Passive House Documentation

Madison Residence
ID: 5168

Single family home with two floors and full basement in Madison, New Jersey

Design: Jennifer Marsh & Brian Marsh
Mowery Marsh Architects LLC www.mowerymarsh.com

Special features: Thermostat-controlled electric floor mats
(or Key Environmental Features) Soundproofed ventilation system
Etc. Etc.

U-Value exterior wall: 0.097 W/(m²K)
U-Value raised floor: 0.092 W/(m²K)
U-Value roof: 0.049 W/(m²K)
U-Value windows: 0.86 W/(m²K)

PHPP Space Heating Demand: 11 kWh/(m²a)
PHPP Primary Energy Demand: 60 kWh/(m²a)
Air Test (n_{50}): 0.4 1/h
Heat recovery efficiency: 81%

2. Construction Task

A single family home in Madison NJ, the exterior of the Madison Residence is designed as a modern farmhouse with vernacular details, various types of white siding, a metal roof, generous eaves and generous windows accented by the deep wall construction.

The front porch offers a gracious approach to the entry door, which opens up into a lofty stair hall that is accentuated by a two story window in the distance, drawing you into the open living and dining room plan.

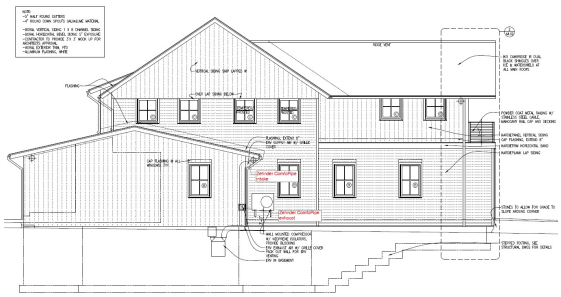
The kitchen extension at the back of the house has windows on three sides with large areas of glass looking on the terrace and expansive backyard with a pool and pool house. There are many opportunities for storage in the pantry, laundry room, office and mudroom spaces accommodated on this floor as well.

The 2nd Floor has four bedrooms with a joined bathroom for the two boys' rooms, and a private bath for the guest room. The master suite has windows on three sides with a generous dressing room that continues into the master suite.

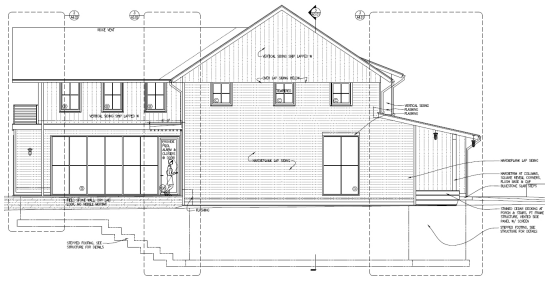
3. Elevations

North Elevation

West Elevation



East Elevation

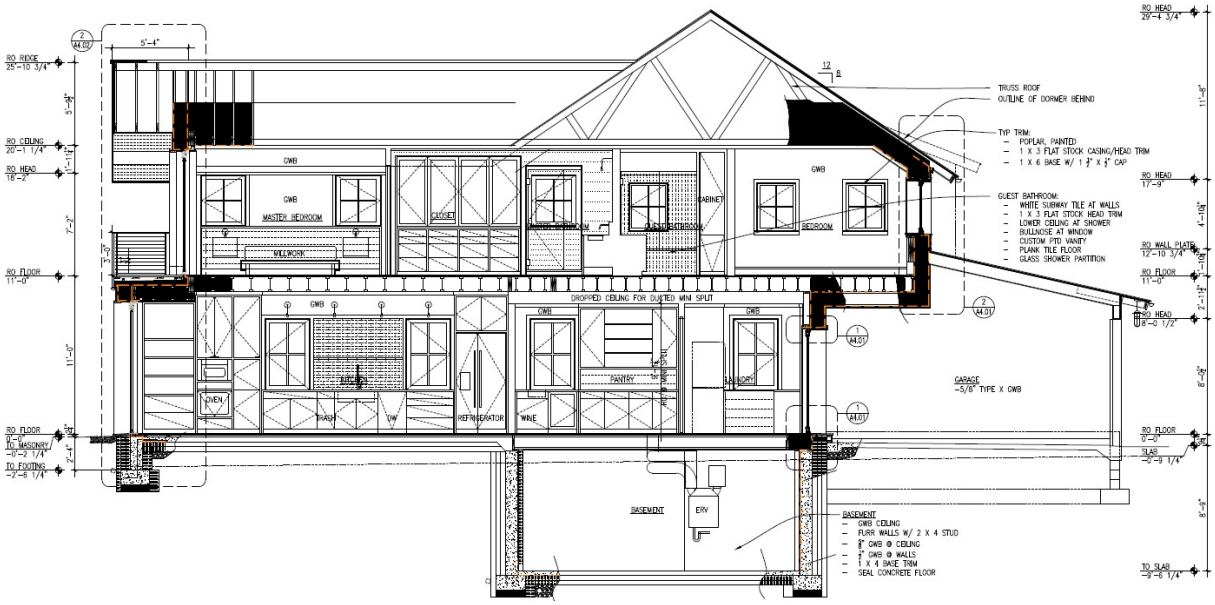


South Elevation

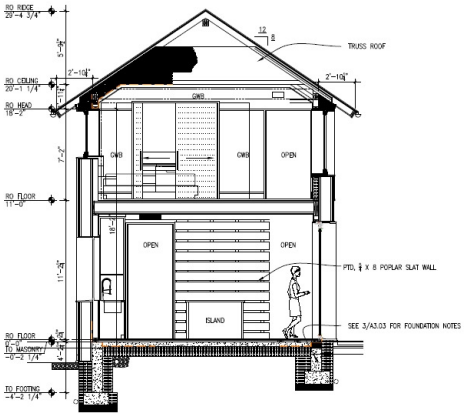
4. Interior Photograph

5. Cross-sections

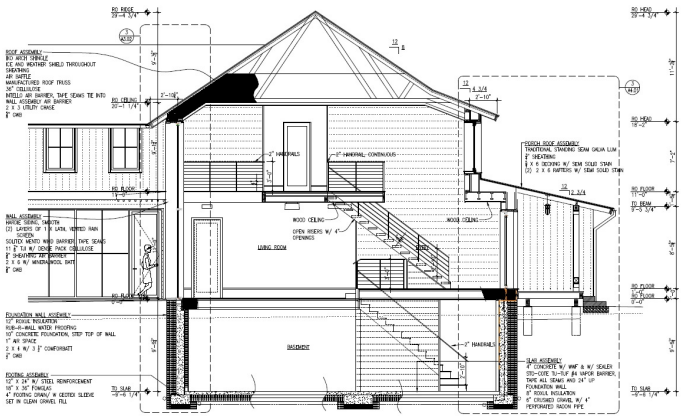
Longitudinal cross-section:



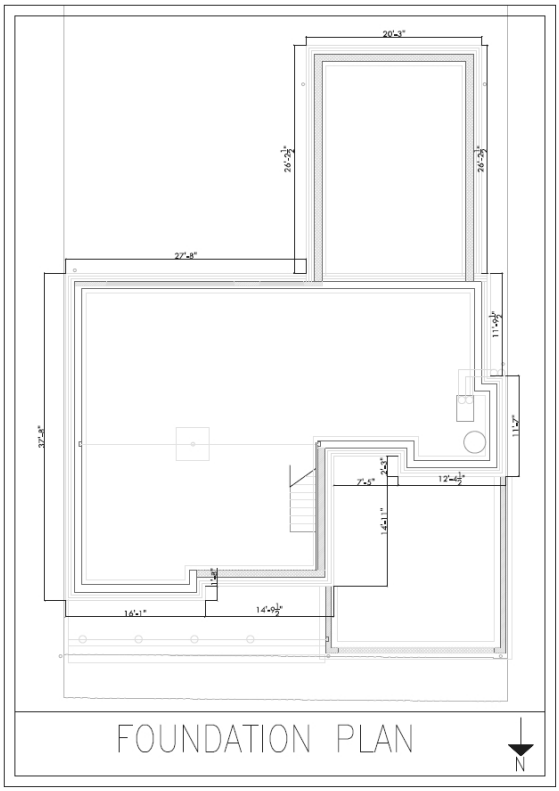
Lateral Section at the kitchen / master:

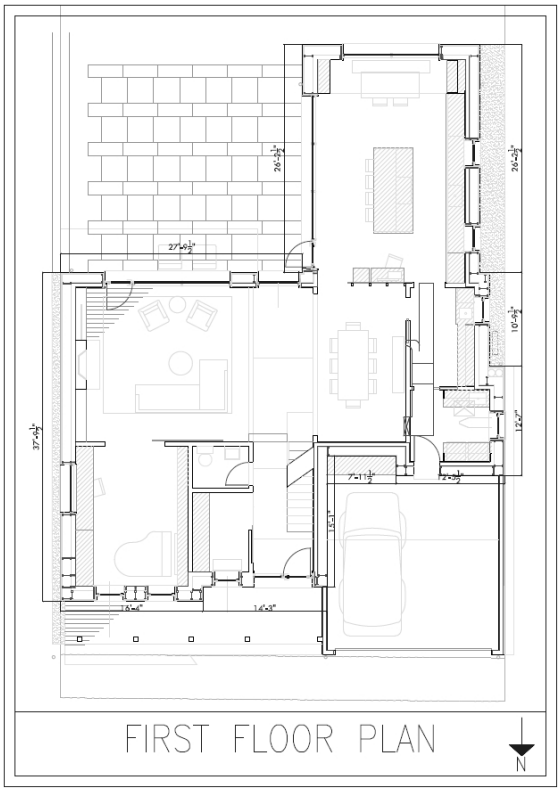


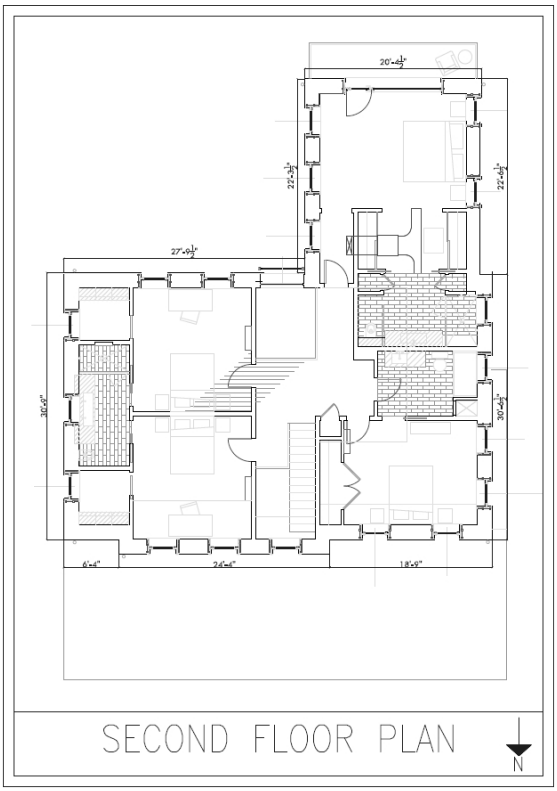
Lateral section at main house / living room / entry:

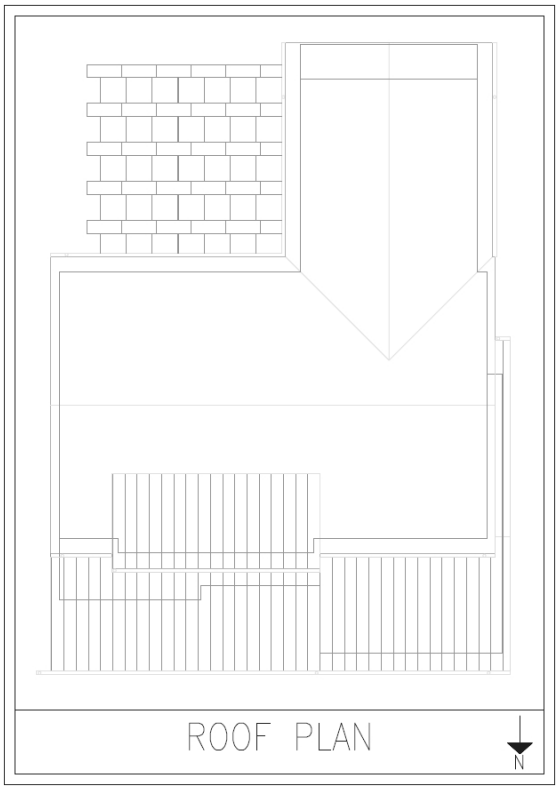


6. Floor Plans



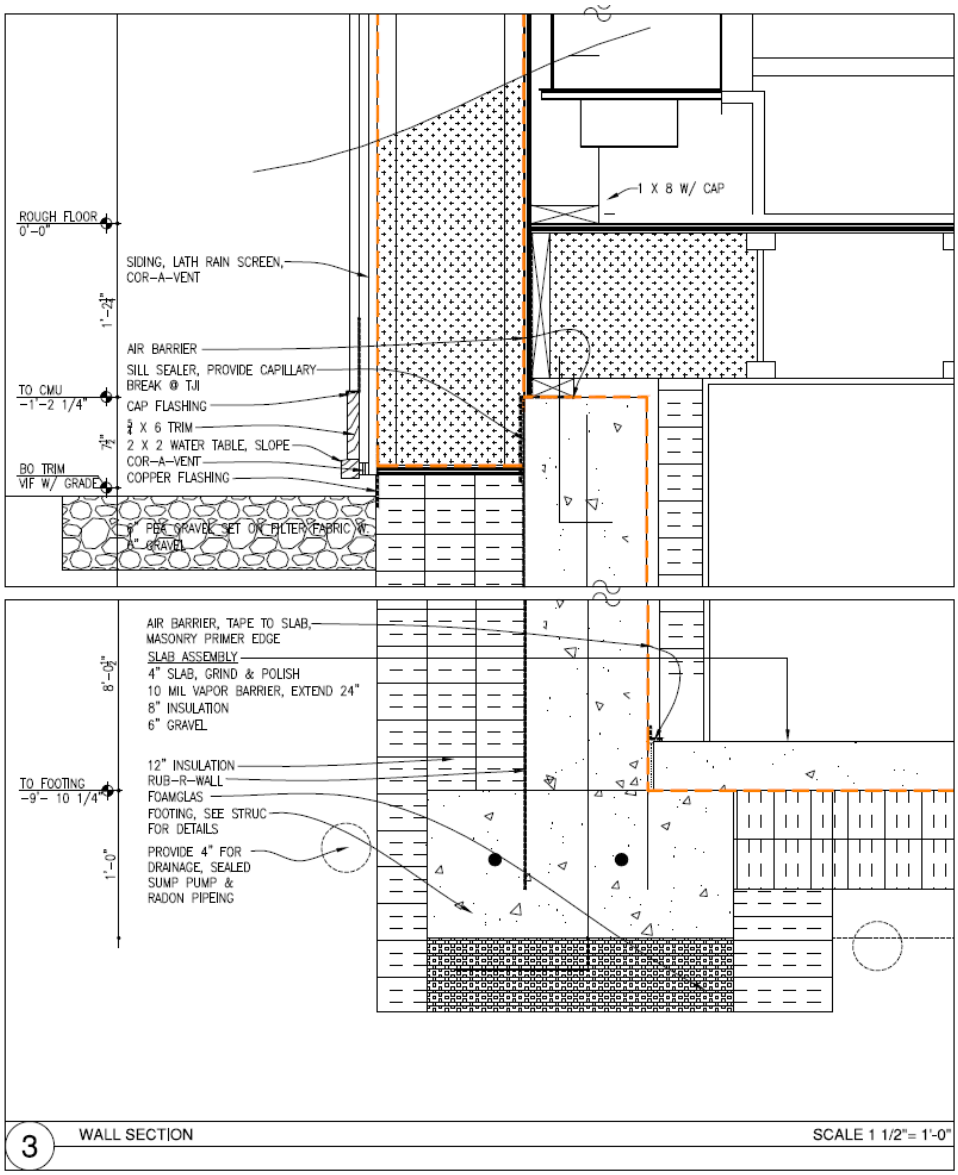






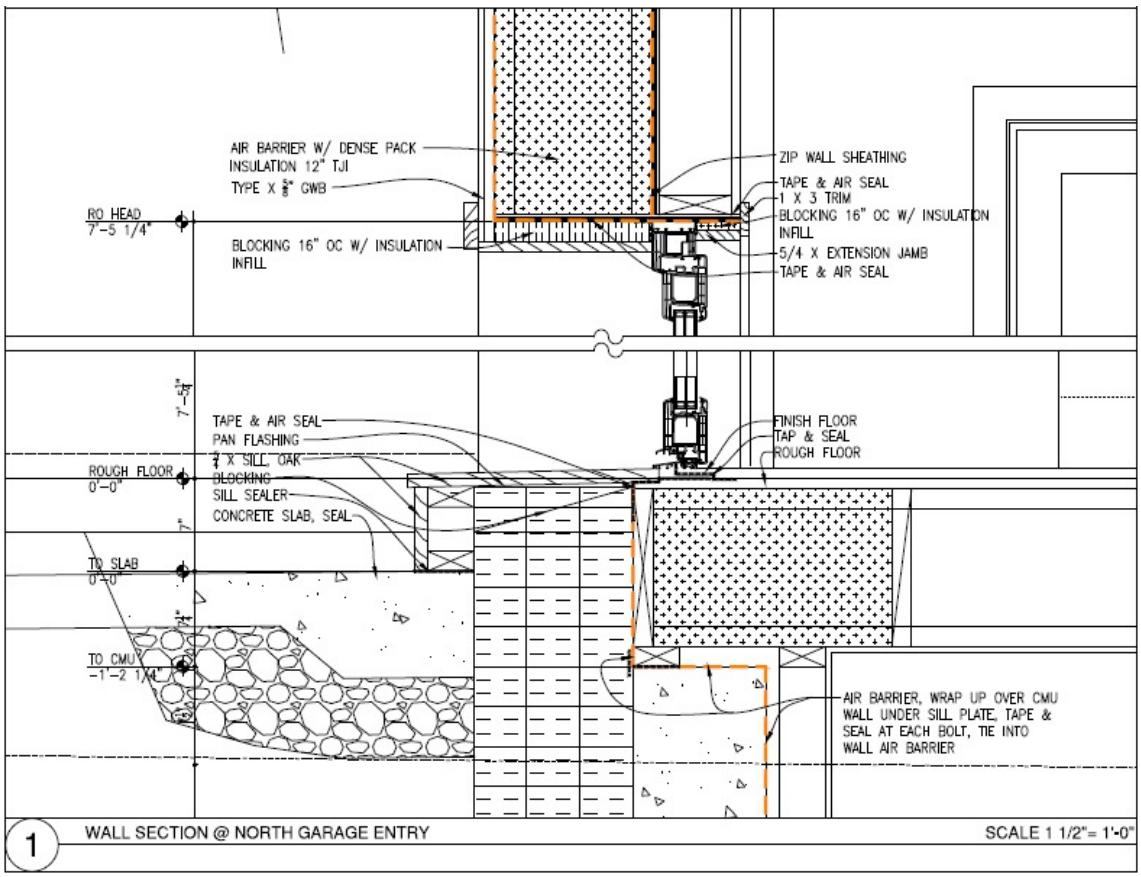
7. Construction of Floor Slab / Basement Ceiling

Exterior foundation insulation is EPS in-line with the wall insulation above. Additional interior EPS insulaiotn is also included as shown in the typical detail drawing below. The first ~16“ of first floor is filled with cellulose insulaiton to eliminate thermal bridging. Foamglas is placed under the footing also to eliminate thermal bridging.



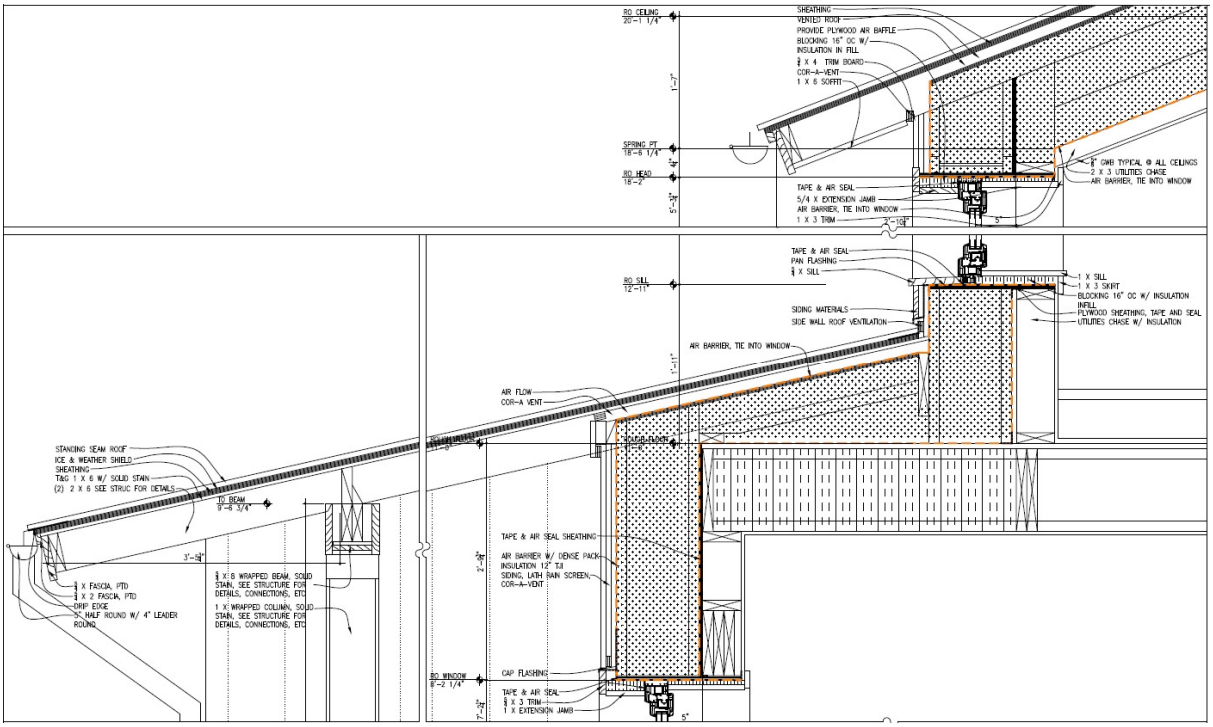
8. Construction of the Exterior Walls

Wall insulation is dense packed cellulose blown into exterior cavities formed by I-joists vertically mounted to the exterior of the wood frame building. A Mento exterior barrier was fastened to the exterior edge of the trusses. From insude to outside the wall construciotn is a 2x6 frame wioth Zip sheathing (primary air barrier), vertical I-joists with dense packed cellulose in cavities, Mento barrier, rainscreen siding.



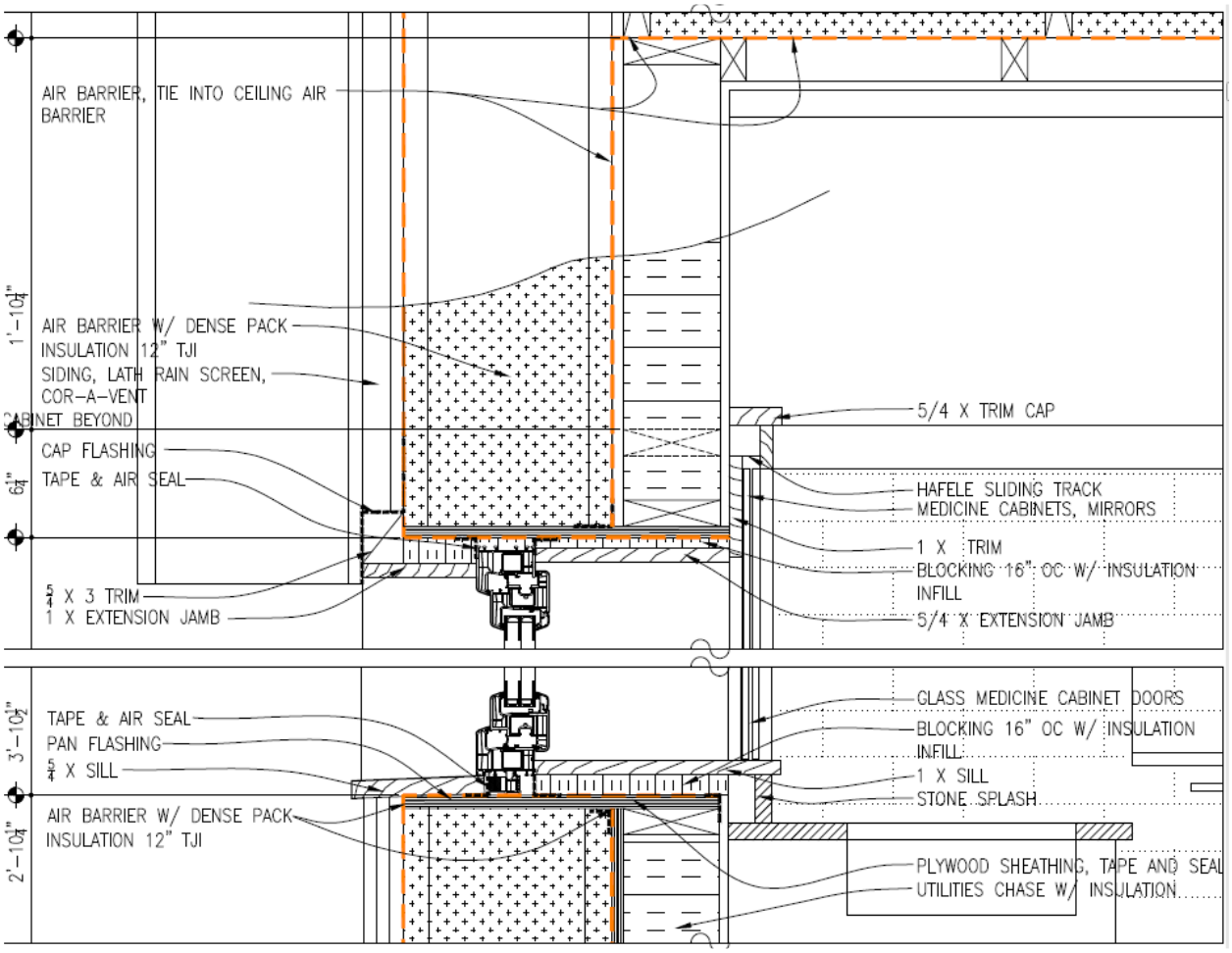
9. Construction Roof / Ceiling of the Top Floor

The roof system consists of wood trusses with blown in cellulose insulation above an Intello air barrier.



10. Windows and Installation of the Window

- Description of the construction of the window (frame): SchucoS182 uPVC windows and Schuco AWS 75.SI Aluminum window/door system
- Product type of the window (frame, product name)/window type: uPVC and aluminum window frames
- U-Value of frame Uf: 1.10 and 1.20 W/(m2K)
- Construction type glazing (3-times thermal insulation glazing): Triple glazing with Swisspacer V
- U-Value of glass/ Ug: 0.60 W/(m2K)
- g-Value of glazing: 0.50



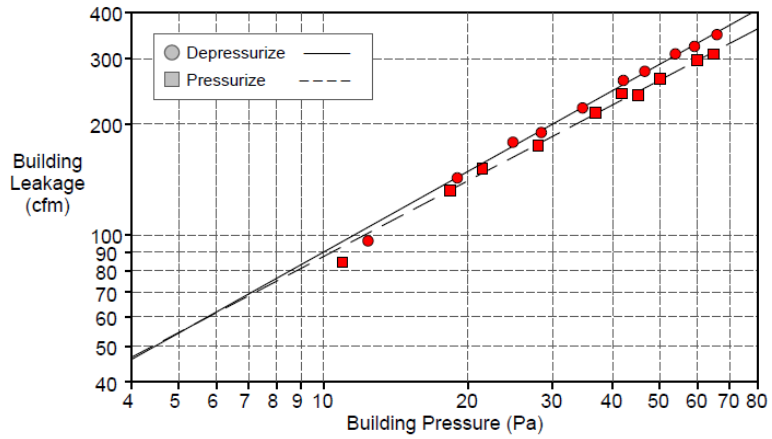
11. Airtight Building Envelope

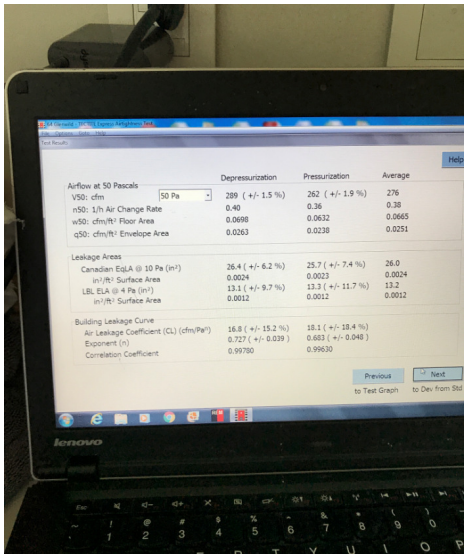
- Roof: Intello membrane under roof trusses with tapes seams
- Exterior wall: Zip system sheathing with taped joints
- Foundation wall: liquid applied air barrier to interior face of foundation wall

Pressurization test conducted by The Levy Partnerhsip, Inc.

Date of Test: 6/22/2017		Technician:	Joseph Khubelashvili
Test File: 64 Glenwild		Project Number:	MMA05
Customer:	Bert Janssen & Greet Verjans 64 Glenwild Rd. Madison, NJ 07940 Phone: Fax:	Building Address:	64 Glenwild Rd Madison , New Jersey 07940

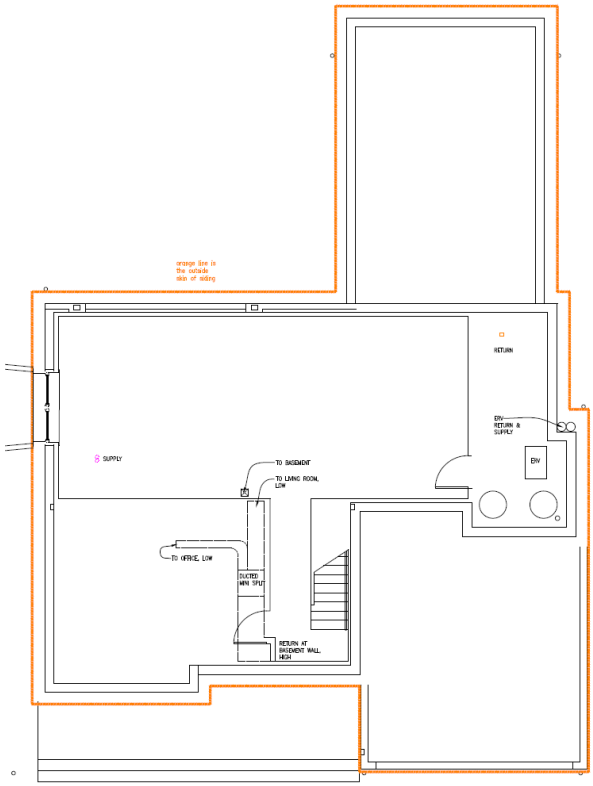
	Depressurization	Pressurization	Average
Test Results at 50 Pascals:			
V50: cfm Airflow	289 (+/- 1.5 %)	262 (+/- 1.9 %)	276
n50: 1/h Air Change Rate	0.40	0.36	0.38
w50: cfm/ft² Floor Area	0.0698	0.0632	0.0665
q50: cfm/ft² Envelope Area	0.0263	0.0238	0.0251
Leakage Areas:			
Canadian EqLA @ 10 Pa (in²)	26.4 (+/- 6.2 %)	25.7 (+/- 7.4 %)	26.0
in²/ft² Surface Area	0.0024	0.0023	0.0024
LBL ELA @ 4 Pa (in²)	13.1 (+/- 9.7 %)	13.3 (+/- 11.7 %)	13.2
in²/ft² Surface Area	0.0012	0.0012	0.0012
Building Leakage Curve:			
Air Flow Coefficient (Cenv) (cfm/Paⁿ)	16.9 (+/- 15.2 %)	18.2 (+/- 18.4 %)	
Air Leakage Coefficient (CL) (cfm/Paⁿ)	16.8 (+/- 15.2 %)	18.1 (+/- 18.4 %)	
Exponent (n)	0.727 (+/- 0.039)	0.683 (+/- 0.048)	
Correlation Coefficient	0.99780	0.99630	
Test Standard:	EN 13829		
Test Mode:	Depressurization and Pressurization		
Type of Test Method:	A		
Regulation complied with:	Passive House n50 ≤ 0.6 1/h		



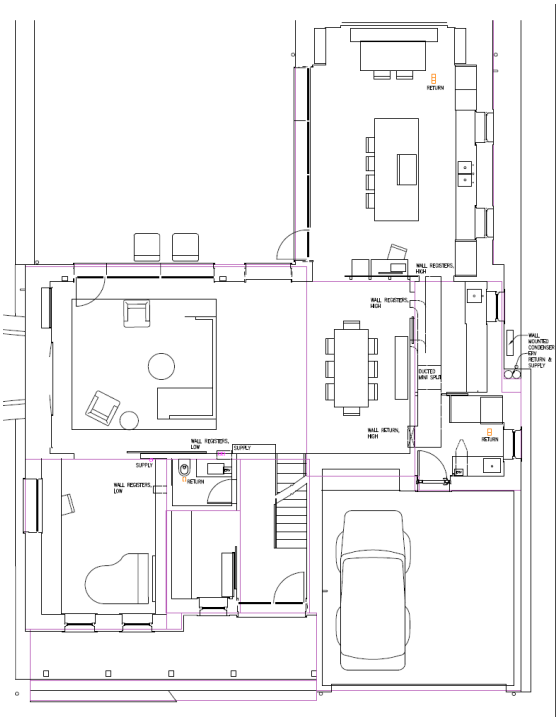


12. Layout of the ventilation system ducting

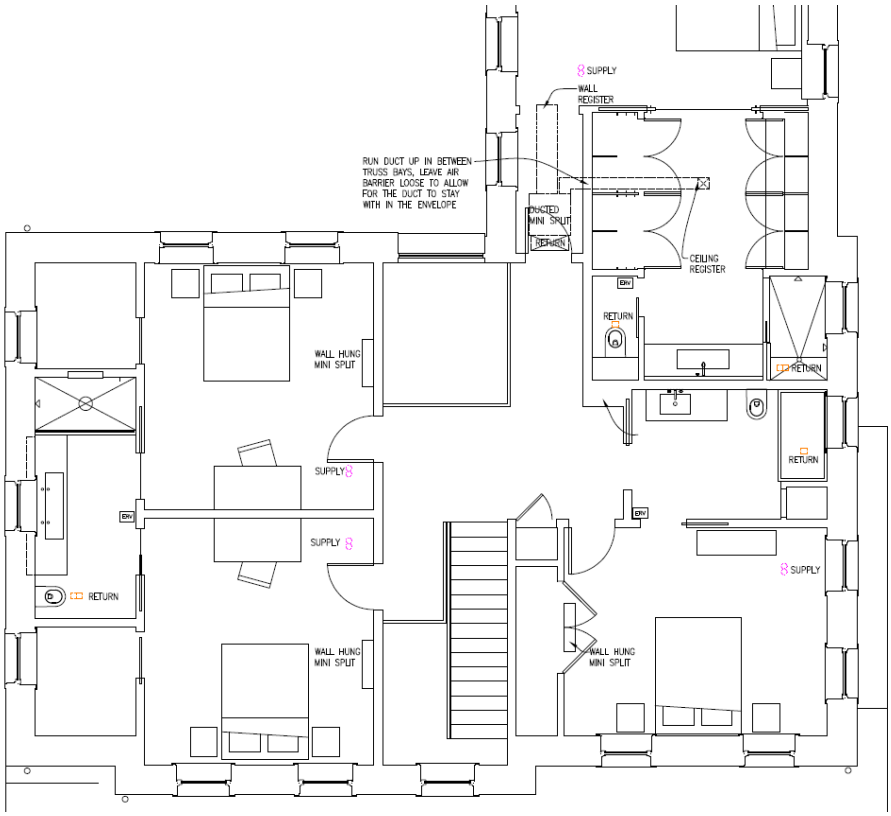
Ventilation ducting utilizes Zehnder Comfotube system. Drawings below are labeled with supply and return locations.



Basement



First floor



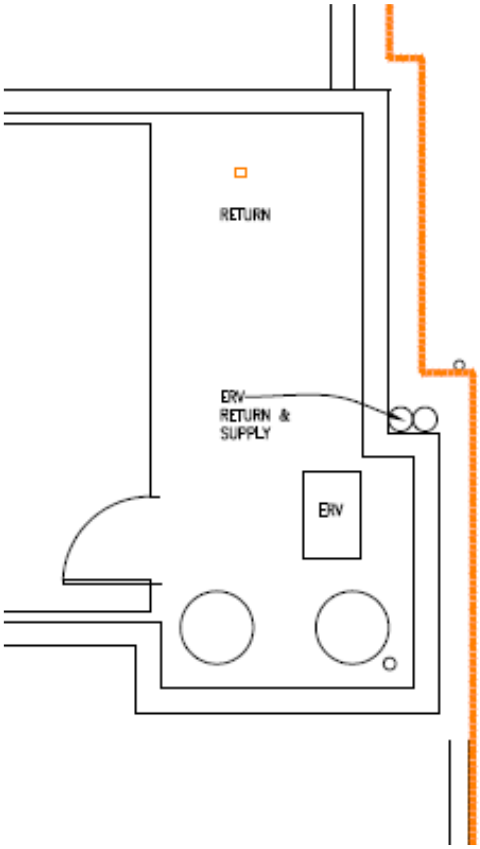
Second floor

Installation

13. Ventilation Unit / Central Ventilation Unit

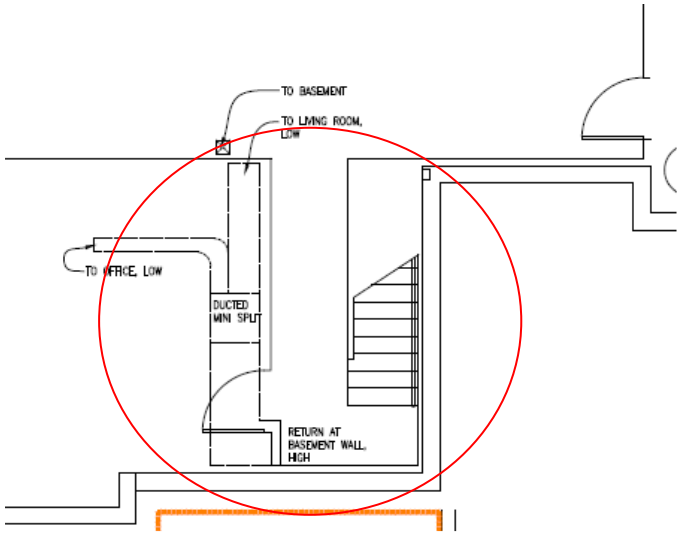
The home utilizes a central heat recovery ventilator located in the basement, connected to round ducts that distribute air in a home-run arrangement from a manifold.

- Product type of the ventilation unit: Zehnder Comfiair 550
- Effective heat recovery: 0.84
- Electrical efficiency [Wh/m^3]: 0.31 Wh/m3

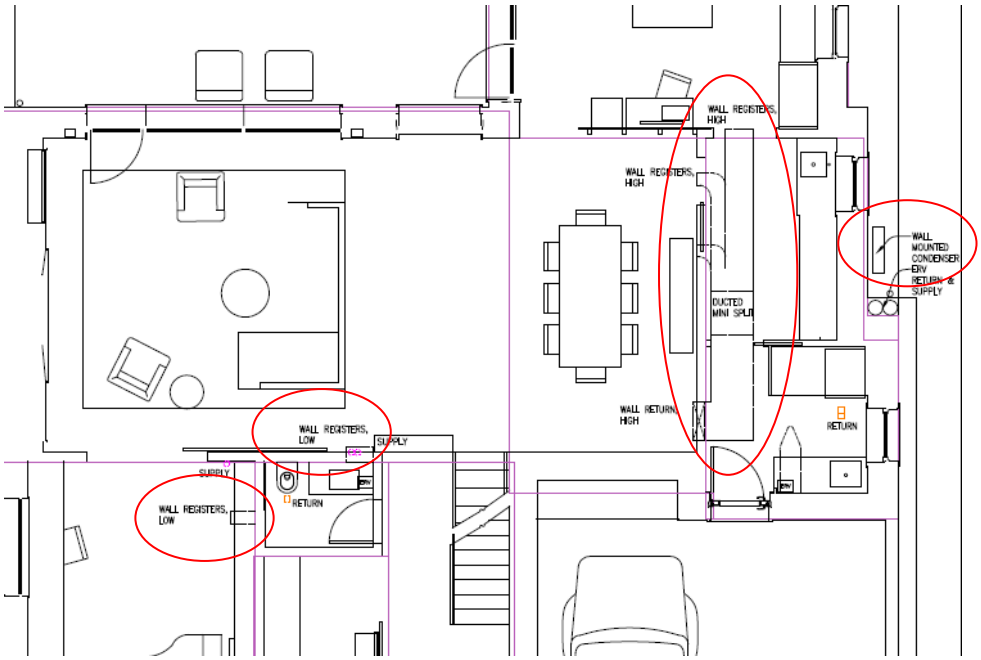


14. Heat Supply

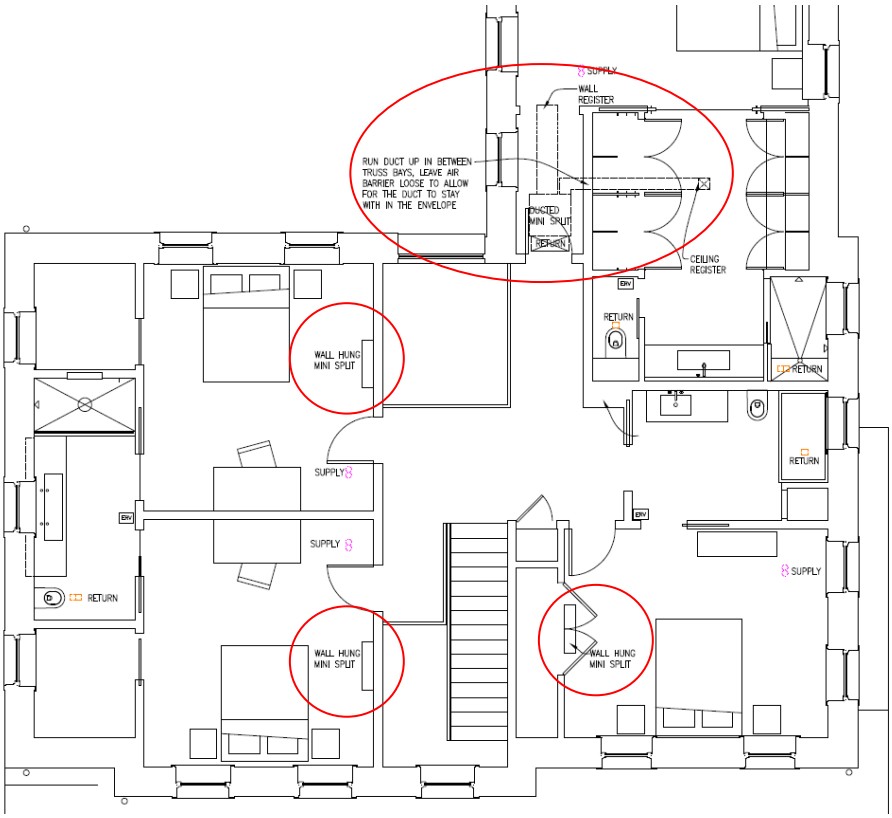
Heating and cooling is provided by a combination of mini-ducted and wall-mounted ductless air source heat pumps manufactured by Mitsubishi.



Basement



First floor



Second floor

15. Short Documentation of PHPP-Results (Verification Sheet)

					Criteria	Alternative criteria	Fullfilled?[2]
	Treated floor area	m²	385.2				
Space heating	Heating demand	kWh/(m²a)	11	≤	15	-	yes
	Heating load	W/m²		≤	-	10	
Space cooling	Cooling & dehum. demand	kWh/(m²a)	18	≤	16	16	no
	Cooling load	W/m²		≤	-	10	
	Frequency of overheating (> 25 °C)	%	-	≤	-		-
	Frequency excessively high humidity (> 12 g/kg)	%	0	≤	10		yes
Airtightness	Pressurization test result n_{50}	1/h	0.6	≤	0.6		yes
Non-renewable Primary Energy (PE)	PE demand	kWh/(m²a)	108	≤	120		yes
Primary Energy Renewable (PER)	PER demand	kWh/(m²a)	49	≤	-	-	-
	Generation of renewable energy	kWh/(m²a)		≥	-	-	

16. Construction costs
Withheld.

17. Year of Construction
2016-2017

18. Information about the designer / Architect
Mowery Marsh Architects LLC offers a full range of architectural services starting from initial property search through to final construction. Their work includes site analysis, master planning, construction administration and interior design. Personalized attention is a priority, listening to the unique needs of their clients and providing thoughtful design solutions that speak to one's individual aspirations. MMA fosters strong working relationships with clients and contractors adding exceptional value to the design and construction process. With LEED and Passive House training, they have the ability to offer innovative design approaches in planning, building systems and sustainable construction. MMA also offers interior design services allowing the architecture and interior spaces to be fully integrated for a seamless process and final product. Also see http://www.mowerymarsh.com/

19. Information about the planner of building services
Larry Mendez HVAC.

20. Information about the planner of building physics
The Levy Partnership, Inc., 1776 Broadway Suite 1250, New York, NY 10019

21. Information about the structural designer
Proper O'leary Engineering, Melissa O'leary

22. User's experiences
Owners report satisfaction with the home.

23. Available Research Materials / Publications
Listed on Passive House Database:
https://passivhausprojekte.de/index.php?lang=en#d_5168