

Mark Ashby
ARCHITECTURE

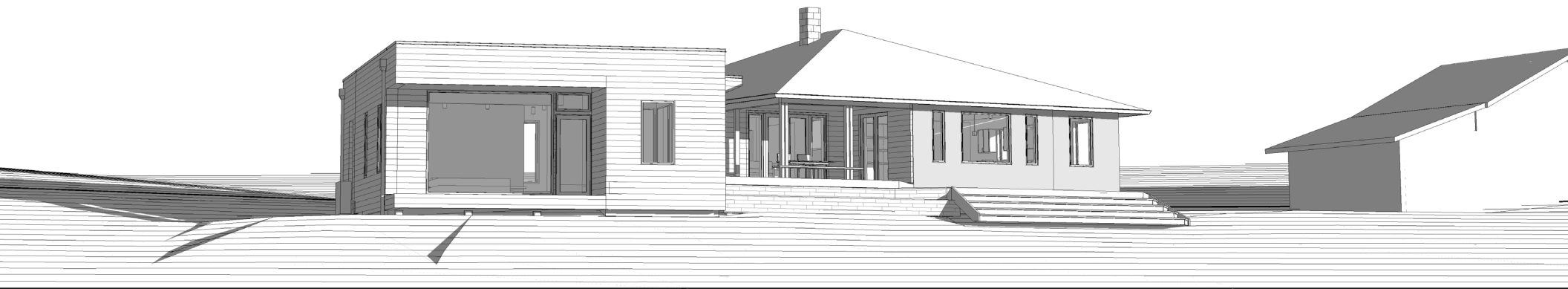
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member:



Design for Value





what are we going to talk about today?





passive house (passivhaus)



CanPHI

Canadian Passive House Institute



marken.projects

Heating & cooling energy represents 75–85% of the total lifecycle environmental impact of a building in Canada, so our singular priority for achieving sustainable buildings must be a dramatic reduction in their energy use.

*The Passive House approach is the world's most **ambitious, verified and practical** way of meeting this goal.*

www.passivehouse.ca

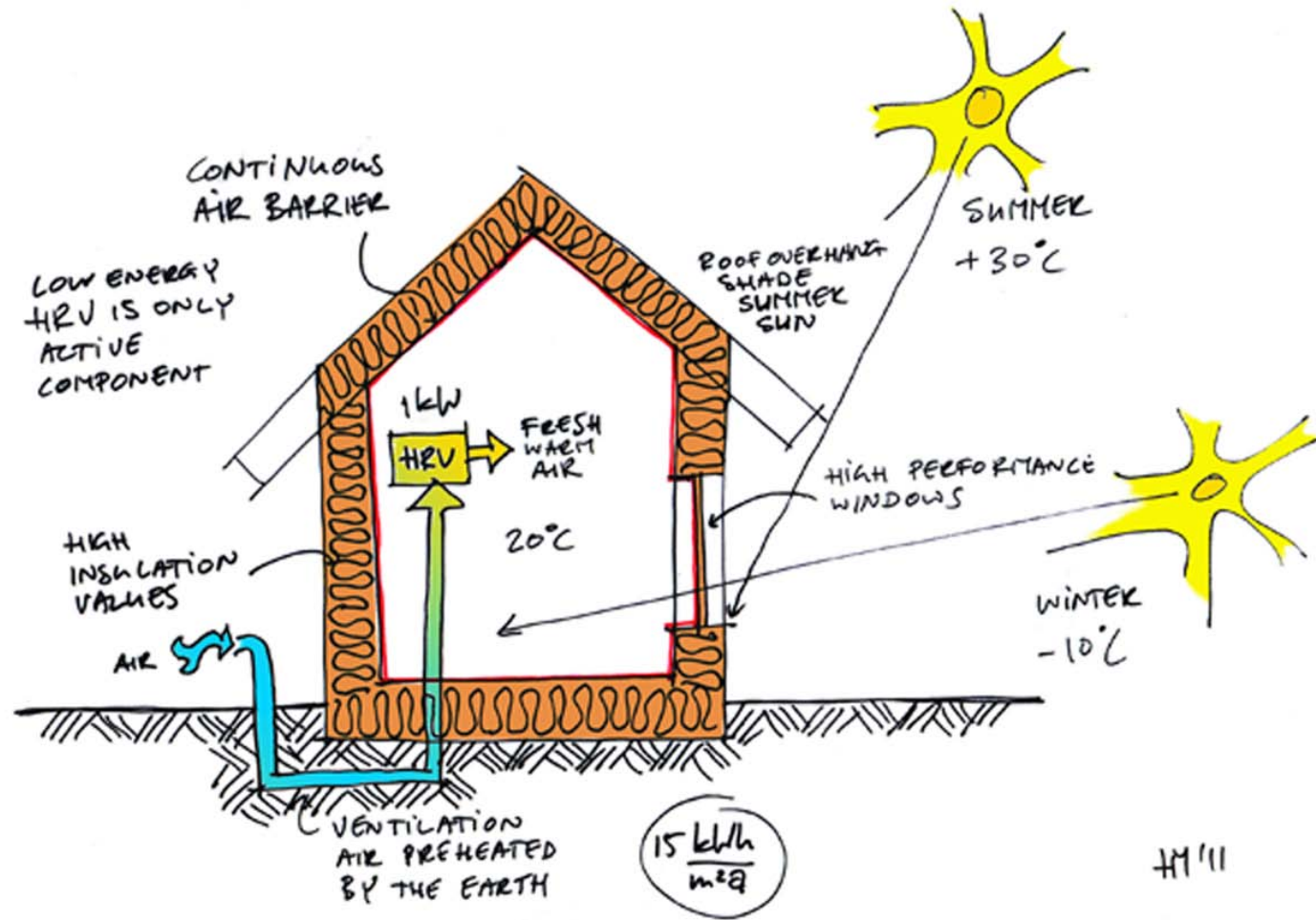
What is a passive house?

The Passive House standard aims to **reduce a building's energy consumption by up to 90%** while providing **superior comfort and indoor air quality.**

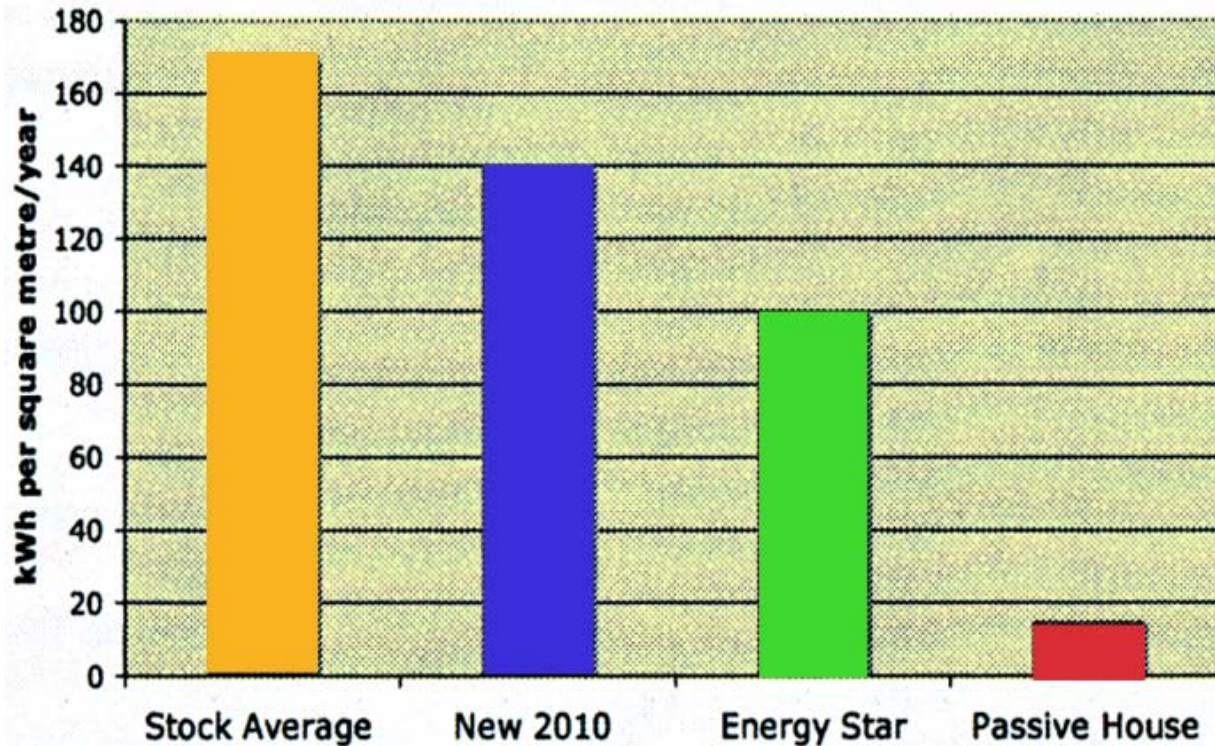
This is achieved through **smart design, super insulation, air-tight construction, and high-efficiency ventilation.**

The essential principal is **energy conservation by design**, rather than meeting demand with technology.

Internal heat sources such as appliances and building occupants provide most of the energy needed to heat the home.



Typical Heating Energy Intensity for Canadian Housing



15kWh/m² per year - for space heating

A 2000 square foot house would use the equivalent of no more than 3000 kWh per year for heating.

The equivalent average electrical charge of \$25 per month at 10 cents per kWh.

By comparison, the average new “code compliant” home utilizes approximately 100kWh/m² per year for space heating.



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10 W/m² maximum load

The same house could maintain a comfortable temperature with the heat generated by 30 - 60 watt lightbulbs. You could heat a smaller house with the heat generated by your refrigerator!

A typical house has an energy demand of approximately 100 W/m² which requires much larger and more expensive heating systems.

High efficiency heat recovery ventilation system

Minimum efficiency of 75%

Ducted distribution to living spaces

High performance windows and doors

U-value of $0.8\text{W}/(\text{m}^2\text{K})$



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Air leakage limit of 0.6 air changes per hour.

Homes with air change rate of 5-6 per hour are considered “tight”.

R-2000 requires maximum 1.5 air changes per hour.

0.6 air changes per hour equates roughly to an “effective leakage area 6” in diameter.

Air leakage can account for 30-50% of heat loss in some homes! www.energyconservatory.com



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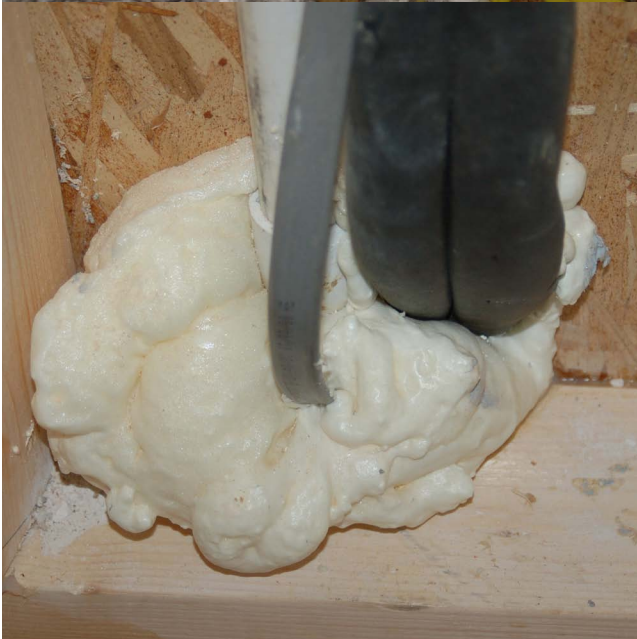
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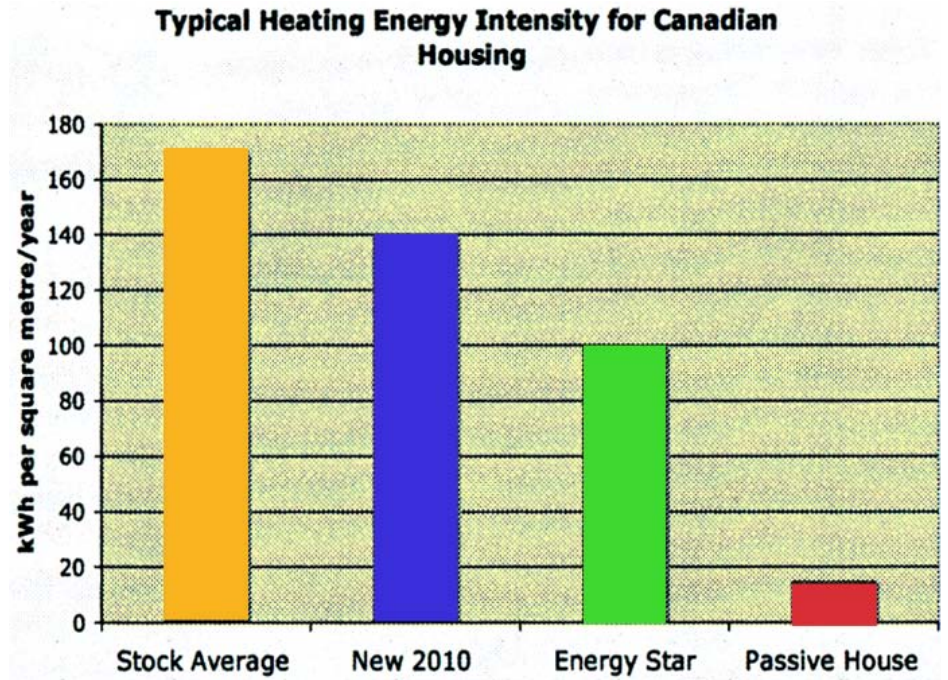
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What does this mean?



Smart and compact architecture

Solar orientation and site context matter



Much more insulation

No thermal bridges

R value conversions

R(metric) U(metric) R U

Passive House (assembly values)

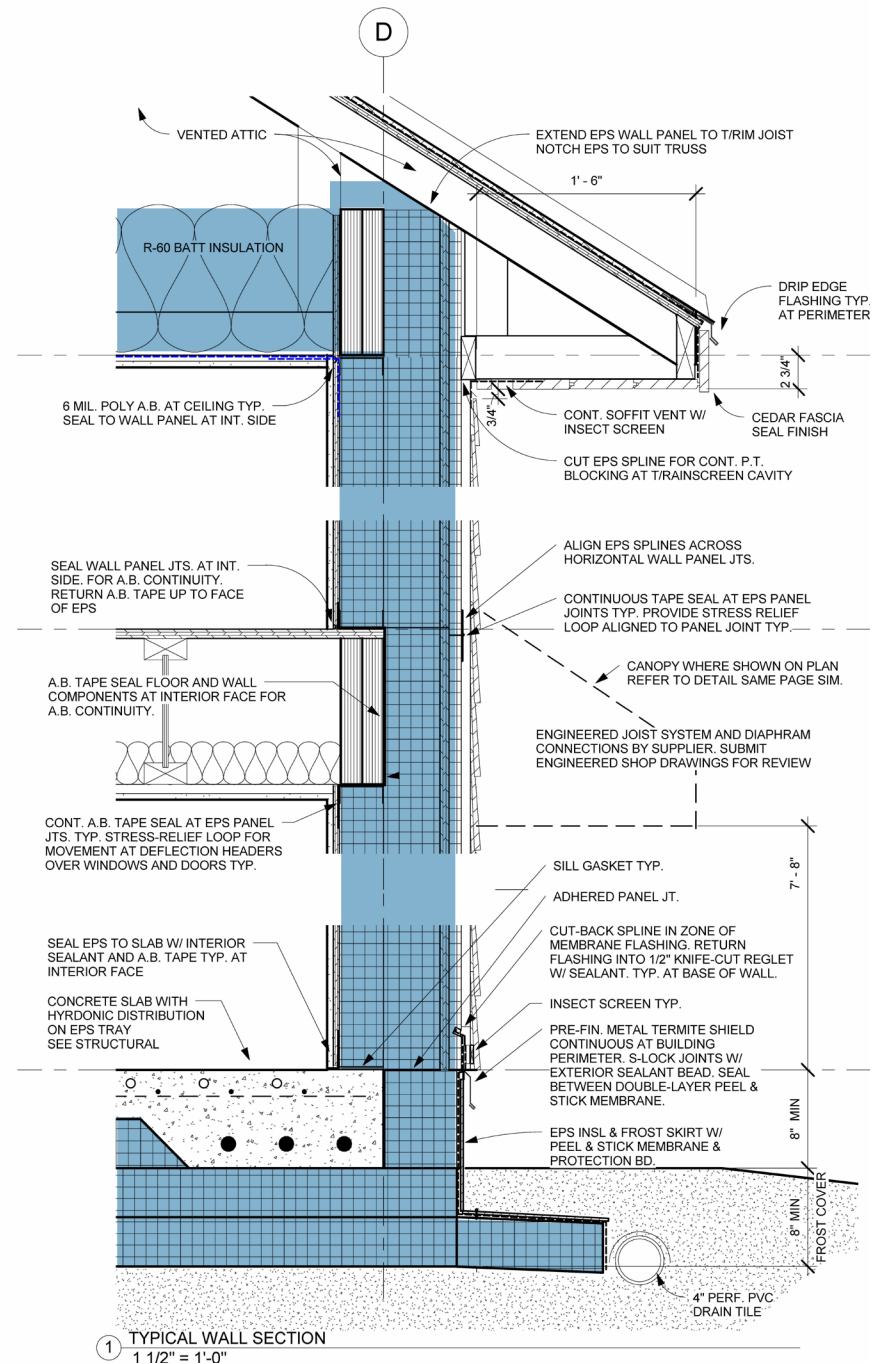
Passive House limit for exterior assemblies	6.67	0.15	38	0.03
Passive House windows	1.25	0.80	7	0.14

BCBC 2012 (insulation values)

Attic	7.00	0.14	40	0.03
Cathedral ceiling	4.90	0.20	28	0.04
Frame Walls	3.50	0.29	20	0.05
Foundation walls	2.10	0.48	12	0.08
Suspended floors	4.90	0.20	28	0.04
Unheated slabs	1.80	0.56	10	0.10
Slabs with radiant heat	2.10	0.48	12	0.08
Typical e-star windows	0.59	1.70	3	0.30

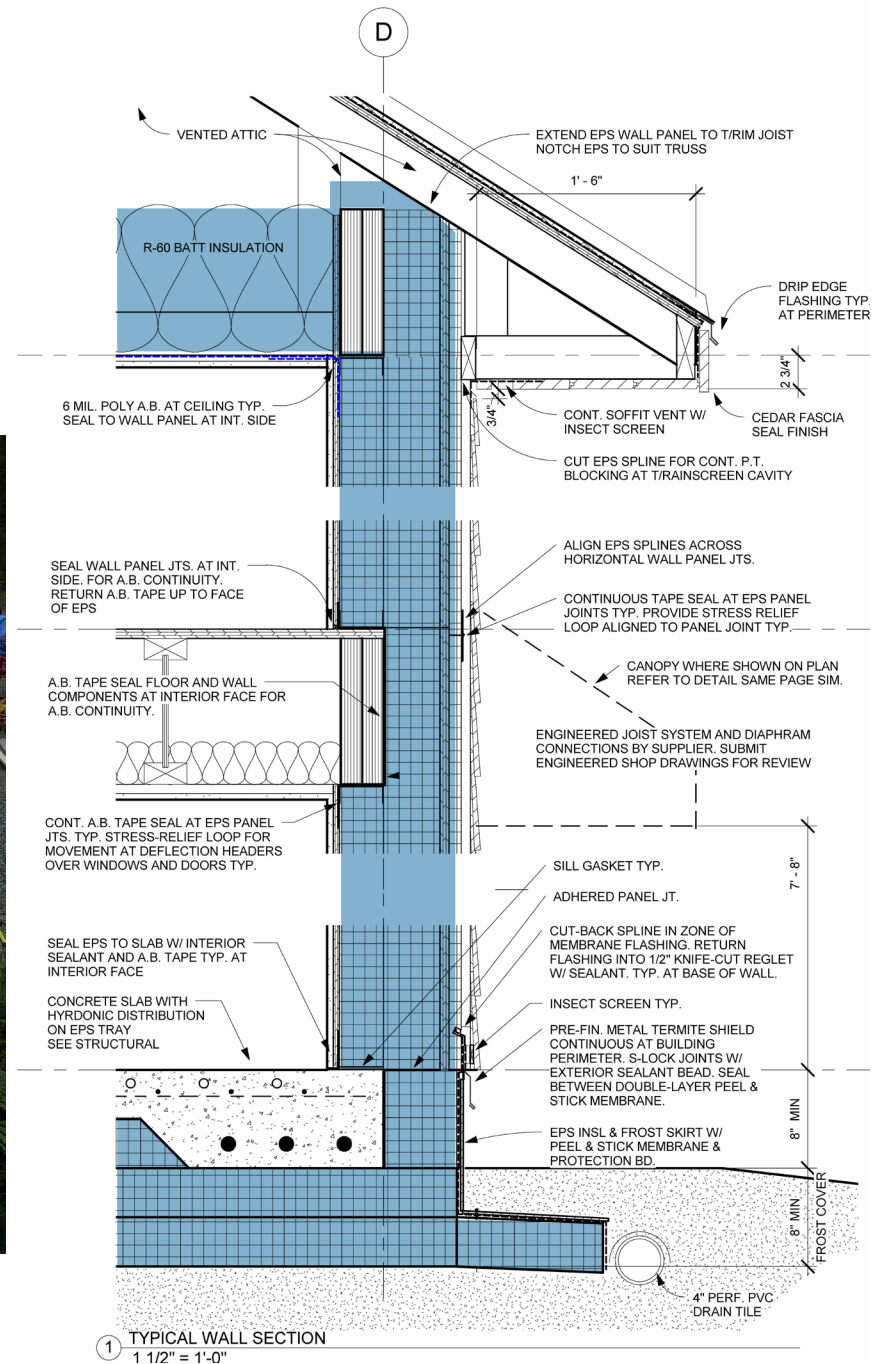
Much more insulation

No thermal bridges

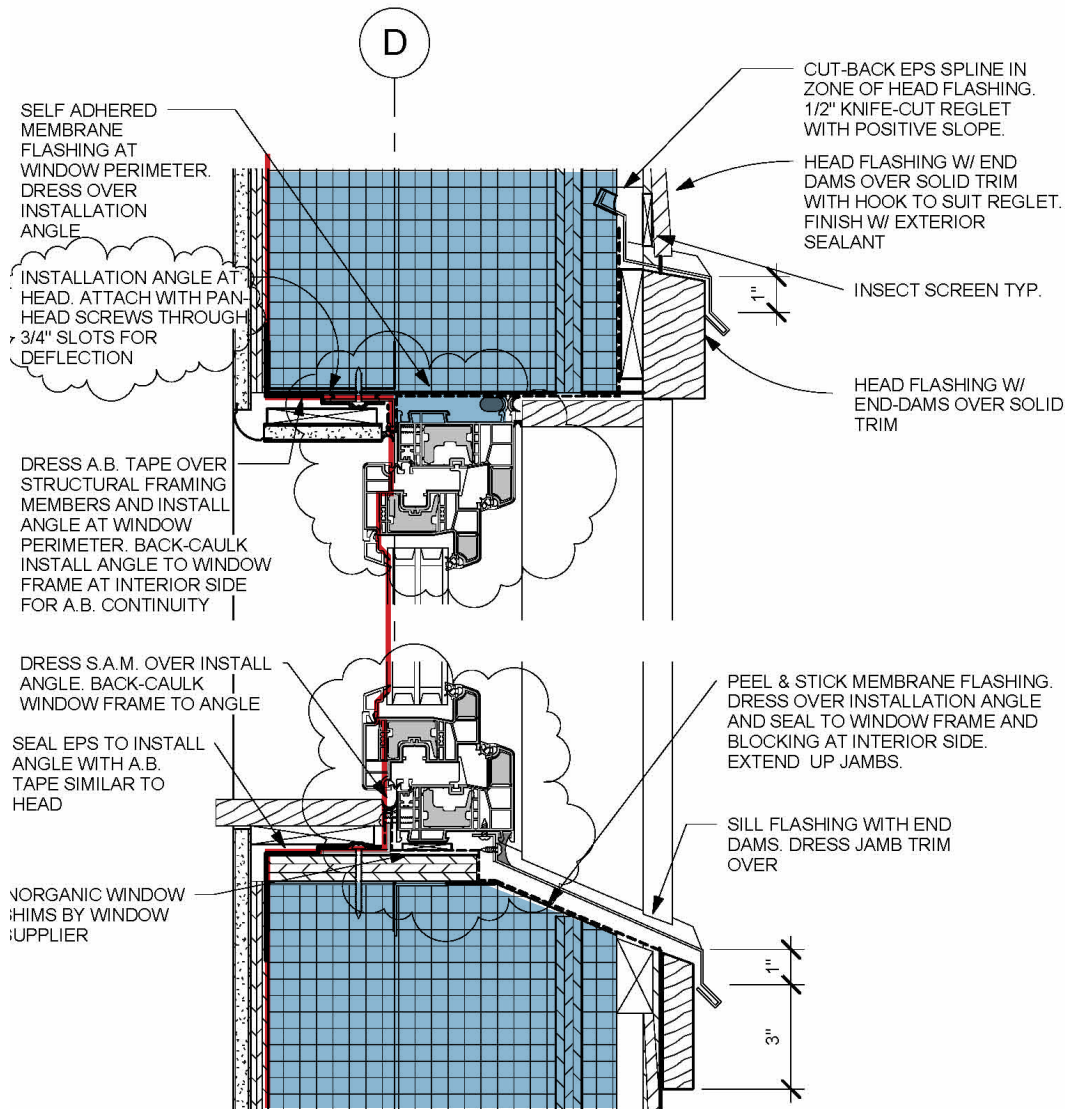


Much more insulation

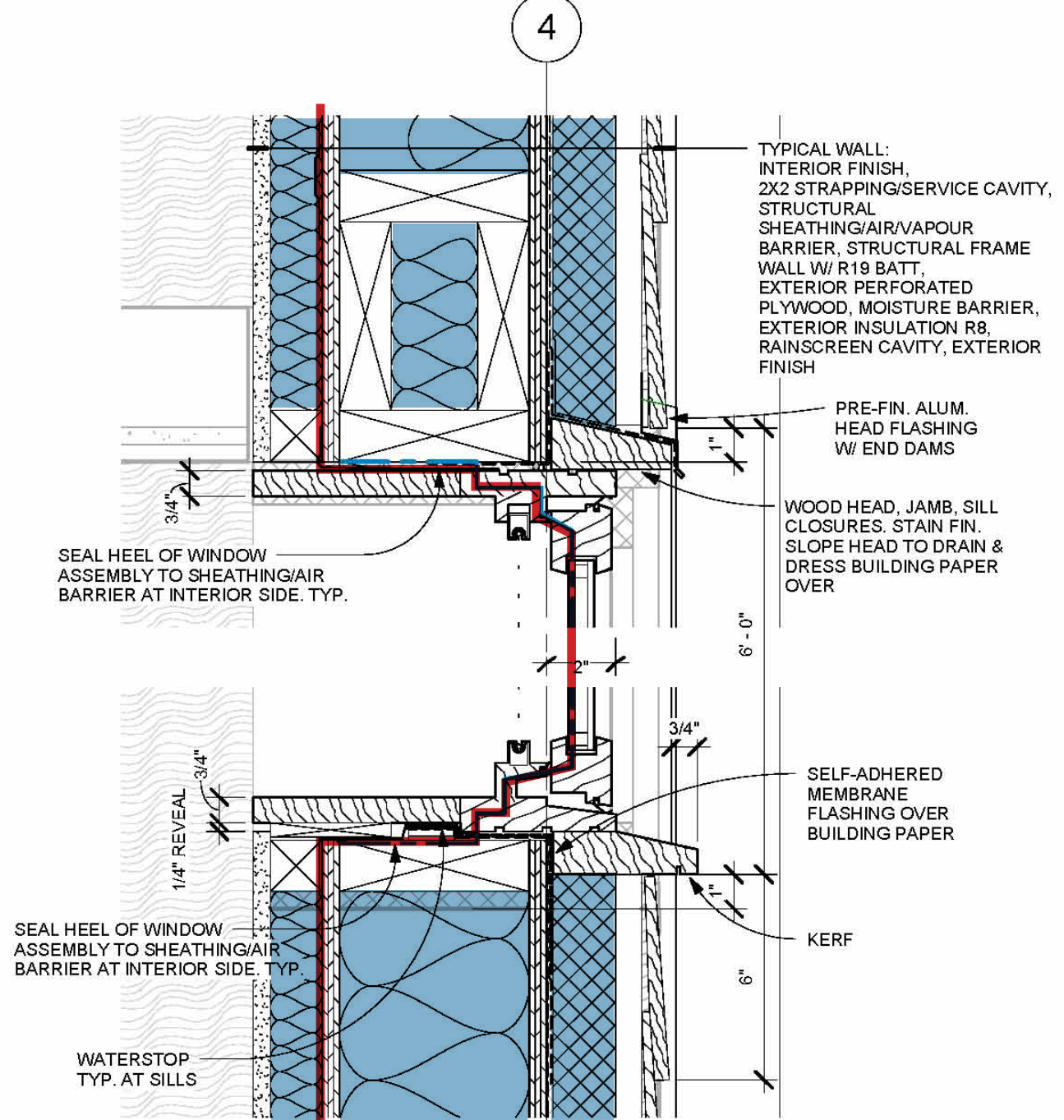
No thermal bridges



High quality windows and doors



Smart details



TYPICAL WINDOW IN EXTERIOR INSULATED WALL

8 3" = 1'-0"

Careful and precise construction



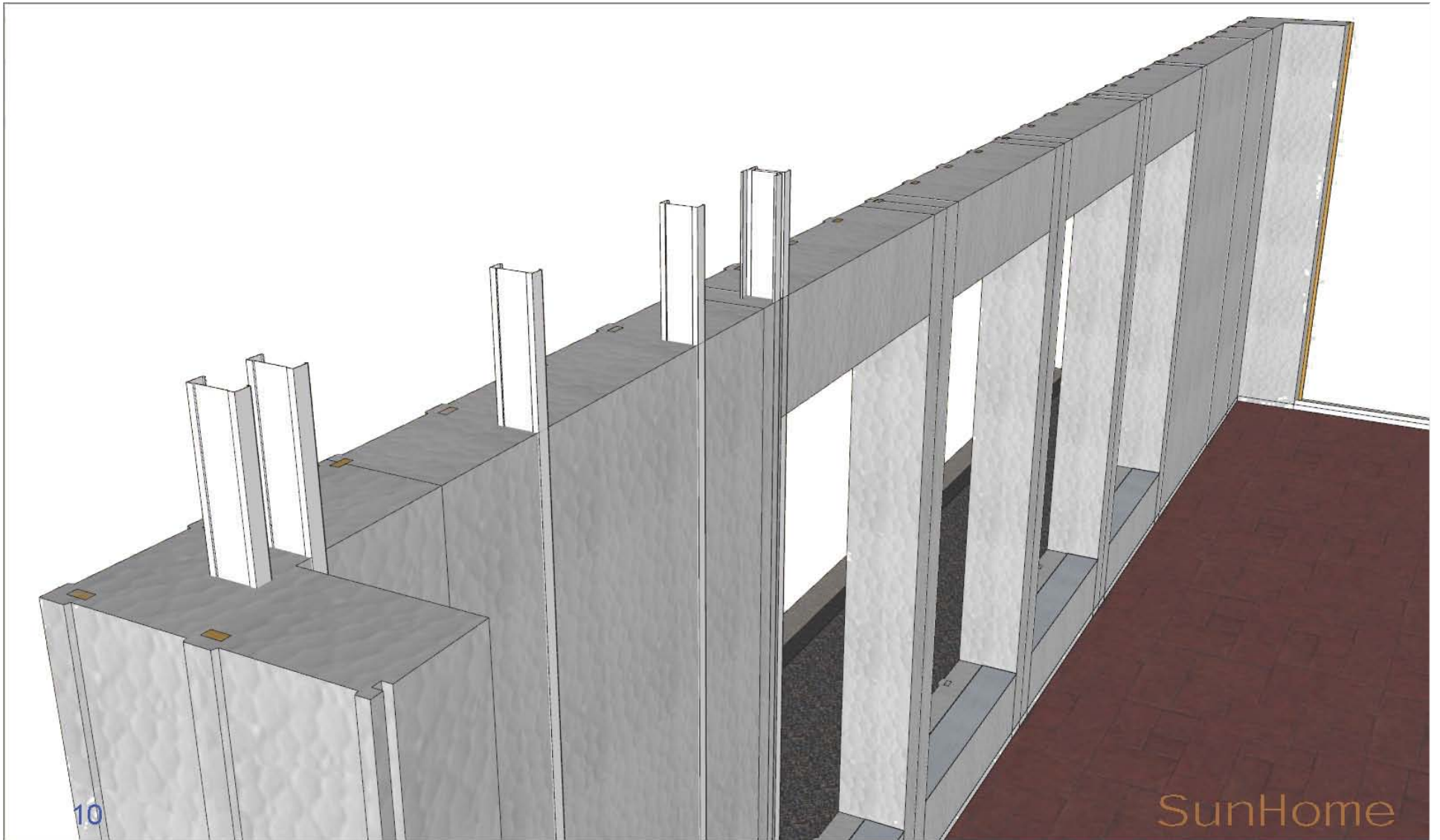
Careful and precise construction



SIPS: Structural insulated panel system

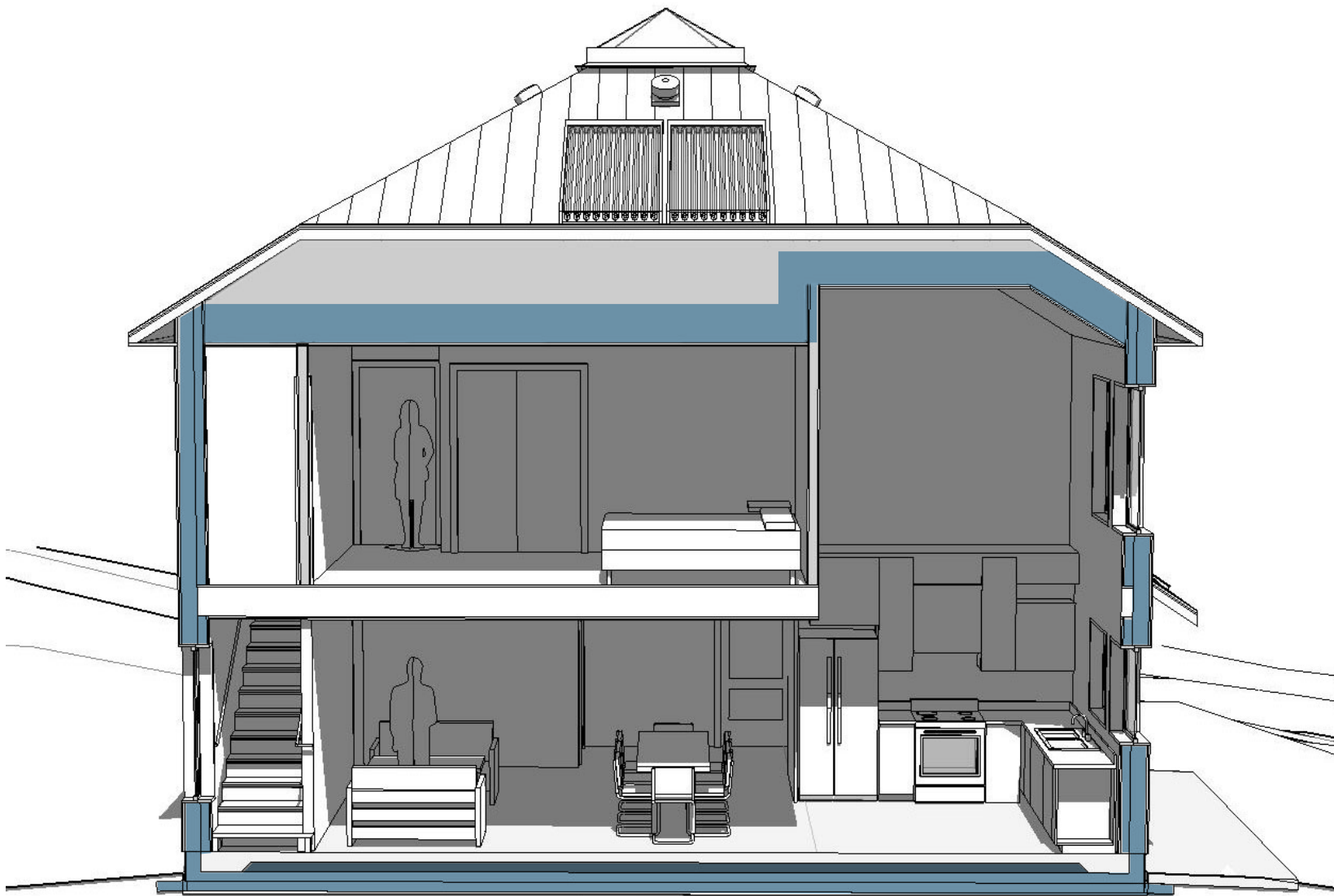


CLT: Cross-laminated timber



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SunHome



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Sunhome Passive House, Salt Spring Island

What is the value of design?

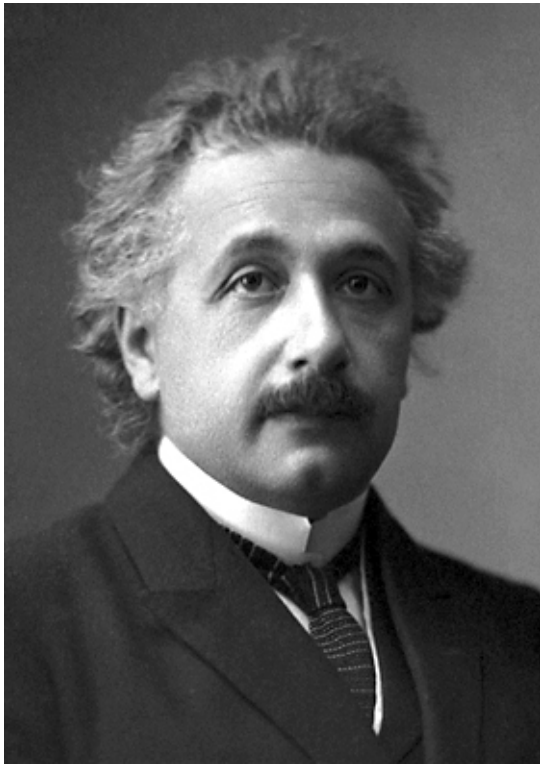
Price is what you pay. Value is what you get.

Warren Buffett

Top ten lessons from a green home builder

10. **Rented essential tools too long before realizing I really needed to own them.**
 9. **Thought I could save money by doing more of the work myself.**
 8. **Didn't use an air gap behind the siding.**
 7. **Too much duct board and flex duct, not enough duct design.**
 6. **Installed a water system without doing enough research.**
 5. **Didn't get an accurate Manual J load calculation.**
 4. **Didn't have our electrical plan completed before breaking ground.**
 3. **Forgot to plan for basement insulation.**
 2. **Built too big a house.**
- Had we built smaller, we might have finished sooner, saved boatloads of money, been just as happy.*
1. **Didn't spend nearly enough time in the design phase.**

This is the most important thing I'd do differently. If I'd spent 6 or 7 months designing instead of 4, we probably could have cut a year off of our construction time. The extra time might have solved all of the problems above and saved us a lot of money and heartache. We thought we needed everything to happen quickly. It didn't.

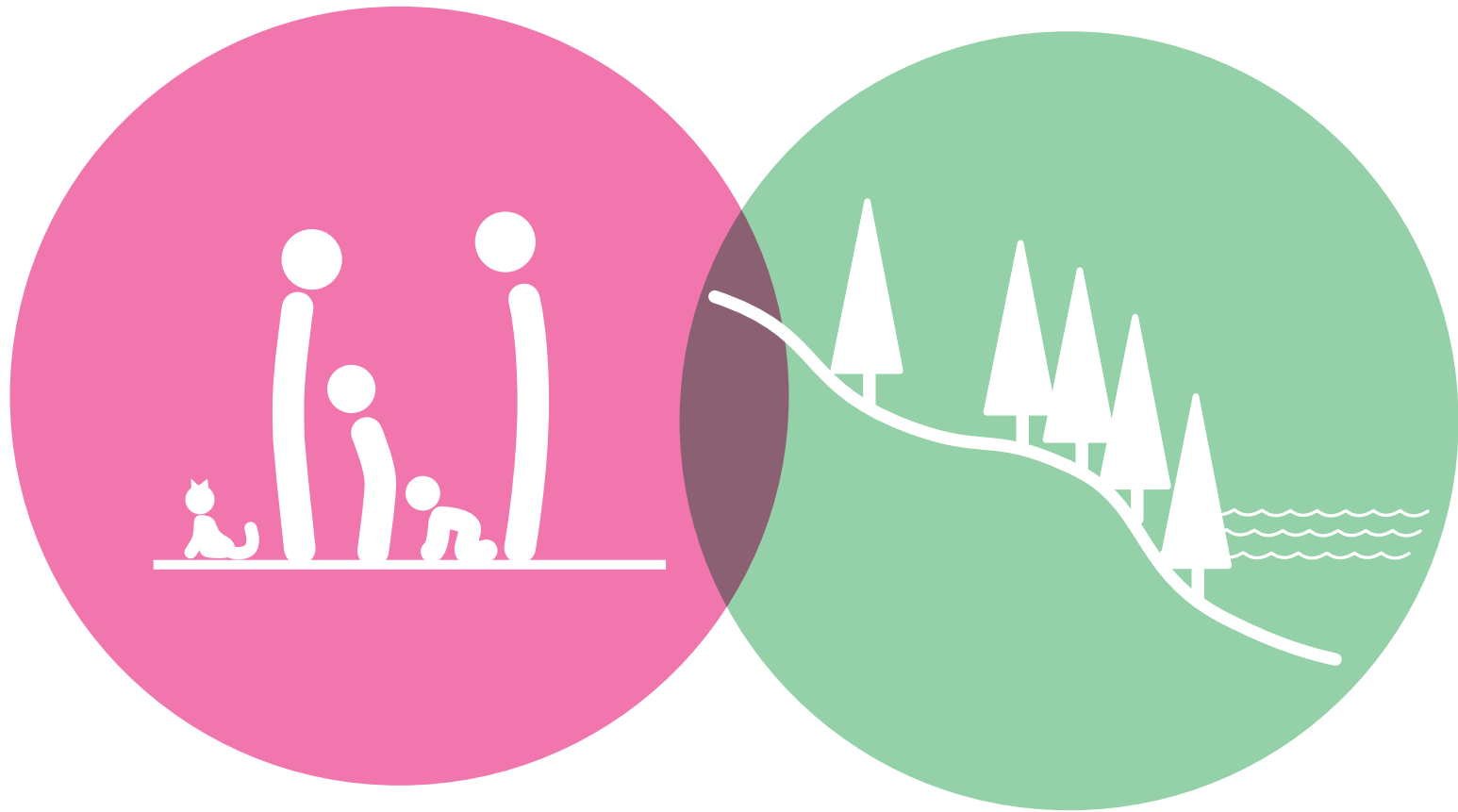


“If I had an hour to solve a problem, I’d spend 55 minutes thinking about the problem and 5 minutes thinking about solutions.”

Albert Einstein

A house exists between us and the world

In its design, a house can either isolate us or connect us to the place where we choose to live



A designer's role is to synthesize the relationship between people and place.

This must begin with inquiry, not answers.

syn·the·size (Verb)

Make (something) by synthesis, esp. chemically.

Combine (a number of things) into a coherent whole



Connecting interior and exterior spaces

Ceiling and floor planes extend through the glass walls extending interior spaces into the landscape.

The 'L' shaped plan creates semi-enclosed outdoor rooms



Connecting interior and exterior spaces

Walls extending past the plane of the window glass frame and edit views of the garden.

Garden and house were carefully designed together to provide unique and varied experiences from each window.



Context

Considering the house in the context of the landscape is particularly important for smaller homes.

Sarah Susanka, The Not So Big House



Opening

Opening rooms to the outdoors extends the living space dramatically into the landscape.



Opening

Opening rooms to the outdoors extends the living space dramatically into the landscape.

Careful use of enclosure to create outdoor spaces with microclimate



Materials and finishes

Natural materials and transparent finishes provide material richness and texture.

Dark colours retain heat to create micro-climatic conditions for extended seasonal use of outdoor spaces.



Windows

Bigger isn't always better. The *right size* window for the experience you want to create.



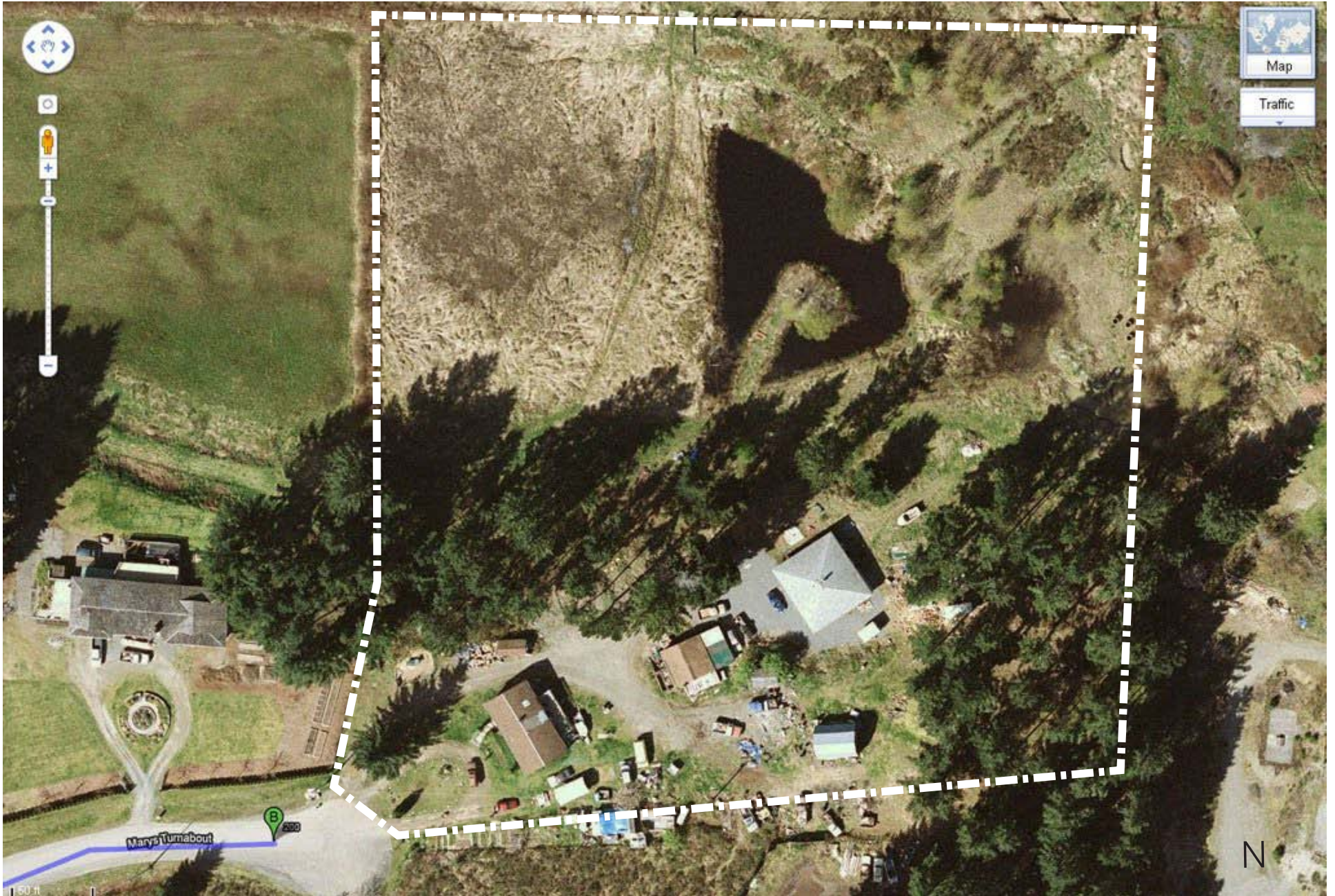
Windows

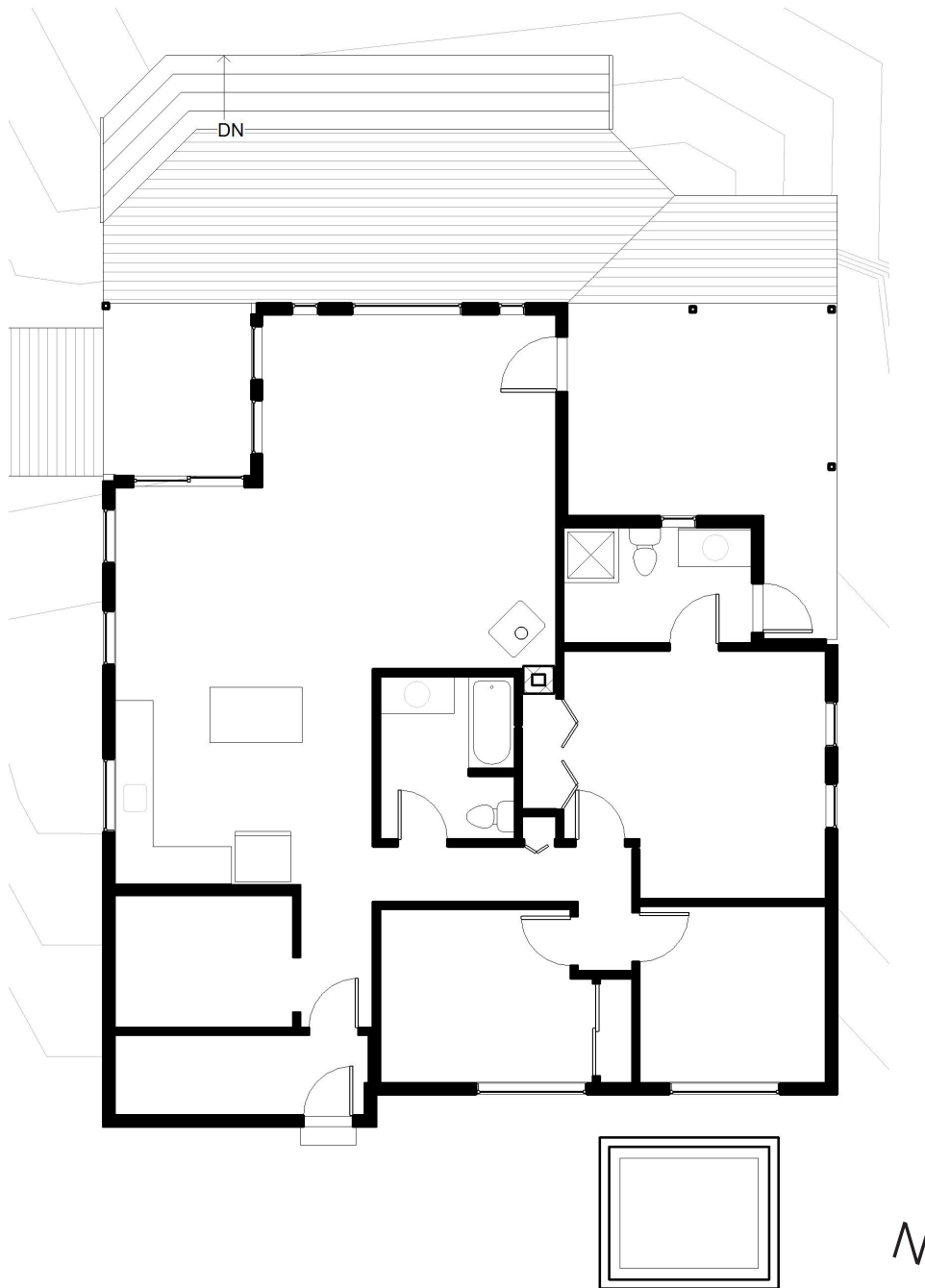
Windows can be used to edit your experience of the site and to serve specific functions such as illuminating the ceiling plane or a counter surface.



drew residence







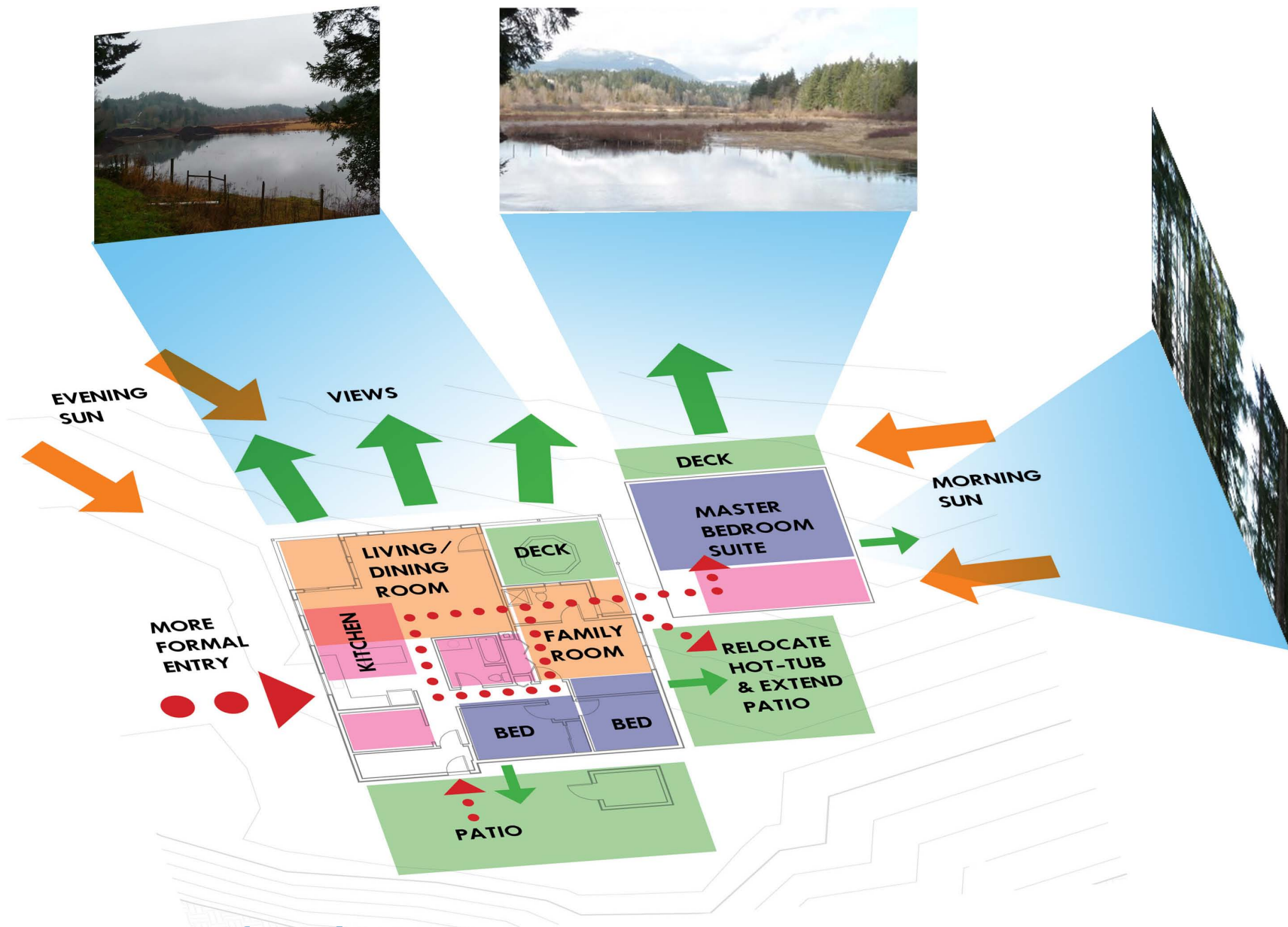
Project goals:

First, to enlarge the home to meet the needs of a growing family.

Second, to renovate the existing house to create a comfortable and nourishing home environment and to connect the home to the site.

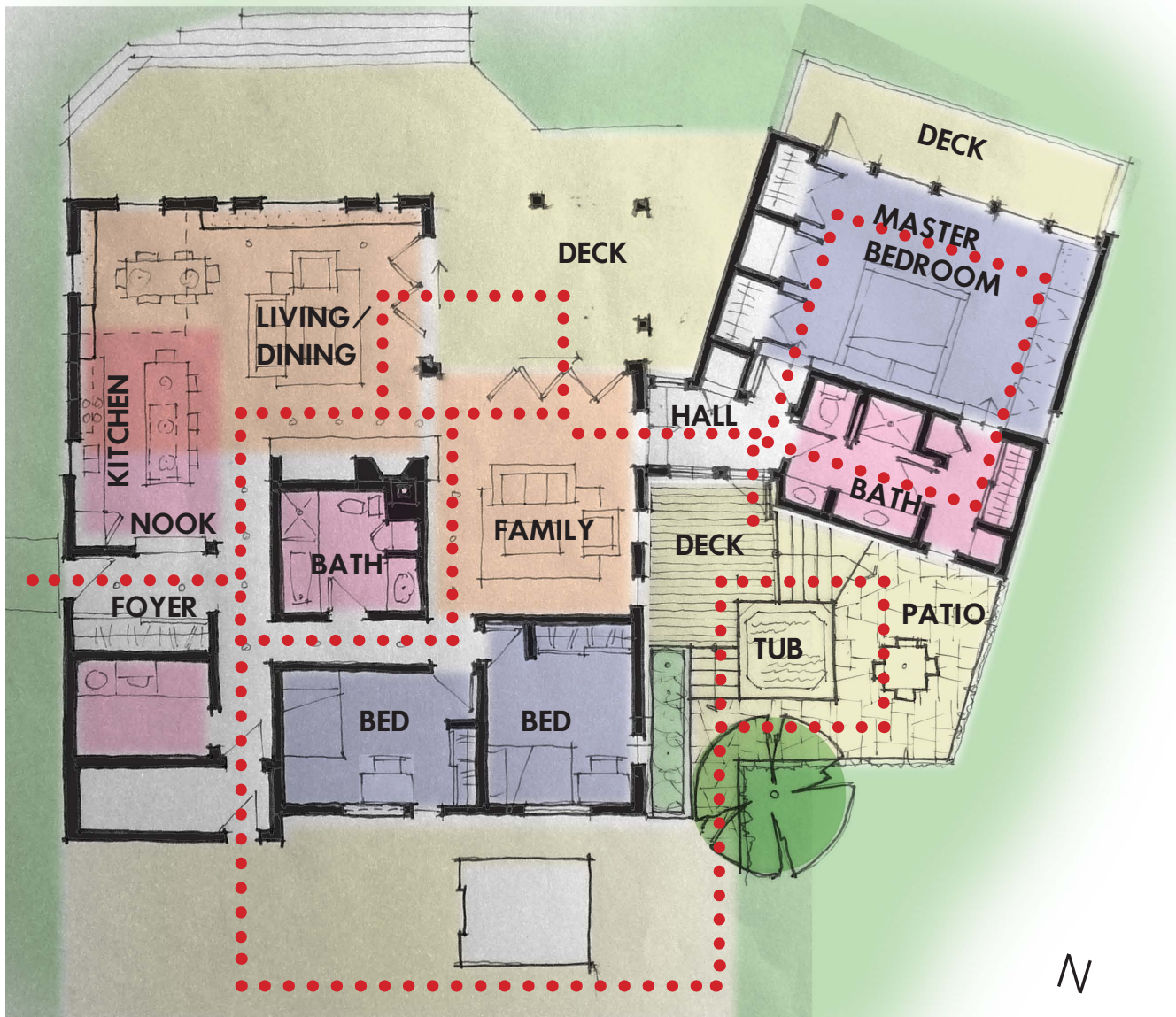
Third, to plan strategically so that work may be undertaken incrementally and with minimum disruption to the family.

The home is a “farm house” and the expectation is to maintain a highly functional, comfortable and liveable home that enhances the family’s relationship with the farm.



Taking advantage of the views:

The windows in different spaces in the house should offer different experiences of the landscape and view opportunities from **expansive vistas to intimate glimpses**. This can be provided by the size and proportion of windows, orientation of rooms and alignment of spaces with existing planting and natural features. Undesirable views to neighbouring buildings can be edited with similar means.



Entry and circulation:

Formal and informal entrances should not open onto primary living spaces. Shifting the formal entry south (to the current location of the kitchen) will provide guests with a dramatic experience when moving from a foyer to the primary living spaces.



Indoor and outdoor living spaces:

Reclaiming the porch for a dining table provides space for the new entry and closet. Locating the addition adjacent to the existing recessed deck provides a third wall to this exterior space, framing the view and bouncing evening light and warmth into the deck. Large patio doors from the living and family room allow this outdoor space to be used for most of the year.



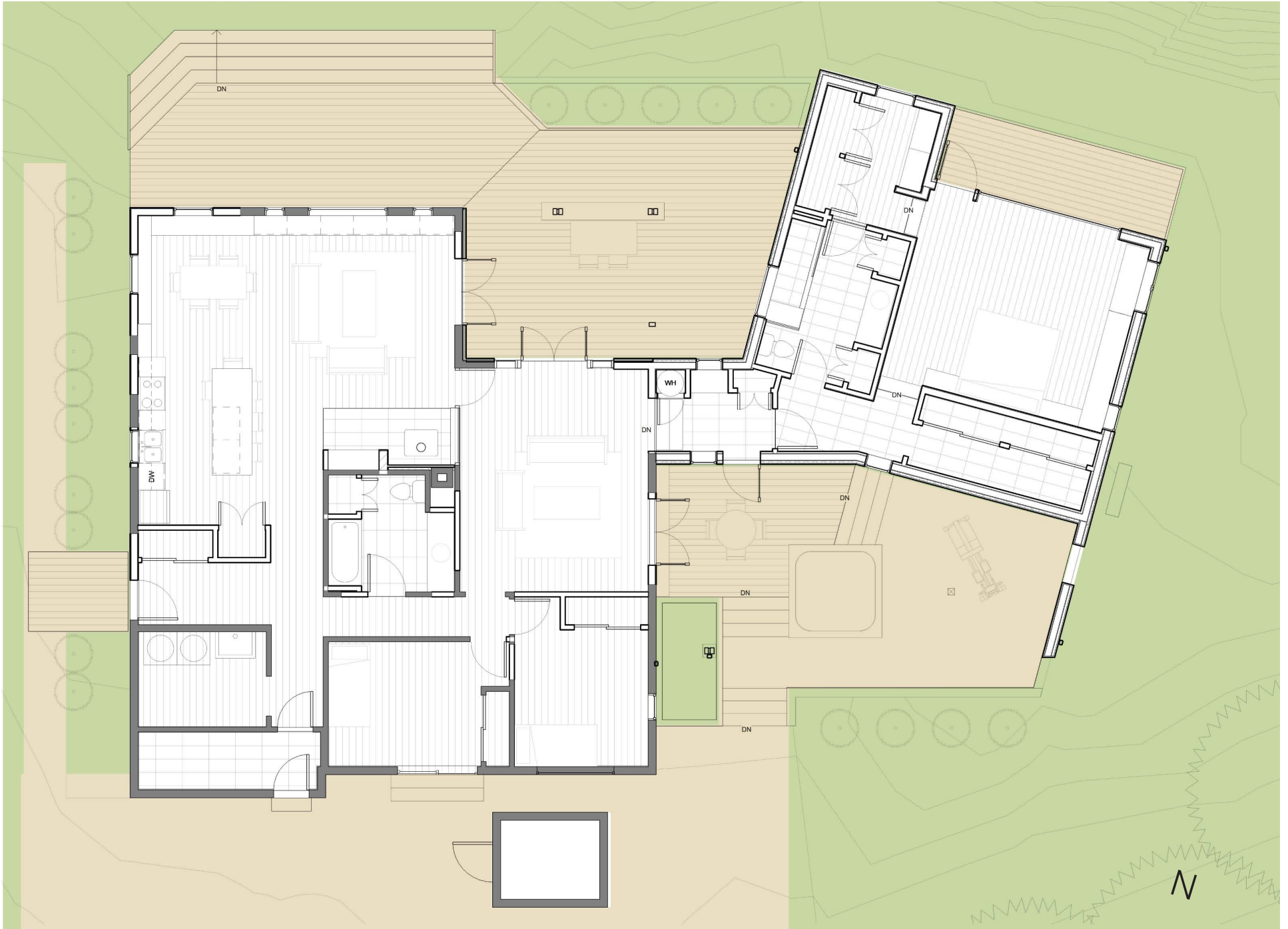
Connecting inside to outside:

This can be achieved by stepping the addition down to be closer to grade and by using the addition to create **semi-enclosed exterior spaces** to the north and south.



Master bedroom suite:

The suite is a sanctuary, distinct from the rest of the house. A change in interior finishes, level and orientation will achieve this.



Rock House Sechelt, BC





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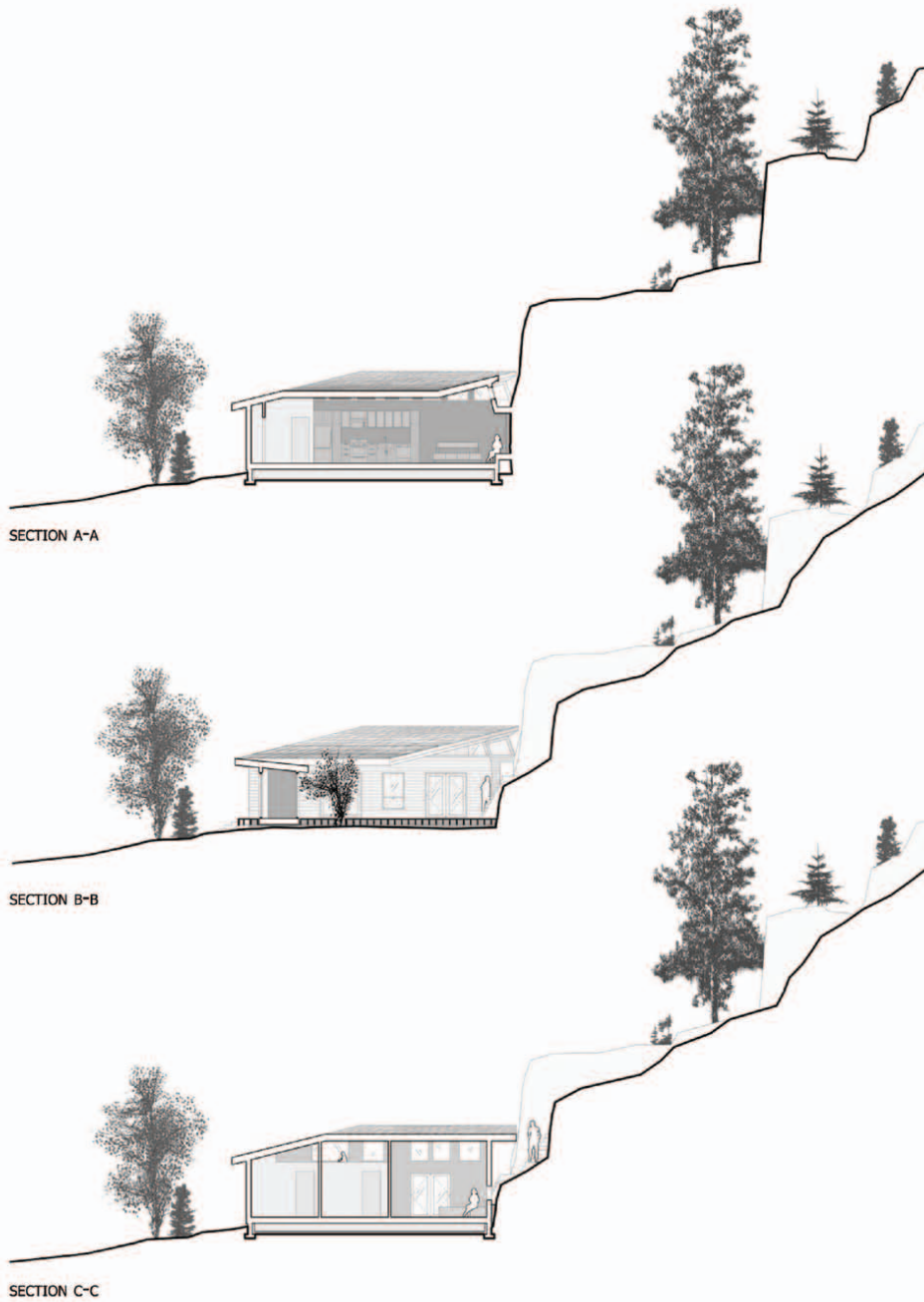
FLOOR PLAN



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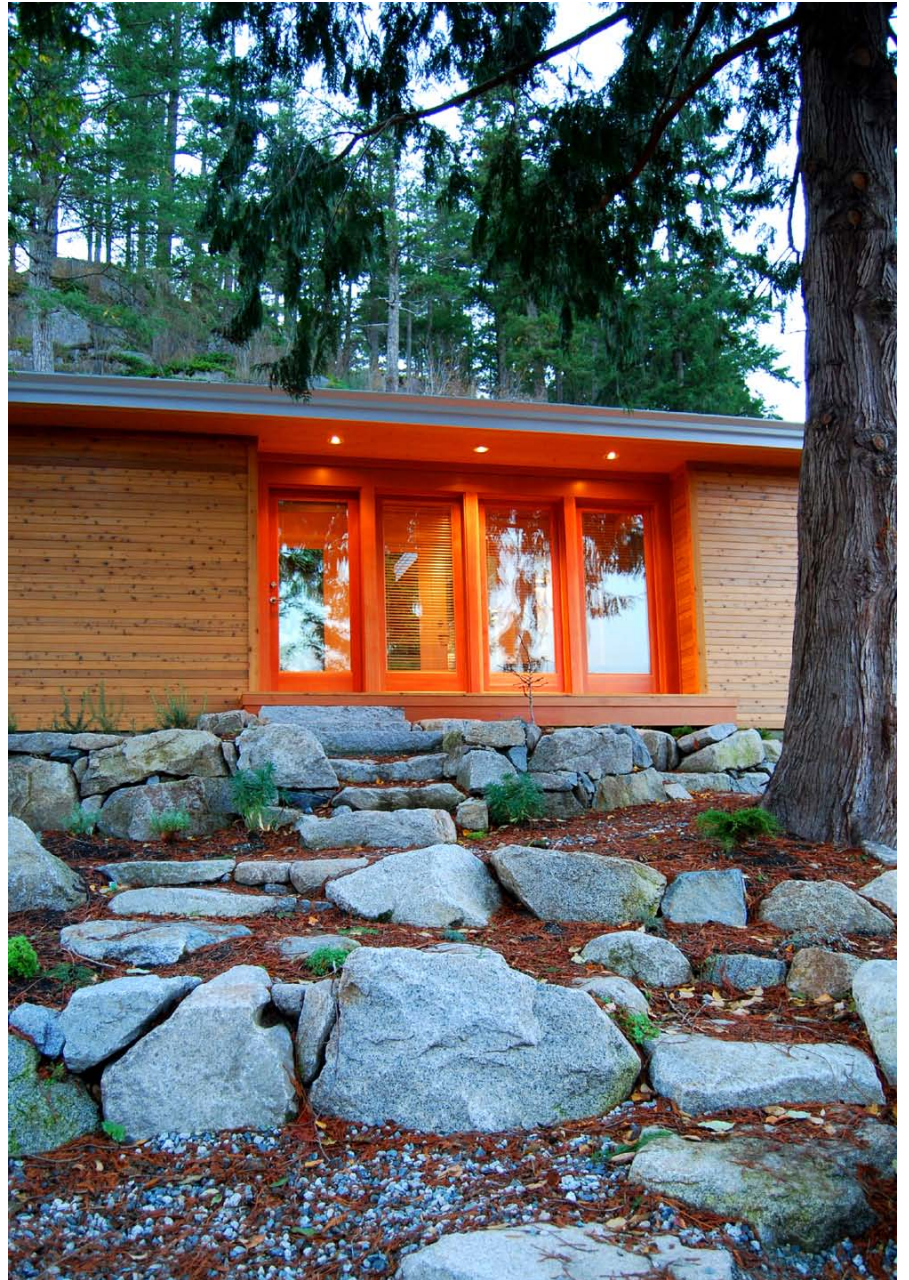


Rock house was constructed for slightly less than a conventional house on a conventional lot in the same neighbourhood of Sechelt, but it has considerably more value both to its owners and to the community. Rock house has become a regular venue for Sechelt art events and a demonstration of how sensitive design can capitalize on the features of a difficult site while minimizing environmental disturbance.



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How to get the most from your designer

- Trust:** Design is a service, not a product. The more candid you are with your expectations, the better your designer can serve your needs.
- Communicate:** Is your designer listening to you? Be honest with your feedback and share your ideas. This is your house.
- Attend to the site:** Both you and the designer should spend time on the property. A well situated home should act in dialog with the site, not be inflicted upon it. Allow yourself to be inspired.
- Performance:** Think about your future home in terms of the experiences you want to have, not as an inventory of rooms. How will your home function for you?
- Take time:** The first draft of a design is never perfect. Design is a process. Take time to get it right on paper before you build it wrong in the field.
- Budget:** Consider your *whole* budget (including soft-costs, landscape costs, life-cycle costs). Consider design in terms of the value it offers to the entire project budget.
- Don't settle:** Your designer can create opportunities from challenges. Build it right for your needs and don't accept compromise.



“The most important tool in our office is the garbage can”

Will Bruder Architect

Riddell Residence, Will Bruder Architect



The value of life can be measured by how many times your soul has been deeply stirred.

Soichiro Honda

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