

North Carolina 2018 - Simulated Performance Alternative (N1105)

Property
1037 Atkins Rd
Fuquay Varina, NC 27526
Model: Custom

Organization
Model Energy
Andrew King

Inspection Status
Results are projected

Template - Cunningham
Construction Group - 1037 Atkins
1037 Atkins Rd

Builder
Cunningham Construction
Group

This report is based on a proposed design and does not confirm field enforcement of design elements.

Annual Energy Cost

Design	North Carolina 2018 Performance	As Designed
Heating	\$1,722	\$1,624
Cooling	\$451	\$491
Water Heating	\$319	\$319
Mechanical Ventilation	\$0	\$0
SubTotal - Used to determine compliance	\$2,492	\$2,434
Lights & Appliances w/out Ventilation	\$813	\$813
Onsite generation	\$0	\$0
Total	\$3,305	\$3,247

R405.3 Source Energy Exception: The proposed home uses 2.82 MBtu LESS source energy than the reference home.

Requirements

✓	405.3	Performance-based compliance passes by 2.3%
✓	R402.4.2.2	Air Leakage Testing Air sealing is 0.27 CFM50 / ft² Shell Area. It must not exceed 0.30 CFM50 / ft² Shell Area.
✓	R402.5	Area-weighted average fenestration SHGC
✓	R402.5	Area-weighted average fenestration U-Factor
✓	R404.1	Lighting Equipment Efficiency
✓	Mandatory Checklist	Mandatory code requirements that are not checked by Ekotrope must be met.
✓	R403.3.1	Duct Insulation

Design exceeds requirements for North Carolina 2018 Performance compliance by 2.3%.

As a 3rd party extension of the code jurisdiction utilizing these reports, I certify that this energy code compliance document has been created in accordance with the requirements of Chapter 4 of the adopted International Energy Conservation Code based on WAKE County. If rating is Projected, I certify that the building design described herein is consistent with the building plans, specifications, and other calculations submitted with the permit application. If rating is Confirmed, I certify that the address referenced above has been inspected/tested and that the mandatory provisions of the IECC have been installed to meet or exceed the intent of the IECC or will be verified as such by another party.

Name: Andrew King
Organization: Model Energy

Signature: _____
Date: _____



Ekotrope RATER - Version 4.0.1.2852

North Carolina 2018 Performance compliance results calculated using Ekotrope RATER's energy and code compliance algorithm, including appropriate amendments. Ekotrope RATER is a RESNET Accredited HERS Rating Tool. All results are based on data entered by Ekotrope users. Ekotrope disclaims all liability for the information shown on this report.

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General Building Information

Number Of Bedrooms	4
Number Of Floors	2
Conditioned Floor Area [sq. ft.]	4,621
Has Electric Vehicle Ready Space	No
Unconditioned, attached garage?	Yes
Conditioned Volume [cu. ft.]	45,067
Total Units in Building	1
Residence Type	Single family detached
Number of Floors in Building	-
Floor Number	-
Model	Custom
Community	
RESNET/IECC 2006 Climate Zone	4A

Foundation Wall

None Present

Foundation Wall Library List

None Present

Slab

Name	Library Type	Perimeter	Floor Grade	Carpet R	Exposed Masonry Area	Surface Area	Location	Enclosing
slab	Uninsulated	322	On Grade	1	0	3,478.0 ft²	Exposed Exterior	Conditioned Space

Slab Library List

Name	Wall Construction Type	Slab Completely Insulated?	Underslab Insulation Width [ft]	Perimeter Insulation Depth [ft]	Perimeter Insulation R Value	Thermal Break	Effective R-value
Uninsulated	Wood Frame / Other	No	0	0	0	No	0.00

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Framed Floor

Name	Library Type	Carpet R	Floor Grade	Surface Area	Location
over garage	R 19, 16"OC G1 Carpet	0	Above Grade	685.0 ft²	Unconditioned, attached garage

Framed Floor Library List

Name	Effective R-value
R 19, 16"OC G1 Carpet	19.566

Rim Joist

Name	Library Type	Surface Area	Location
1st floor garage	R 13 G1, 16"OC	22.0 ft²	Unconditioned, attached garage

Rim Joist Library List

Name	Effective Insulation R-value
R 13 G1, 16"OC	12.00

Wall

Name	Library Type	Surface Color	Surface Area	Location
1st floor ambient	R 19 FG G1 16" O.C	Medium	3,000.0 ft²	Exposed Exterior
1st floor garage	R 19 FG G1 16" O.C	Medium	220.0 ft²	Unconditioned, attached garage
2nd floor ambient	R 19 FG G1 16" O.C	Medium	921.0 ft²	Exposed Exterior
2nd floor attic	R 19 FG G1 16" O.C	Medium	771.0 ft²	Attic

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1037 Atkins Rd

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Cunningham Construction Group

Wall Library List

Name	Effective R-value
R 19 FG G1 16" O.C	16.805

Glazing

Name	Library Type	Wall Assignment	Foundation Wall Assignment	Is Operable	Overhang Depth	Overhang Ft To Top	Overhang Ft To Bottom	Orientation	Surface Area
front 2nd unshaded	28/32	2nd floor ambient		Yes	0	0	0	Northwest	210.6 ft²
front shaded	28/32	1st floor ambient		Yes	8	1	7	Northwest	173.0 ft²
left 2nd unshaded	28/32	2nd floor ambient		Yes	0	0	0	Northeast	96.4 ft²
left shaded	28/32	1st floor ambient		Yes	20	2	10	Northeast	24.0 ft²
left unshaded	28/32	1st floor ambient		Yes	0	0	0	Northeast	85.2 ft²
rear 2nd unshaded	28/32	2nd floor ambient		Yes	0	0	0	Southeast	30.6 ft²
rear shaded	28/32	1st floor ambient		Yes	8	2	10	Southeast	112.8 ft²
rear unshaded	28/32	1st floor ambient		Yes	0	0	0	Southeast	58.5 ft²
right 2nd unshaded	28/32	2nd floor ambient		Yes	0	0	0	Southwest	96.4 ft²
right shaded	28/32	1st floor ambient		Yes	20	1	6.1	Southwest	15.3 ft²
right unshaded	28/32	1st floor ambient		Yes	0	0	0	Southwest	94.9 ft²

Glazing Library List

Name	Shgc	U-factor
28/32	0.32	0.280

Skylight

None Present

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 Atkins Rd - HERS
 1037 Atkins Rd

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Skylight Library List

None Present

Opaque Door

Name	Library Type	Wall Assignment	Foundation Wall Assignment	Emittance	Solar Absorptance	Surface Color	Surface Area	Location
attic door	Fiberglass R-5	2nd floor attic		0.9	0.75	Medium	18.0 ft²	Attic
front door	Fiberglass R-5	1st floor ambient		0.9	0.75	Medium	24.0 ft²	Exposed Exterior
garage door	Fiberglass R-5	1st floor garage		0.9	0.75	Medium	24.0 ft²	Unconditioned, attached garage

Opaque Door Library List

Name	Effective R-value
Fiberglass R-5	5.00

Roof Insulation

Name	Library Type	Attic Exterior Area [ft²]	Clay or Concrete Roof Tiles	Surface Color	Surface Area	Location
attic	R 38 Attic BATT FG G1 2x10 24"OC NO Radiant Barrier	5,828.2	No	Dark	4,163.0 ft²	Attic

Roof Insulation Library List

Name	Has Radiant Barrier	Effective R-value
R 38 Attic BATT FG G1 2x10 24"OC NO Radiant Barrier	No	32.263

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1037 Atkins Rd

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Whole House Infiltration

Infiltration	Measurement Type	Shelter Class
3605 CFM at 50 Pa	Blower-door tested	4

Mechanical Ventilation

None Present

Lighting

% Interior Fluorescent Lighting	% Interior LED Lighting	% Exterior Fluorescent Lighting	% Exterior LED Lighting	% Garage Fluorescent Lighting	% Garage LED Lighting
0	100	0	0	0	0

Onsite Generation

None Present

Onsite Generation Library List

None Present

Solar Generation

None Present

Dehumidifier

None Present

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1037 Atkins Rd

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Dehumidifier Library List

None Present

Conditioning Equipment

Name	Library Type	Serial Number	Heating Percent Load	Cooling Percent Load	Hot Water Percent Load	Location
1st floor main a/c	z 16 SEER A/C 3 ton variable speed		0%	55%	0%	Unspecified
1st floor main furnace	z 92 AFUE Gas Furn 64k		55%	0%	0%	Unspecified
1st floor master a/c	z 16 SEER A/C 2.0 ton variable speed		0%	20%	0%	Unspecified
1st floor master furnace	z 92 AFUE Gas Furn 48k		20%	0%	0%	Unspecified
2nd floor heat pump	z 24k 16 SEER 9.0hspf		25%	25%	0%	Unspecified
Water Heater	Rinnai R94LS		0%	0%	100%	Unspecified

Equipment Type: Rinnai R94LS

Equipment Type	Residential Water Heater
Fuel Type	Natural Gas
Distribution Type	Hydronic Delivery (Radiant)
Hot Water Efficiency	0.82 Energy Factor
Tankless?	Yes

Equipment Type: z 16 SEER A/C 2.0 ton variable speed

Equipment Type	Air Conditioner
Fuel Type	Electric
Distribution Type	Forced Air
Motor Type	ECM (Variable Speed)
Cooling Efficiency	16 SEER
Cooling Capacity [kBtu/h]	24

Equipment Type: z 16 SEER A/C 3 ton variable speed

Equipment Type	Air Conditioner
Fuel Type	Electric
Distribution Type	Forced Air
Motor Type	ECM (Variable Speed)
Cooling Efficiency	16 SEER
Cooling Capacity [kBtu/h]	36

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1037 Atkins Rd

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Equipment Type: z 24k 16 SEER 9.0hspf

Equipment Type	Air Source Heat Pump
Fuel Type	Electric
Distribution Type	Forced Air
Motor Type	PSC (Single Speed)
Heating Efficiency	9 HSPF
Heating Capacity [kBtu/h]	24
Backup Fuel Type	Electric
Switchover Temperature [°F]	0
Backup Heating Efficiency	1 COP
Use default Supplemental Heat	Yes
Cooling Efficiency	16 SEER
Cooling Capacity [kBtu/h]	24

Equipment Type: z 92 AFUE Gas Furn 48k

Equipment Type	Furnace
Fuel Type	Natural Gas
Distribution Type	Forced Air
Motor Type	PSC (Single Speed)
Heating Efficiency	92 AFUE
Heating Capacity [kBtu/h]	48
Use default EAE	No
EAE [kWh]	427

Equipment Type: z 92 AFUE Gas Furn 64k

Equipment Type	Furnace
Fuel Type	Natural Gas
Distribution Type	Forced Air
Motor Type	PSC (Single Speed)
Heating Efficiency	92 AFUE
Heating Capacity [kBtu/h]	64
Use default EAE	No
EAE [kWh]	591

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Distribution System

Distribution Type	Forced Air
Heating Equipment	1st floor main furnace
Cooling Equipment	1st floor main a/c
Sq. Feet Served	2,558
# Return Grilles	2
Supply Duct R Value	8
Return Duct R Value	8
Supply Duct Area [ft ²]	690.66
Return Duct Area [ft ²]	255.8
Leakage to Outdoors	102 CFM @ 25Pa (3.99 / 100 ft ²)
Total Leakage	102 CFM25
Total Leakage Duct Test Conditions	Post-Construction
Use Default Flow Rate	Yes
Duct 1	
Duct Location	Attic (well vented)
Percent Supply Area	100
Percent Return Area	100
Duct 2	
Duct Location	Basement (insulated basement ceiling)
Percent Supply Area	0
Percent Return Area	0
Duct 3	
Duct Location	Conditioned Space
Percent Supply Area	0
Percent Return Area	0
Duct 4	
Duct Location	Conditioned Space
Percent Supply Area	0
Percent Return Area	0
Duct 5	
Duct Location	Conditioned Space
Percent Supply Area	0
Percent Return Area	0
Duct 6	
Duct Location	Conditioned Space
Percent Supply Area	0
Percent Return Area	0

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 Atkins Rd - HERS
 1037 Atkins Rd

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 Cunningham Construction Group

Distribution System

Distribution Type	Forced Air
Heating Equipment	1st floor master furnace
Cooling Equipment	1st floor master a/c
Sq. Feet Served	920
# Return Grilles	1
Supply Duct R Value	8
Return Duct R Value	8
Supply Duct Area [ft²]	248.4
Return Duct Area [ft²]	46
Leakage to Outdoors	36 CFM @ 25Pa (3.91 / 100 ft²)
Total Leakage	36 CFM25
Total Leakage Duct Test Conditions	Post-Construction
Use Default Flow Rate	Yes
Duct 1	
Duct Location	Attic (well vented)
Percent Supply Area	100
Percent Return Area	100
Duct 2	
Duct Location	Basement (insulated basement ceiling)
Percent Supply Area	0
Percent Return Area	0
Duct 3	
Duct Location	Conditioned Space
Percent Supply Area	0
Percent Return Area	0
Duct 4	
Duct Location	Conditioned Space
Percent Supply Area	0
Percent Return Area	0
Duct 5	
Duct Location	Conditioned Space
Percent Supply Area	0
Percent Return Area	0
Duct 6	
Duct Location	Conditioned Space
Percent Supply Area	0
Percent Return Area	0

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Distribution System

Distribution Type	Forced Air
Heating Equipment	2nd floor heat pump
Cooling Equipment	2nd floor heat pump
Sq. Feet Served	1,143
# Return Grilles	1
Supply Duct R Value	8
Return Duct R Value	8
Supply Duct Area [ft ²]	308.61
Return Duct Area [ft ²]	57.15
Leakage to Outdoors	45 CFM @ 25Pa (3.94 / 100 ft ²)
Total Leakage	45 CFM25
Total Leakage Duct Test Conditions	Post-Construction
Use Default Flow Rate	Yes
Duct 1	
Duct Location	Attic (well vented)
Percent Supply Area	100
Percent Return Area	100
Duct 2	
Duct Location	Basement (insulated basement ceiling)
Percent Supply Area	0
Percent Return Area	0
Duct 3	
Duct Location	Conditioned Space
Percent Supply Area	0
Percent Return Area	0
Duct 4	
Duct Location	Conditioned Space
Percent Supply Area	0
Percent Return Area	0
Duct 5	
Duct Location	Conditioned Space
Percent Supply Area	0
Percent Return Area	0
Duct 6	
Duct Location	Conditioned Space
Percent Supply Area	0
Percent Return Area	0

Ceiling Fan

Has Ceiling Fan	No
Cfm Per Watt	100

Water Distribution

Water Fixture Type	Standard
Use Default Hot Water Pipe Length	No
Hot Water Pipe Length [ft]	130
At Least R3 Pipe Insulation?	Yes
Hot Water Recirculation System?	No
Recirculation System Pipe Loop Length [ft]	110
Drain Water Heat Recovery?	No

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Clothes Dryer

Cef	3.01
Fuel Type	Electric
Field Utilization	Timer Controls
Is Outside Conditioned Space	No
Clothes Dryer Available	Yes
Defaults Type	HERS Reference

Clothes Washer

Label Energy Rating	153 kWh/Year
Annual Gas Cost	\$12.00
Electric Rate	\$0.11/kWh
Gas Rate	\$1.22/Therm
Capacity	3.31
Imef	2.1547
Defaults Type	Custom
Load Type	Front-load
Loads Per Week	6
Is Outside Conditioned Space	No
Clothes Washer Available	Yes

Dishwasher

Dishwasher Efficiency	270 kWh
Dishwasher Size	Standard
Annual Gas Cost	\$22.23
Electric Rate	\$0.12/kWh
Gas Rate	\$1.09/Therm
Is Outside Conditioned Space	No

Appliances and Controls

Programmable thermostat?	Yes
Range/Oven Fuel	Electric
Convection Oven?	No
Induction Range?	No
Range/Oven Outside Conditioned Space?	No
Refrigerator Consumption	538 kWh/Year
Refrigerator Outside Conditioned Space?	No

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Notes

Initial inputs by __JS 03/11/22__

- confirm insulation specs
- confirm window specs
- confirm cfl lighting percentage
- ventilation modeled as air none