

This document was prepared to show the effects of select energy improvements on the subject home's ERI in accordance with the 2018 NC Residential Code.

The home used for the analysis is a 2-story single family dwelling with relevant attributes as follows:

Conditioned Floor Area	1,687 ft ²
Conditioned Volume	15,200 ft ³
Foundation Type	Concrete Slab on Grade
Slab Exposed Area	732 ft ²
Slab Exposed Perimeter	125 ft
Slab Edge Insulation	R-0
Exposed Floor	281 ft ²
Exposed Floor R-Value	19
Exposed Rim/Band Area	93 ft ²
Exposed Rim/Band R-Value	15
Exposed Above Grade Walls Area	2,320 ft ²
Exposed Above Grade R-Value	13
Window Area	190 ft ²
Window U-value	.49
Window SHGC	.55
Exterior Door Area	62 ft ²
Exterior Door R-Value	1.85
Exposed Ceiling Area	953 ft ²
Exposed Ceiling R-Value	30
Heating and Cooling System	2-ton Air to Air Heat Pump
Cooling SEER	14 btu/watt
Heating HSPF	8.50 btu/watt
Thermostat	Non-Programmable
Water Heating	50 gallon electric
Water Heater EF	.94
Service hot water piping design	Standard (no recirculation)
Duct Location	60% Attic - 40% Between Floors
Exposed Duct R-value	8
Duct leakage to the outside	70 CFM @ 25 PA
House leakage	5 ACH @ 50 PA
Appliances	Standard
Lighting (CFL's)	10%
Lighting (LED's)	50%
Incandescent	40%
Software	RemRate 16.0.2
Code Compliance Metric	2018 NC Residential Code ERI
Energy Cost	Duke Energy Standard Rate 03/20

ERI modeled as detailed above with annual energy cost.

Wilmington	Charlotte	Raleigh	Greensboro	Asheville	Boone
CZ 3A	CZ 3A	CZ 4	CZ 4	CZ 4	CZ 5
83	82	94	94	94	102
\$1325	\$1416	\$1481	\$1517	\$1581	\$1626

A. Improvement implemented - Increase heat pump efficiency from SEER 14/HSPF 8.5 to 2 stage heat pump SEER 16/HSPF 10.

ERI modeled as described above with annual energy cost..

Wilmington	Charlotte	Raleigh	Greensboro	Asheville	Boone
CZ 3A	CZ 3A	CZ 4	CZ 4	CZ 4	CZ 5
76	76	86	87	88	96
\$1285	\$1376	\$1438	\$1477	\$1548	\$1598

B. Improvement implemented - Replace electric water heater with heat pump water heater with 3.50 Energy Factor.

ERI modeled as described above with annual energy cost.

Wilmington	Charlotte	Raleigh	Greensboro	Asheville	Boone
CZ 3A	CZ 3A	CZ 4	CZ 4	CZ 4	CZ 5
68	68	77	78	79	86
\$1107	\$1186	\$1242	\$1275	\$1331	\$1374

C. Improvement implemented - Reduce duct leakage from 70 CFM Outside @25 PA to 30 CFM @25.

ERI modeled as described above with annual energy cost.

Wilmington	Charlotte	Raleigh	Greensboro	Asheville	Boone
CZ 3A	CZ 3A	CZ 4	CZ 4	CZ 4	CZ 5
66	66	75	75	76	82
\$1090	\$1163	\$1214	\$1244	\$1295	\$1333

D. Improvement implemented - Improvement implemented - Improve window performance from base to U-.35 & SHGC .30.

ERI modeled as described above with annual energy cost.

Wilmington	Charlotte	Raleigh	Greensboro	Asheville	Boone
CZ 3A	CZ 3A	CZ 4	CZ 4	CZ 4	CZ 5
63	63	71	72	73	79
\$1069	\$1140	\$1188	\$1218	\$1269	\$1306

E. Improvement implemented - Increase wall insulation from R-13 to R-15

ERI modeled as described above with annual energy cost.

Wilmington	Charlotte	Raleigh	Greensboro	Asheville	Boone
CZ 3A	CZ 3A	CZ 4	CZ 4	CZ 4	CZ 5
63	62	71	71	72	77
\$1061	\$1131	\$1178	\$1206	\$1255	\$1290

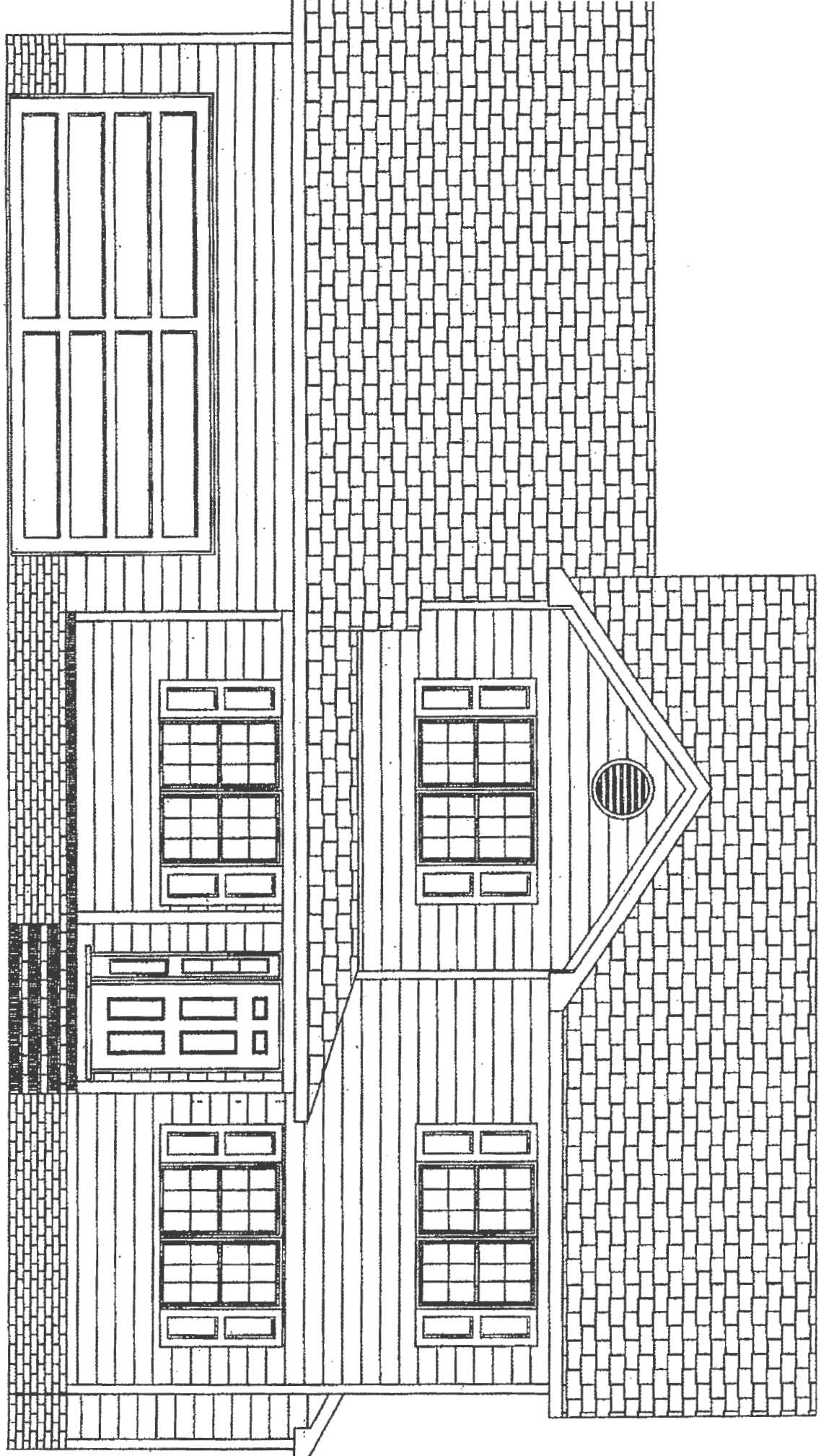
F. Improvement implemented - Reduce house leakage from 5.0 ACH(50) to 3.0 ACH (50).

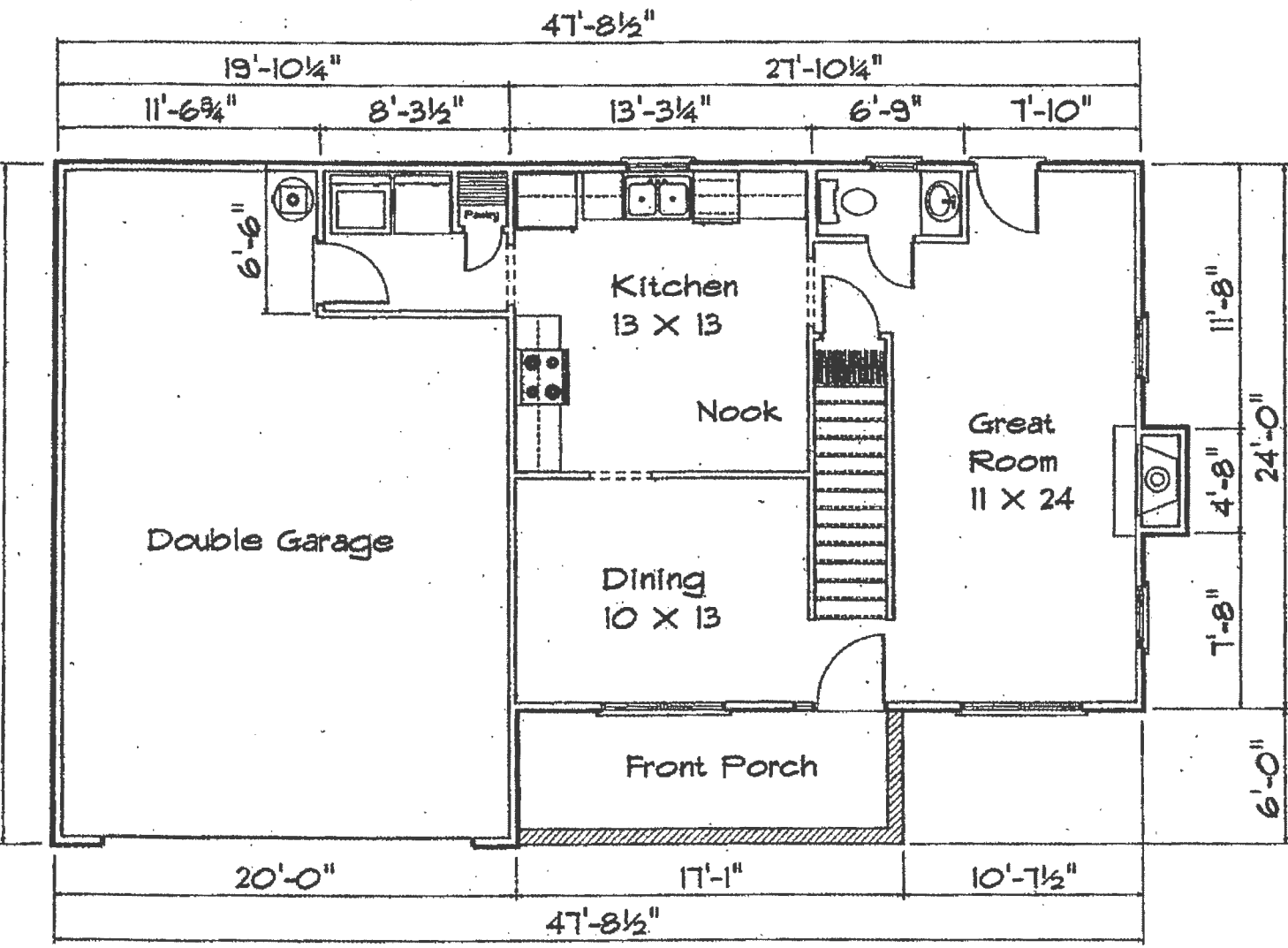
ERI modeled as described above with annual energy cost.

Wilmington	Charlotte	Raleigh	Greensboro	Asheville	Boone
CZ 3A	CZ 3A	CZ 4	CZ 4	CZ 4	CZ 5
63	62	71	71	72	77
\$1044	\$1109	\$1152	\$1179	\$1222	\$1257

Green ERI indicates compliance with Table 1106.4.1 Maximum Energy Rating Index, 2018 NC Residential Code.

Red ERI indicates noncompliance with Table 1106.4.1 Maximum Energy Rating Index, 2018 NC Residential Code.

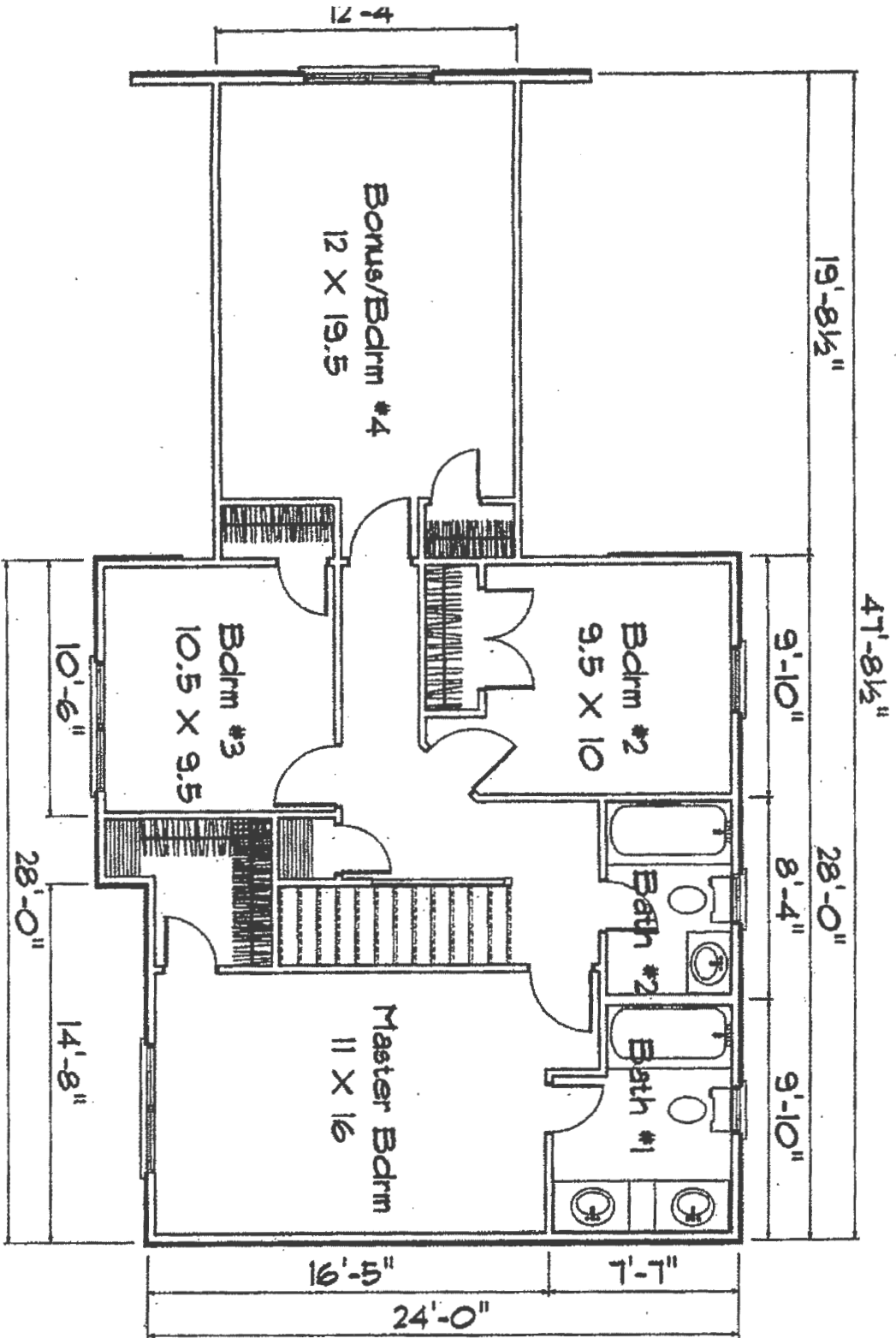




First Floor Plan

Area

First Floor Heated	734±
Second Floor Heated	671±
Bonus Room Heated	254±
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Total Heated	1659±
Garage	568±
Front Porch	109±



Second Floor Plan