54

HVAC Construction Material Counts - ERV

Purchased Materials	Donated By:	Units	Unit Cost	Quantities	Total Costs
Renue-Air 130 ERV		EA	\$810.00	0	\$0.00
Renue-Air 150/200 ERV		EA	\$995.53	1	\$995.53
ERV Timer		EA	\$68.04	1	\$68.04
1 1/8" OD Mini		EA	\$12.36	0	\$0.00
12/2 Elec Wire		FT	\$0.24	4	\$0.96
2x4 Utility Box		EA	\$1.93	1	\$1.93
Switch Plug Combo		EA	\$10.75	1	\$10.75
Receptical Cover		EA	\$0.86	1	\$0.86
3/8" Set screw conn		EA	\$0.18	0	\$0.00
18-2 Thermostat wire		FT	\$0.13	40	\$5.20
18-5 Thermostat wire		FT	\$0.21	40	\$8.40
Wire Ties		EA	\$0.05	25	\$1.25
Duct - 6" GA		FT	\$8.13	0	\$0.00
Elbow - 6" GA		FT	\$2.32	0	\$0.00
Misc		EA			
TOTALS					\$1,092.92



Appendix G – Initial Cost Estimates

Total Window Work		12	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$10,110	\$10,110	\$0.00
Doors														
Remove/Frame in Patio Slider - Rough Int. Finish	\$1											\$985	\$985	\$8.00
Replacement - Patio Slider	2	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,700	\$4,700	\$2,950.00
Total Door Work	1	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,685	\$5,685	\$0.00
Basement														
R/B Joist	79	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$8.00
Thermax Foundation Walls	822	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4.25
Ignition Barrier	0	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0.00
Total Basement Work	0	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0.00
Crawl Space														
R/B Joist	\$46	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$8.00
Insulation	184	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4.25
Ignition Barrier	0	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0.00
Vapor Barrier	204	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0.00
Total Crawl Space Work	0	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0.00
Heating System														
	\$0	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0.00
Cooling System														
	\$0	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0.00
DHW System														
	\$1	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Other														
1 Permits	0	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$200	\$200	\$0.00
2. HRV	0	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,775	\$2,775	\$0.00
3 Move Electric Service + Misc. Elec.	0	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,500	\$1,500	\$0.00
Total Other Work	0	0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,475	\$4,475	\$0.00
Project Management/Commissions														
	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0.00
TOTALS		0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$62,302	\$62,302	\$0.00



Appendix H – Actual Costing

Kriesel Project Wall Cost Estimates vs Actuals

Wall Work	Contract Amount	Contract Amount per SF	Estimate of Donated Material	Net Contract Amount	Total Actual	Donated Material	Total Actual w/ Donated Material	Actual % vs Projected	Actual Cost/sf
Remove Siding	\$1,045	\$0.55	\$0	\$1,045	\$1,152	\$0	\$1,152	110.3%	\$0.61
New Framing	\$5,495	\$2.91	\$1,475	\$4,020	\$6,624	\$1,475	\$8,099	147.4%	\$4.29
Remove windows	\$700	\$0.37	\$0	\$700	\$659	\$0	\$659	94.1%	\$0.35
Window Trim	\$3,504	\$1.85	\$0	\$3,504	\$3,681	\$0	\$3,681	105.1%	\$1.95
Foamboard	\$8,180	\$4.33	\$2,520	\$5,660	\$3,786	\$2,520	\$6,306	77.1%	\$3.34
Install T-ply	\$0	\$0.00	\$0	\$0	\$0	\$0	\$0	0.0%	\$0.00
Box bottom	\$420	\$0.22	\$0	\$420	\$914	\$0	\$914	217.7%	\$0.48
TOTALS (W/O Siding)	\$19,344	\$10.24	\$3,995	\$15,349	\$16,816	\$3,995	\$20,811	107.6%	\$11.02

Install siding	\$16,877	\$8.71	\$0	\$16,457	\$15,501	\$0	\$15,501	91.8%	\$8.21
TOTALS (W/ Siding)	\$36,221	\$19.17	\$3,995	\$31,806	\$32,317	\$3,995	\$36,312	100.3%	\$19.22



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November 12, 2012

Appendix I – Monitoring Agreement



Agreement to Permit Monitoring and Access to Premises:

THIS AGREEMENT TO PERMIT MONITORING AND ACCESS TO PREMISES (this "Agreement") is dated and effective 1/20, 2012 and is entered into by and between IBACOS, INC., a Pennsylvania corporation ("IBACOS") and SETH & CAROLYN KRIESEL ("Homeowner").

BACKGROUND

A. The Homeowner is the rightful property owner of a residential house located at 8453 RIVER RD. BALDWINSVILLE, NY. (the "House") to be upgraded by GreenHomes America, Inc. ("Contractor"). The Contractor, under a separate agreement with IBACOS, has incorporated certain building materials and products (collectively, "Products") into the energy retrofit upgrade construction of the House which are technologically innovative and/or energy efficient. This was done as part of Contractor's participation in the "Building America Program" of the United States Department of Energy ("DOE"), in conjunction with DOE's research contractor, IBACOS.

B. In order to evaluate the performance of the Products, the Contractor has agreed to have IBACOS equip the House with monitoring instruments and devices ("Monitors"), which will measure several building performance parameters, including but not limited to: thermal, comfort, and energy performance of the House and Products.

C. It may be necessary for employees and/or contractors ("Representatives") of the Builder, DOE and/or IBACOS to access the House during the Monitoring Period to test, inspect or repair the Monitors, and to remove the Monitors at the end of the Monitoring Period.

AGREEMENT

Therefore, IBACOS and the Buyer agree to the following:

1. The Homeowner agrees to allow IBACOS to collect data with the Monitors for a period of at least one (1) year but not longer than two (2) years from the date of final activation of the Monitors (the "Monitoring Period"). Homeowner agrees that IBACOS may release building performance results based on analysis of this data publicly, provided that IBACOS shall not disclose the exact street address of the House, the Homeowner's name, or any data or results that the Homeowner might reasonably wish to be held confidential.



2. Homeowner recognizes and agrees that the Monitors will remain in the House for the Monitoring Period, and Homeowner grants Contractor and IBACOS a license to so locate the Monitors. Prior to selling or leasing the House to any third party during the Monitoring Period, Homeowner will notify IBACOS, and facilitate the transfer of this Agreement to any future owner or lessee of the House.

3. Homeowner will permit the Representatives to enter the House and access the Monitors during the Monitoring Period, upon reasonable notice to Homeowner and at a time convenient to Homeowner, for the purpose of inspecting, replacing, repairing or removing the Monitors.

4. At the end of the Monitoring Period, IBACOS will remove (or require the Representatives to remove) the Monitors from the House.

5. IBACOS shall be responsible for and shall repair in a timely fashion any and all damage to the House caused by the Monitors, the Representatives, or the installation or removal of the Monitors, except to the extent any such damage is caused by Homeowner or Homeowner's invitees.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

IBACOS, Inc.:

HOMEOWNER:

Signature

Signature

Printed Name

Printed Name

SETH & CAROLYN KRIESEL



Host Site Agreement:

The service and equipment for 8453 RIVER RD. BALDWINVILLE NY being provided by IBACOS as part of your participation in this NYSERDA DER demonstration project is funded, in part, by the New York State Energy Research and Development Authority (NYSERDA).

SETH & CAROLYN KRIESEL agrees to hold harmless NYSERDA, its agents and employees, and the State of New York against loss or expense, including legal fees, from any and all claims, demands, losses, causes of action, damage, lawsuits and judgments, including attorney fees and costs arising out of or in consequence of this agreement.

Photo Release Form:

I hereby give my consent for IBACOS/NYSERDA/Green Homes America to use my photograph and likeness in all forms and media for marketing, reporting, advertising, trade and any other lawful purposes.

SETH & CAROLYN KRIESEL
Name (Please Print)

Seth Kriese / Carolyn Kriese
Signature

7-20-12
Date

Building America Retrofit Participation Requirements and Release

(NOTE: THIS FORM HAS TWO SIDES. PLEASE BE SURE TO FILL OUT BOTH.)

The results of an initial inspection of each retrofit home in the Building America Program will populate this form. If "yes" is a response to any of the following questions, the participating homeowner shall be responsible to undertake appropriate mitigation of the health and safety issue. The "method of mitigation" will be documented and the participating homeowner's Release executed before commencing retrofit measures. By signing this Retrofit Participation Requirements document, the Building America Team member acknowledges verification that the participating homeowner has undertaken the appropriate mitigation of the identified health and safety issues.

Building America Team Lead: _____ Date of Initial Inspection: 7/20/12

Home's Address: 8453 RIVER RD, BALDWINVILLE NY Year Built: _____

	YES	NO	METHOD OF MITIGATION	DATE OF COMPLETED MITIGATION
Are there building materials that contain asbestos in locations where retrofit measures will be implemented? - If present, homeowner is responsible for hiring a licensed professional to properly mitigate. (see below)		✓		
Is lead present in locations where retrofit measures will be implemented? - If present, homeowner is responsible for hiring a trained professional to evaluate potential for lead exposure and properly mitigate in accordance with 29 CFR 1926.62 as applicable. (see below)		✓		
Are radon levels greater than or equal to 2 pCi/L in the home? - If present, homeowner is responsible for hiring a licensed professional to properly mitigate. (see below)		.		
Is knob and tube wiring present in locations where retrofit measures will be implemented? - If present, homeowner is responsible for hiring a licensed electrician to properly mitigate. (see below)		✓		
Is there visible moisture/mold damage in the home? - If moisture damage is present, the homeowner is responsible to provide a moisture detector to determine that moisture problem has been properly mitigated. - If mold is present, homeowner is responsible for hiring a licensed professional to properly mitigate. (see below)		✓		
Are there any exhaust systems in the home with ducts that terminate in the attic? - If ducts terminate in the attic, homeowner is responsible for redirecting ducts to the exterior.		✓		
Is there a carbon monoxide detector on each floor of the home? - If detectors are not present, homeowner is responsible for installing carbon monoxide detectors on each floor.	✓			
Are there any open combustion , fossil fuel-fired furnaces or water heaters installed in conditioned spaces? - If present, homeowner is responsible for redirecting combustion to the exterior.		✓		

BA Team Member verification of completed work:

Signature: _____ Final Date of Inspection: ___/___/___

BA Team Member Name (printed): _____

Building America Retrofit Participation Requirements and Release

Page 2

For each issue that requires a professional to mitigate/treat relevant areas, please provide the individual name and company of the professional hired to perform mitigation:

Asbestos Mitigation Professional (If Applicable): _____

Company of Professional: _____ License #: _____

Lead Mitigation Professional (If Applicable): _____

Company of Professional: _____ License #: _____

Radon Mitigation Professional (If Applicable): _____

Company of Professional: _____ License #: _____

Electrician (If Applicable): _____

Company of Professional: _____ License #: _____

Mold Mitigation Professional (If Applicable): _____

Company of Professional: _____ License #: _____

HOMEOWNER'S RELEASE AND ASSUMPTION OF RISK

I, _____, HAVE VOLUNTARILY AGREED TO PARTICIPATE IN AN ENERGY RETROFIT OF MY HOME AND ACKNOWLEDGE THAT THE BUILDING AMERICA TEAMS, ASSOCIATED MEMBERS AND AFFILIATES, THE U.S. DEPARTMENT OF ENERGY, AND THE ALLIANCE FOR SUSTAINABLE ENERGY, LLC IN ITS CAPACITY AS MANAGER AND OPERATOR OF THE NATIONAL RENEWABLE ENERGY LABORATORY (COLLECTIVELY "BUILDING AMERICA PROGRAM CONSTITUENTS") WHO WILL CONDUCT ENERGY RETROFIT ACTIVITIES HAVE NO LIABILITY TO ME AS A PARTICIPATING HOMEOWNER AND I HEREBY RELEASE, INDEMNIFY, AND HOLD HARMLESS THE BUILDING AMERICA PROGRAM CONSTITUENTS FROM ALL RESPONSIBILITY AND LIABILITY FOR THE MITIGATION OF HEALTH AND SAFETY ISSUES IDENTIFIED BEFORE, DURING, OR AFTER COMPLETION AND ASSOCIATED WITH THE ENERGY RETROFIT OF MY HOME.

Homeowner's Signature: _____ Date: ____ / ____ / ____

Homeowner's Name (Printed): _____



NYSERDA Deep Energy Retrofits:
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November 12, 2012

Appendix J – Duct Map



NYSEERDA Deep Energy Retrofits:
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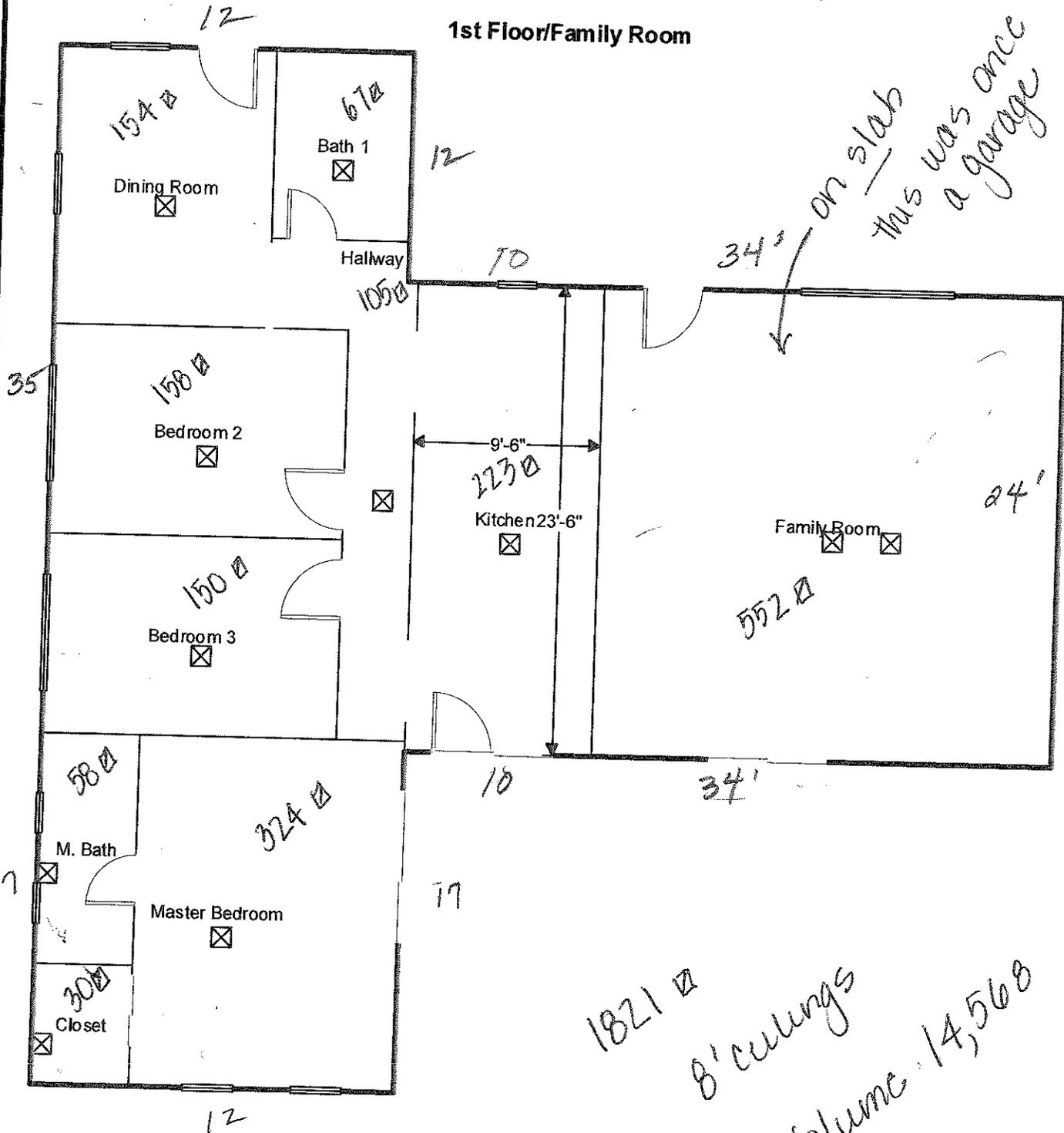
Appendix K – Floor Plans

117 20 1405 = 117 x 8 = 1416 x 20 = 28320

SETH & CAROLYN KRIESEL
8453 RIVER RD.
BALDWIN, NY



1st Floor/Family Room



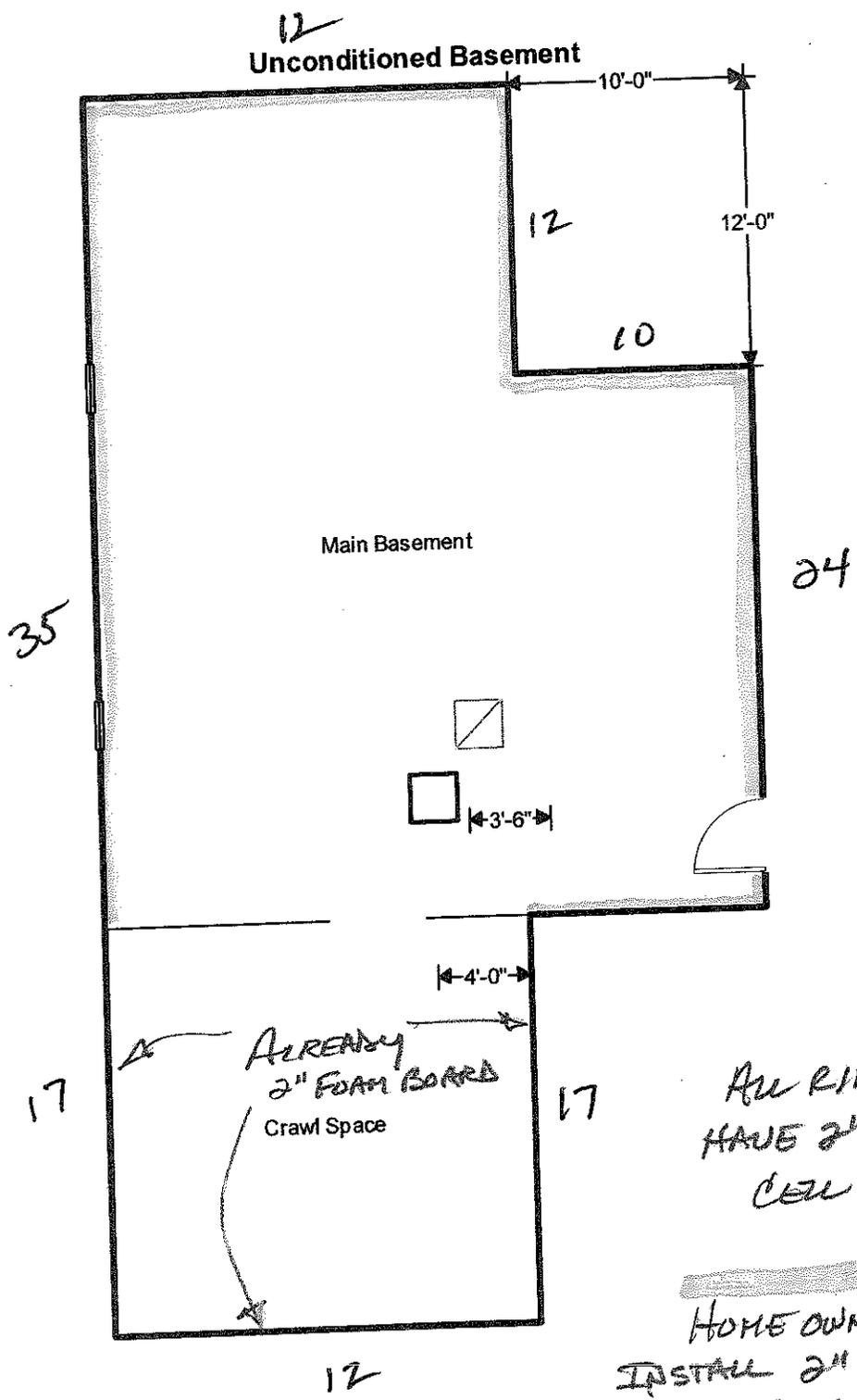
34' on slab
this was once
a garage

1821 sq ft
8' ceilings
Volume: 14,568

Job #:
Performed by T. Martin for:
Seth Kriesel
8453 River Rd.
Baldwinsville, NY 13027
Phone: 315-303-5685
goforce32@gmail.com

Performance Energy Solutions
7873 Dewitt Dr.
Baldwinsville, NY 13027
Phone: 315-857-3668
tmarti18@twcny.rr.com

Scale: 1 : 86
Page 1
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2010-Sep-06 18:24:46
C:\Program Files\Wrightsoft HVAC\Pr...



Job #:
Performed by T. Martin for:
 Seth Kriesel
 8453 River Rd.
 Baldwinsville, NY 13027
 Phone: 315-303-5685
 goforce32@gmail.com

Performance Energy Solutions
 7873 Dewitt Dr.
 Baldwinsville, NY 13027
 Phone: 315-857-3668
 tmarti18@twcny.rr.com

Scale: 1 : 86
 Page 2
 Right-Suite® Universal
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