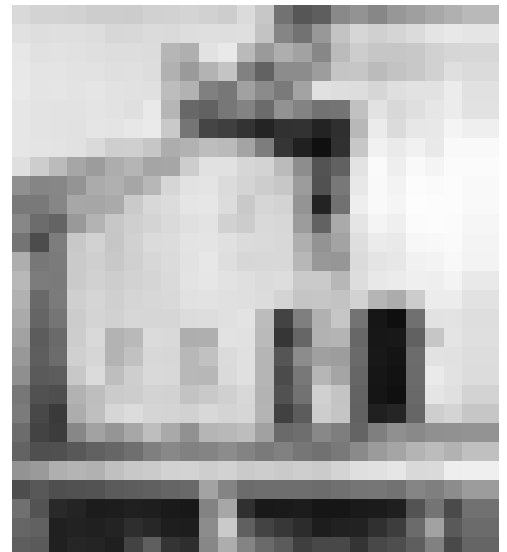
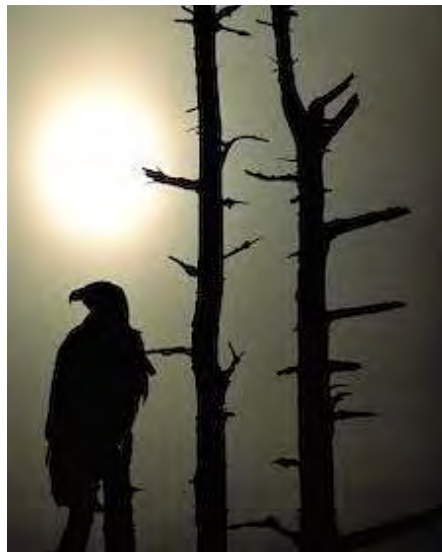

GREEN AND CULTURALLY APPROPRIATE BUILDING DESIGN: for Clayoquot First Nations

PART II: A PROTOYPE HOME DESIGN



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A Community Design collaboration



This document contains information and material pertaining to the on-going Nuu-chah-nulth communities' dialogue between Ecotrust Canada and David Wong, Architect.

The goal of this effort is to explore traditional Nuu-chah-nulth heritage, and explore ideas and methodologies in the creation of a home design that is respectful to cultural traditions, as well as being climatically appropriate. 'Green' concepts, in terms of local materials, passive systems and community assets will be encouraged. As an evolving effort, the contents of this report will be subject to revisions and changes, as new ideas, circumstances and new challenges appear.

Although care and attention has been placed onto this effort, Ecotrust Canada and Architect David Wong makes no warranties nor assurances for the final built form.

It is recommended that a costing manager (or quantity surveyor) be retained early in the effort for each project (home design) undertaking, to assist with budgets. In addition, other associated professionals and disciplines should be engaged to review soil conditions, structural components, local materials grading/ quality, inspections, and proposed mechanical systems.

1.0 Background

During spring 2011, Architect David Wong was retained by Ecotrust Canada to undertake a series of community led discussions on Nuu-chah-nulth traditional designs, and 'historic' best practices. This work resulted in the report, "Part One: Interviews and Preliminary findings". From this initial work, further discussions had taken place, and this second report is a summary of preliminary (and generalized) concepts and ideas on what the new home design may look like.

This report consists of :

- lessons from the past
- dealing with current home design issues – mould and associated health issues, material palettes, modern "conveniences"
- the dynamic family size
- wish list(s)
- ideas for community engagement - artists, weavers, carvers, children, elders – assets for the building of community
- a design for today's family – concept layouts, green aspects, options and variations on basic form
- 3D visuals and photographs of interiors (and exteriors) that help explain possibilities.

As an early design concept, the proposed home will be presented as "massing forms" – i.e. without finishes, nor material representations on the 3D renderings.



Seniors' dinner, Ahousaht



Totems, Opitsaht

2.0 Summary from Part one

LESSONS

In the past, traditional architecture passed down the generations described dwellings that were constructed from local materials – cedar planks, cedar logs, stones, etc. – all placed in harmony with the environment. Buildings housed generations of families, where elders shared space with the young – sharing knowledge, stories and respect. Neighbours and families often supported each other in the creation of buildings. People contributed to the building of homes and common areas. This collaboration of people often resulted in opportunities that facilitated and maintained 'community building'.

It is with these desirable attributes from where the design for the new Nuuchahnulth home will draw inspiration from. Homes and structures that welcome community members to contribute their artistic endeavours; homes that can accommodate multiple generations of family under one roof... or the option and flexibility to accommodate this at a future date; airy vaulted spaces that allow homes to breathe, and more important, spaces that echo past traditions of long houses.



3.0 Key issues

WATER AND MOISTURE



The part one report described water ingress and moisture removal issues. The following are suggestions that addresses some of the water and moisture issues.

KEEP OUT WET CLOTHES

An entry room should be considered as a first line response to individuals entering the home with wet clothes. The entry “wetroom” would have a place to sit down for the removal of wet jackets, umbrellas, hats and shoes. This space is unheated, but should have cross ventilation for air drying.

By removing some of the wet clothes outside the main living areas, one source of moisture into the home is decreased. This entry room could also serve to air dry laundry.

RAISE LOWER LEVEL

The main floor level should be a few steps above the outdoor ground level. Thought should be given to sloping the outdoor landscape and walking surfaces away from the home, so that surface water would flow away. A combination of sloped surfaces, swales, and drainage devices should all be used to discourage surface and ground water ingress.

Design care should be given to accessibility issues resulting from raised floors. Perhaps a gentle ramp from the higher part of a home site be planned as part of the home’s design.





ROOFS

Flat roofs are not ideal in this wet rainforest region. Roofs must be sloped adequately to facilitate drainage. A suggestion was made by a Nuu-chah-nulth community member – for the use of cedar as a more resilient and locally available material. It was suggested that cedar roofing material be more than just shake and shingle, but may be in the form of long continuous planks! This suggestion is worth exploring, and a maintenance/ community value cost benefit analysis may present some interesting findings.

It is the opinion of this author that the use of locally harvested cedar woods be explored for roofing. Duroid (ie. asphalt) roofing may be an initial inexpensive capital cost, but it only lasts a couple of decades in this climate. The same for metal roofs. Although the metal may last a long time, the connectors and fasteners are first to fail... in addition to the difficulty of repairing a metal roof deformed by impact damage, and the potential for thermal expansion over large metal surface areas.

Rainwater gutter systems should be constructed of a material more resilient and stronger than the ubiquitous aluminum gutter. Discussions with community members expressed interest in rainwater collection barrels for greywater use (i.e. toilet flushing), or collected in non-toxic cisterns for use as watering for vegetable and flower gardens.

Roof penetrations should be minimized.

Ideally, plumbing areas in the home should be concentrated in close proximities to share vent stacks. Where penetrations can not be avoided, proper roof flashing materials and techniques must be employed.

All enclosed roofs must be ventilated. Proper ventilation would include proper quantities of roof vents (with associated rain protection/ caps) and their associated surface area of eave return air vents. Often, roof vents are installed but there is an inadequate eave vent response to allow the roof vents to function properly.



SKYLIGHTS AND DORMERS

Skylights help bring natural light into interior spaces. They can also be operable units that may be “opened up” for ventilation. For these reasons, skylights a present valuable opportunity for the creation of a healthy home.

However, the concern for rainwater leakage into, and from the skylight was raised during a community meeting. A properly installed skylight with an adequate curb and flashing can withstand wind and rainfall challenges. Consultation with the supplier/ manufacturer of quality skylights and it’s installation is an important quality control item.

Dormers also offer natural daylight and the access to ventilation. In addition, dormers can make floor areas more useful by providing headroom access.

Examples of various dormer types are described in the model home examples later in this report.



NATURAL VENTILATION

Natural ventilation helps maintain a healthy home.

Young ones are familiar with the basic concept of “warm air rises”. But as technology permeates our lives more and more, this basic notion of natural air circulation has been ignored in favour of technological solutions. As a result, recent house designs often rely on fans as the main ‘solution’ to circulate air.

The proposed design solution on the following pages describe a vaulted space to take advantage of natural air circulation and ventilation.

AVOID “COLD SURFACES”

Proper insulation, and smart design can help minimize the transfer of heat/ cold across building materials.

With less cold surfaces, there will be less opportunities for condensation to occur.

4.0 a Prototype Design

THE FORM

The proposed building form will be simple, with a roof form that echoes this simplicity (ie. does not have many added 'forms', joints, valleys or penetrations). The roof will have a minimal pitch of 4 in 12.

The home will be 1 1/2 to 2 storeys tall to encourage the indoor air to circulate within.

Cross ventilation will be a basic requirement for all rooms where walls and layouts permit.

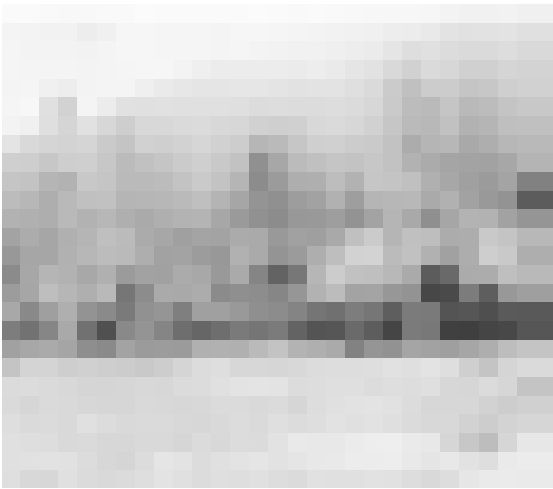
The home will be raised a couple of feet above the surrounding ground, with good and accessible access to the main floor. Roof expanses will be oriented to good solar exposure and aspect – to allow the sun to help warm and dry up roof areas, and to provide the opportunity for those who wish to take advantage of passive green solutions (eg. solar water heating), and to provide other opportunities such as photovoltaics (solar panels).

FLEXIBILITY

The basic home will be designed to be flexible – to allow expansion as an family's financial ability and resources enables additions and / or as family requirements grow.

It is proposed that removal wall panels of approximately 8'-0" wide by 7'-0" tall be provided at the exterior end walls. These walls may be removed when two dwelling units are placed side by side to allow families from each unit to connect through to each other. This connection will occur at the living room area on the main floor. A second floor connection may also be created by punching out the end windows at either end of the second floor walkway/ gallery. Securable doors may be installed at this second level for additional privacy.

Should this scenario of removal wall panels be employed, fire compartmentalization (eg. fire shutters, panels) will be required to separate out the adjoined units in the event of a fire. A fire code specialist / code consultant will be able to provide proper advice and guidance on the design of such fire safety measures.





Rooms on the main (ground) floor may be converted into bedrooms – for guests or for elders. It is also important that a bathroom be provided on both floor levels. One to serve the flex room (eg. elder’s bedroom) on the ground floor, and the other to serve the second floor sleeping rooms.

The size of the main (front and rear) doors will be a minimum 3’-0” wide to allow for wheelchair accessibility. The same for the main floor flex room and for the bathroom. However, these flex room (interior) doors may be sized at 2’-10”.

MATERIALS

Wood is a natural and time tested building material. When source from reliable sources (ie. harvested responsibly and sustainably), wood is a true green building material.

Wood captures carbon from the atmosphere when it is growing as a tree - through photosynthesis - extracting carbon dioxide from the air. Carbon is released back into the air when the tree dies – through rot or when the tree is burned.

However, when a tree is cut and used as a building material, the carbon contained within is captured and contained. Thus the carbon is sequestered and trapped in the wood, until it is finally allowed to biodegrade back down into the earth.

It is recommended as a first step toward creating a green building, the use of wood is to be encouraged and promoted. In particular, the use of locally available species and locally sourced out wood products. Cedar has been identified as a highly desired building and finish material.

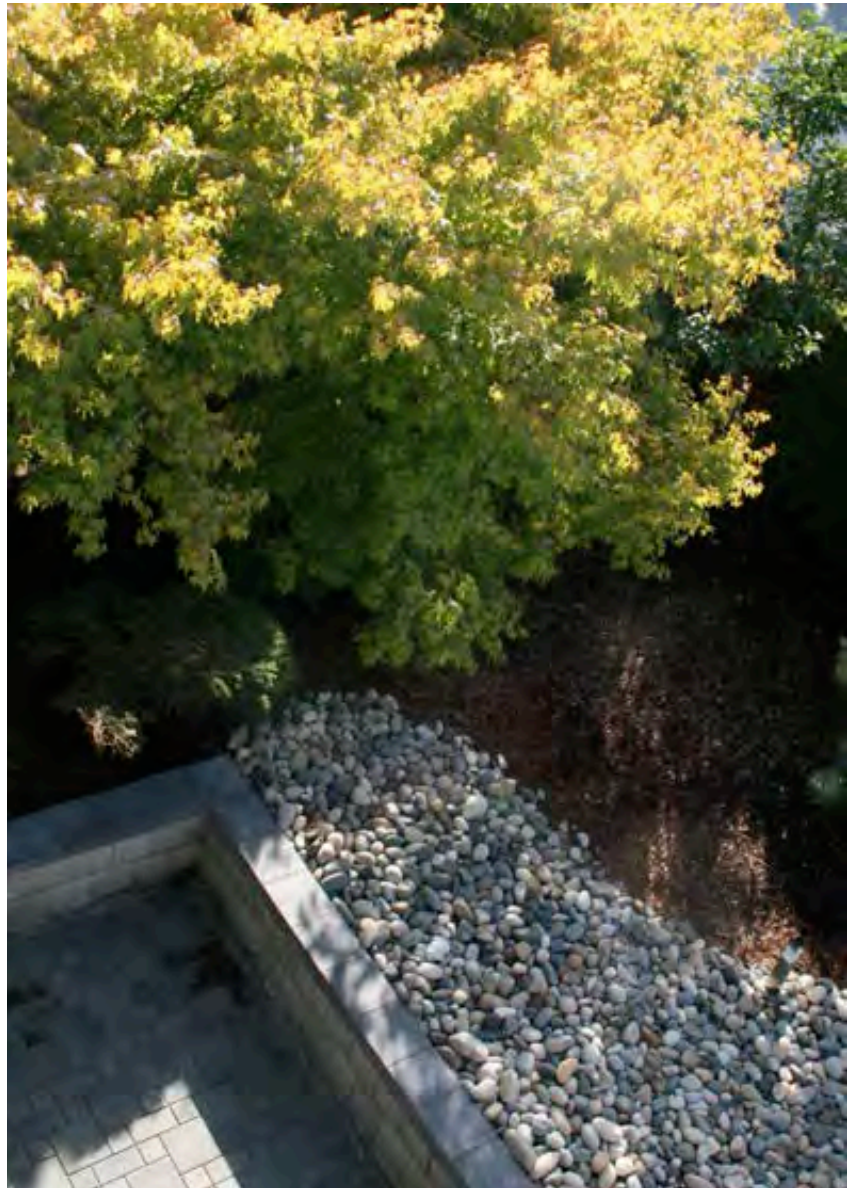
Wood should be used not just as a structural element, but also as an interior finish, as roofing material, as partitions, flooring, exterior finish, artistic, and other innovative uses.

Other building / finish materials may include other products sourced out from trees - eg. roots, bark for making rope and weaving.



Rocks and stones may be employed to build parts of the home as accents or as features- such as river rocks created in a cobble floor finish (eg. at bathroom area) or to create feature walls and/ or fireplaces.

Materials that require translocation from long distances (eg. suppliers and manufacturers from outside the region) are to be discouraged.



5.0 “Green” and “Culturally Appropriate”

GREEN

Passive techniques for Green design are preferred, as they require little or no reliance on technology, and are often associated with a lower cost.

As this project evolves along into the model prototype homes, a matrix of comparisons with goals and definitions will be prepared to identify and quantify desired green qualities and solutions.

CULTURALLY APPROPRIATE

This effort will explore culture appropriateness in more than just “physical expressions”.

A successful culturally appropriate response will focus on those qualities that help define a community whose history demonstrates a historic respect for nature, intergenerational bonds and reverence of the past.

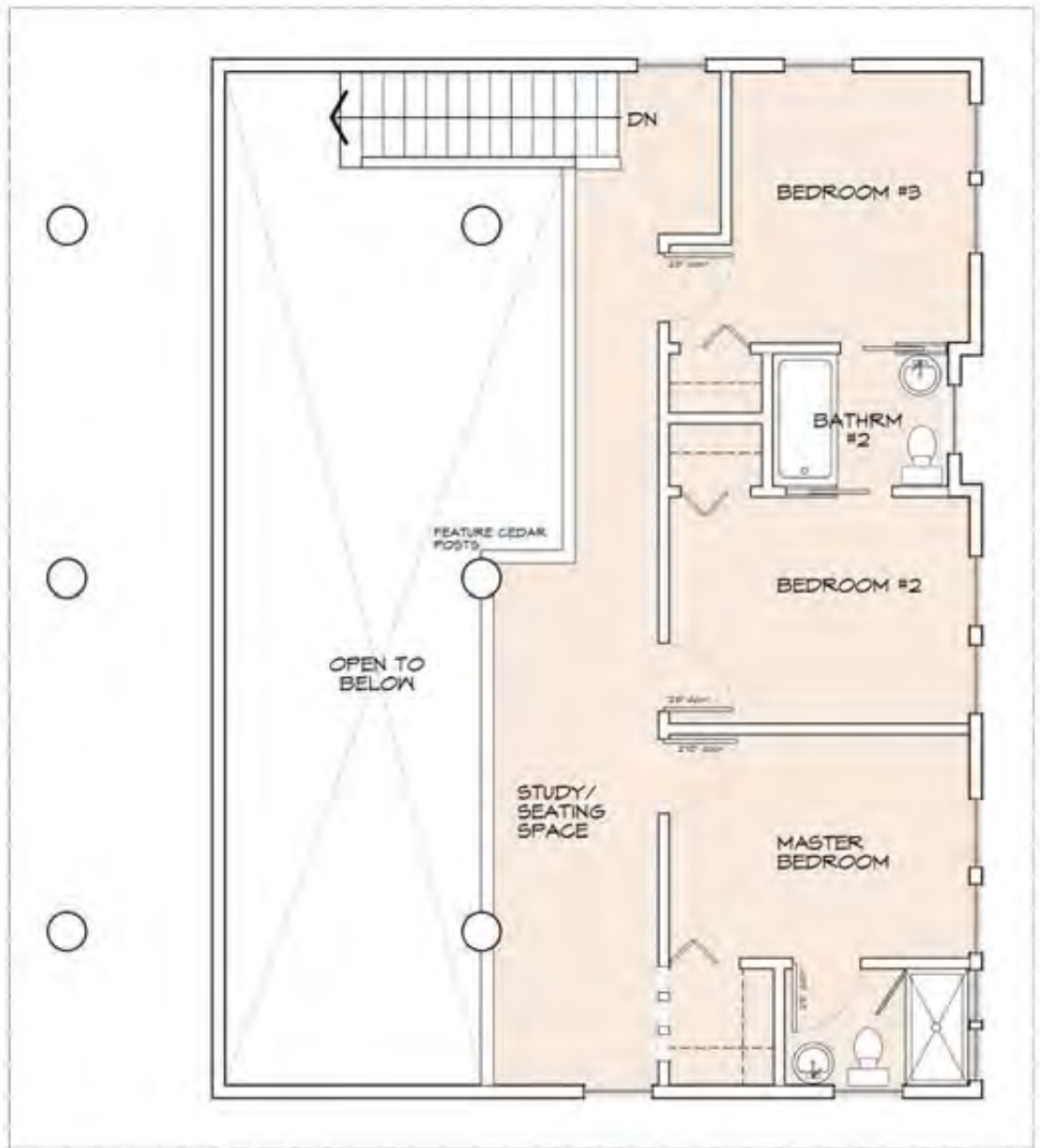
Although First Nations artistic expression has often been defined as cultural appropriateness, the Architect for this report associates the invisible bonds that define the Nuuchahnulth (and other world cultures) as what the real meaning of cultural appropriateness is.

It is desired that the design of the prototype home will aid in creating and enhancing these invisible attributes - the attributes of hopes, desires and pride as expressed from members of the community in part one of this effort.

These attributes, include,
connecting generations
use of traditional knowledge
sharing of knowledge
opportunities to interact - between families, generations and with nature
teaching and learning
eating and sharing
pride and privacy
respect for the environment and climatic conditions

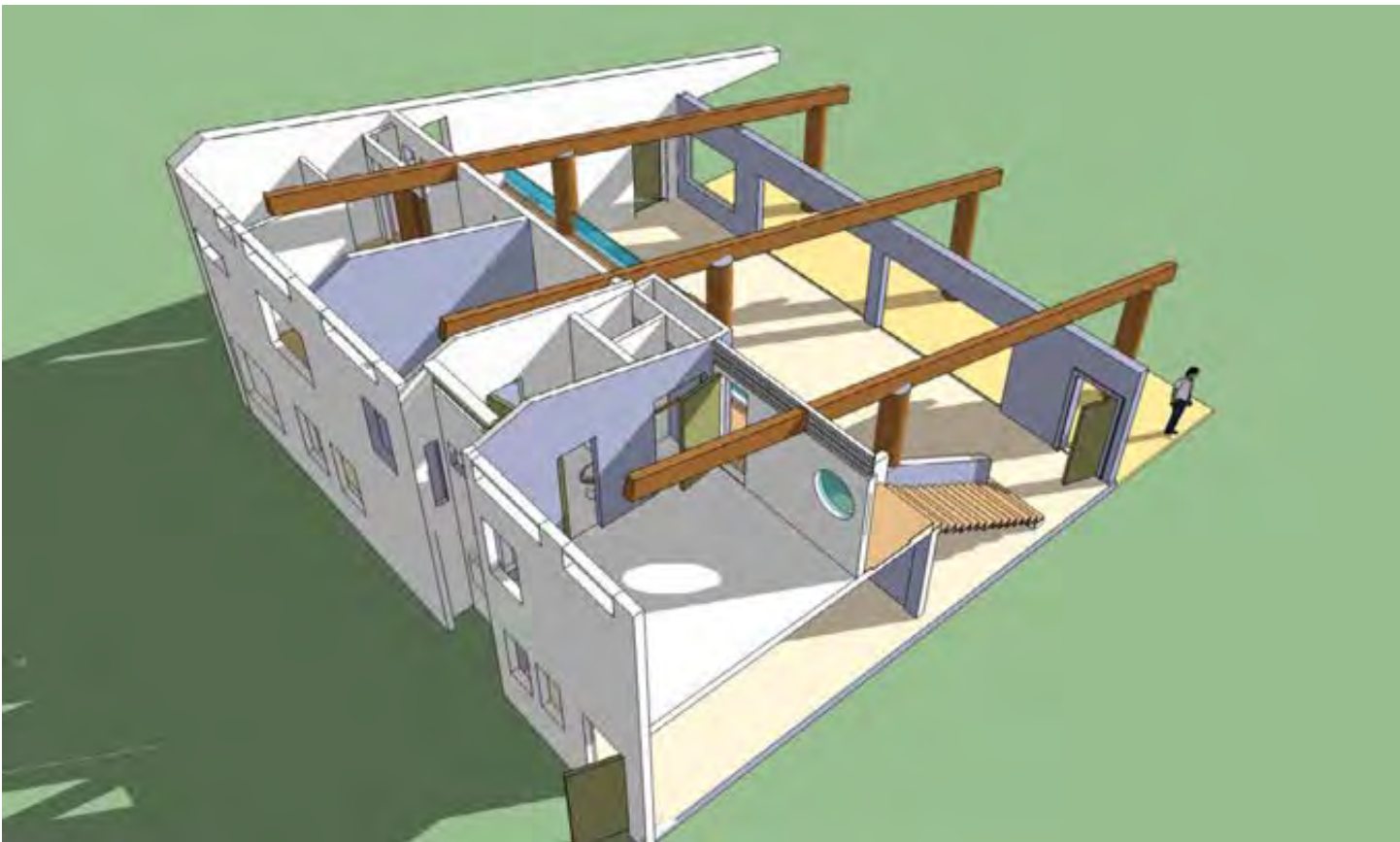
A new home design for the Nuuchahnulth

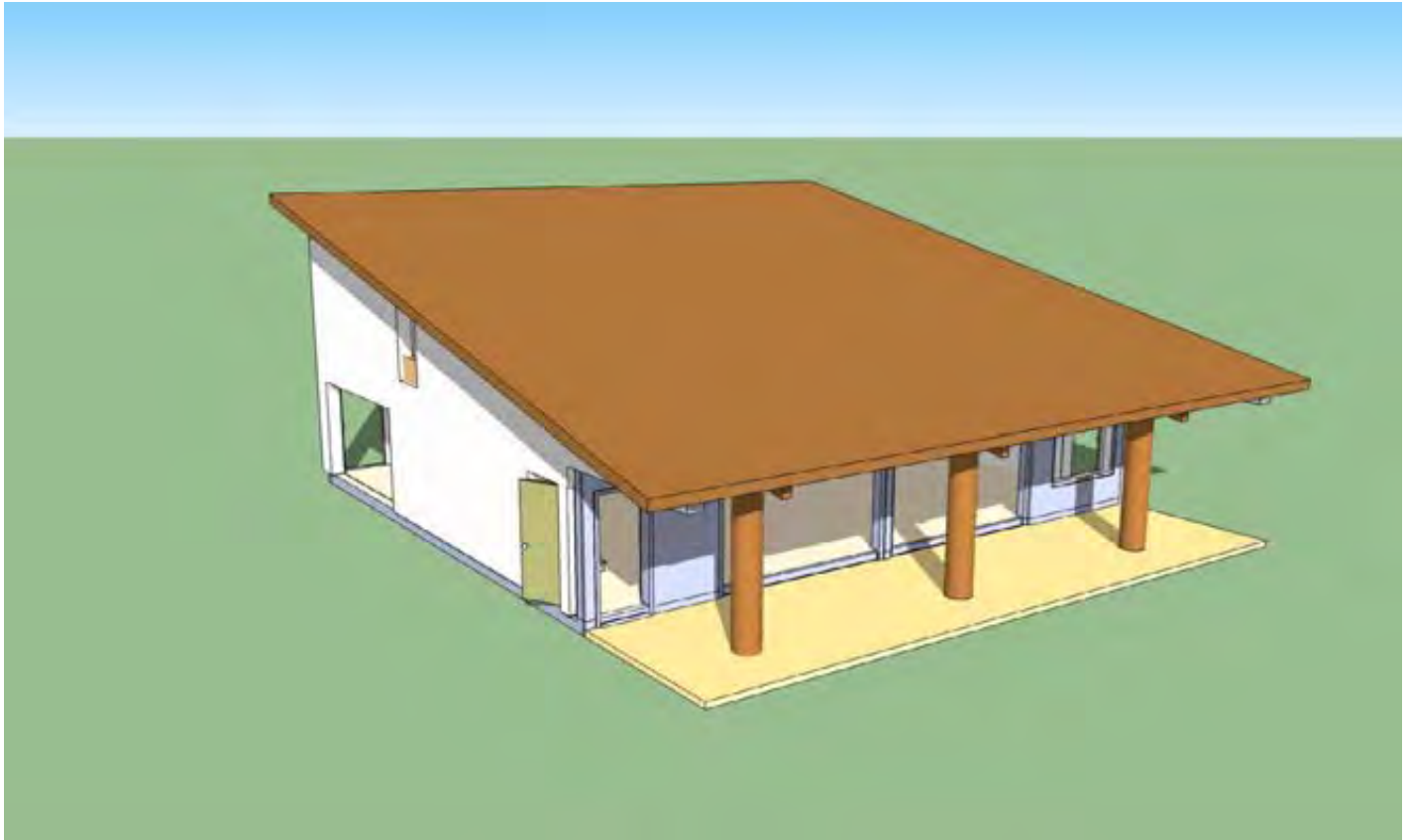




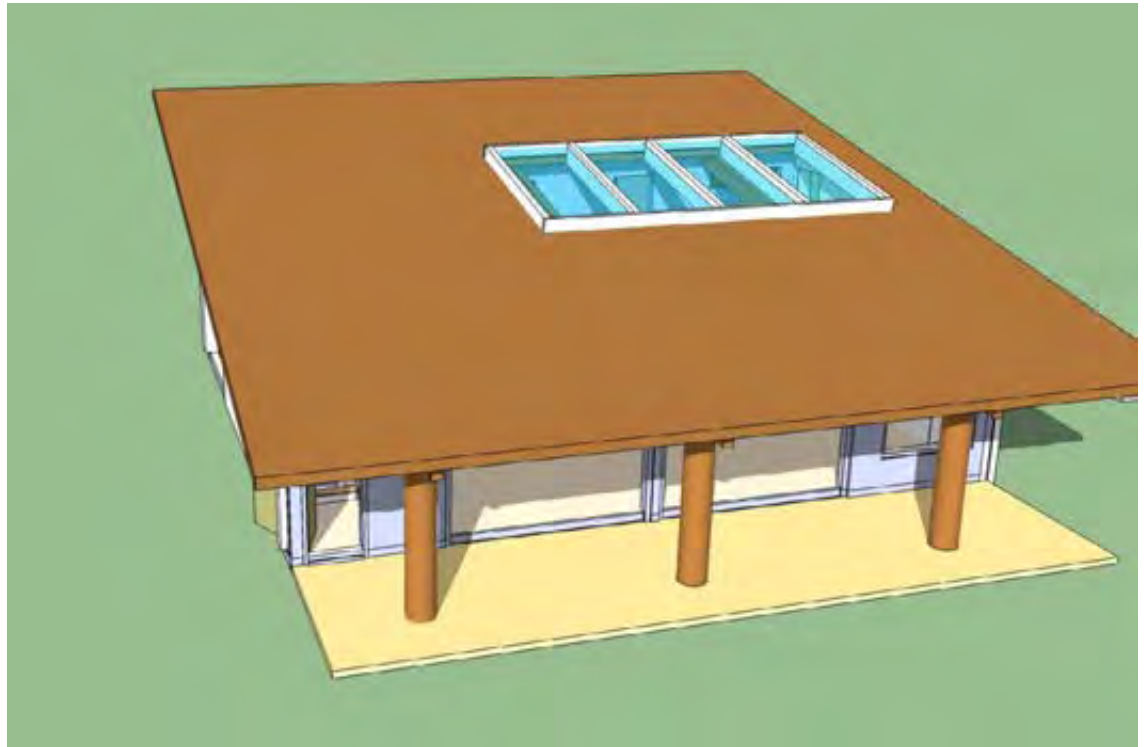
SECOND FLOOR

700 SQ FT

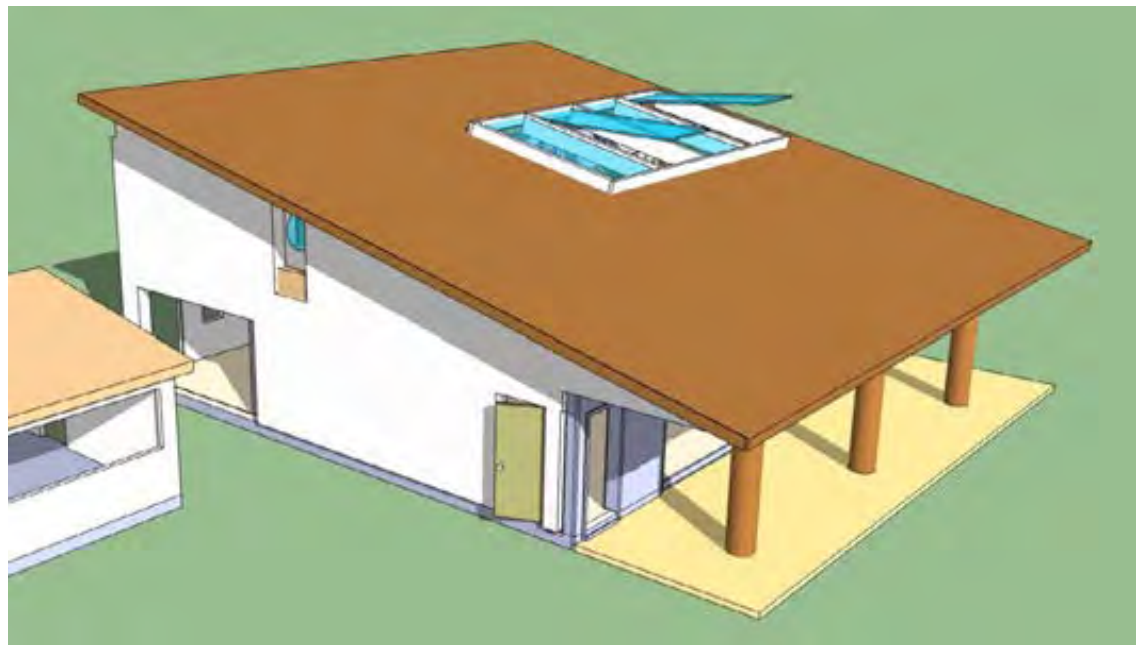




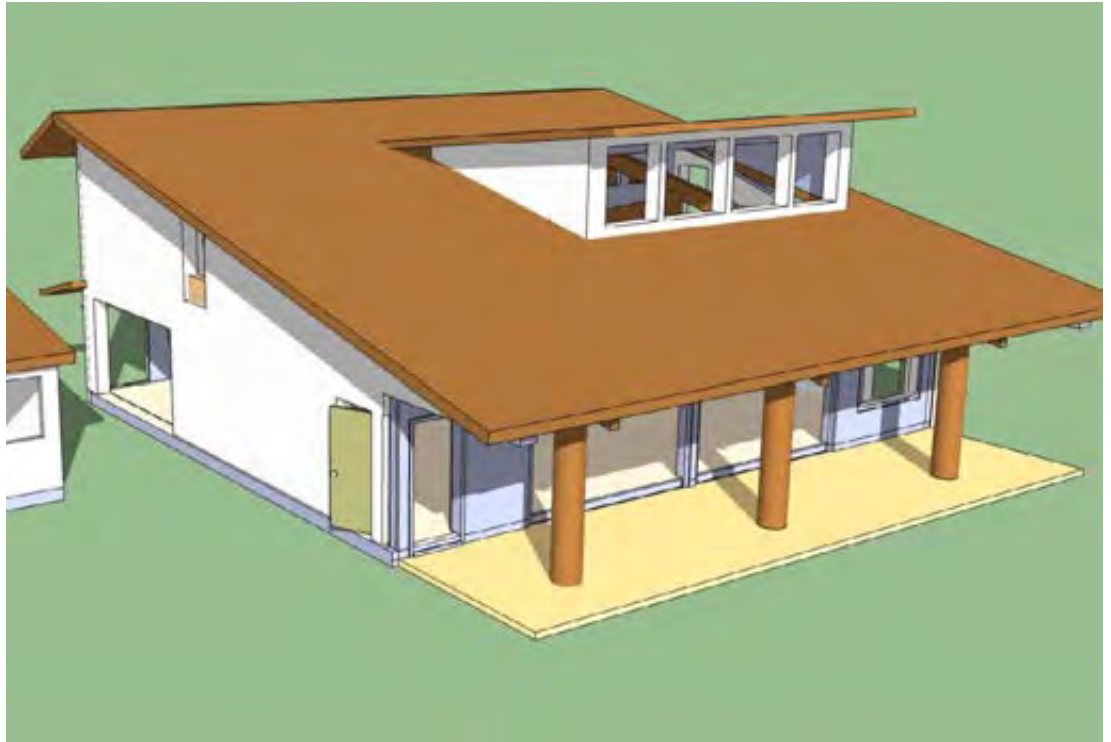
Introduce Skylights for light...



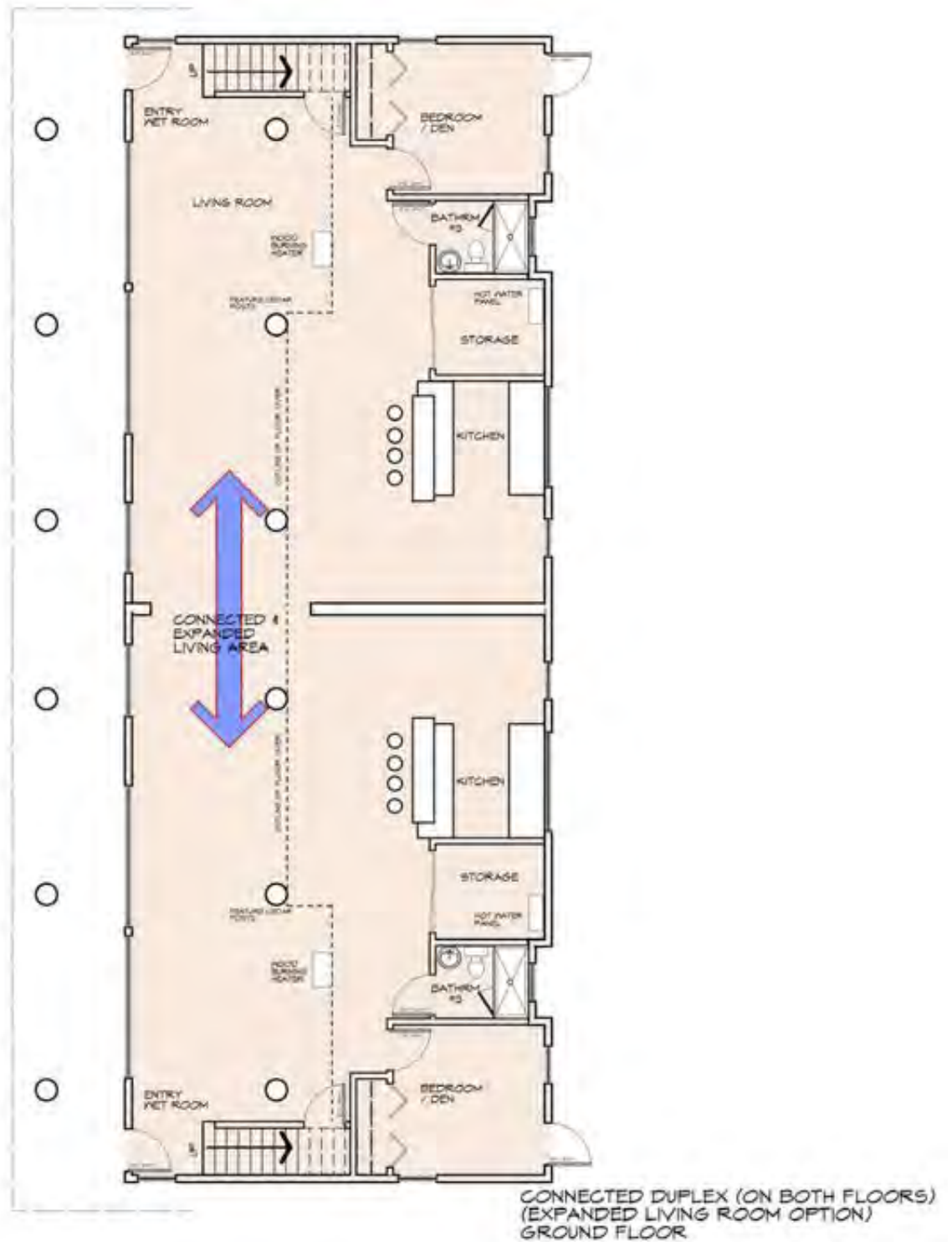
and ventilation.

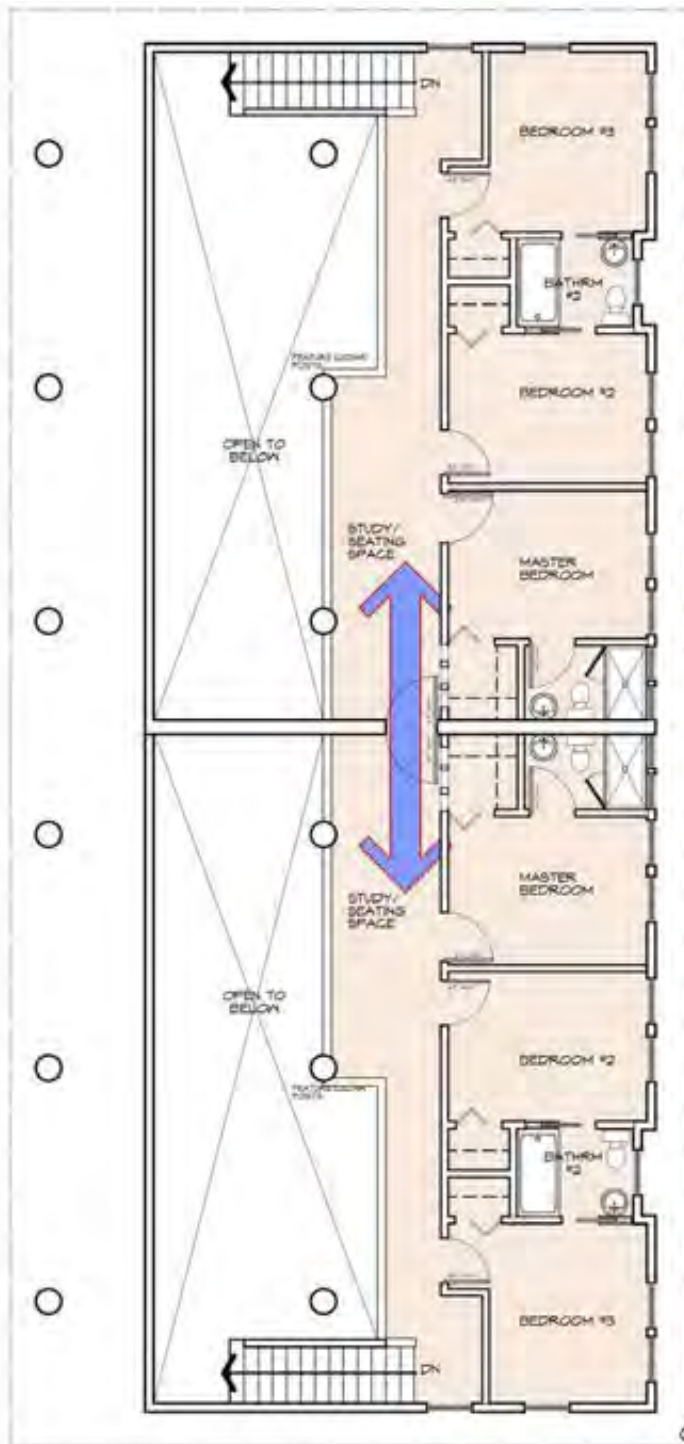


If Skylights are a worry, introduce dormers...



Mirroring along axis to create a Duplex





CONNECTED DUPLEX (ON BOTH FLOORS)
 (EXPANDED LIVING ROOM OPTION)
 SECOND FLOOR

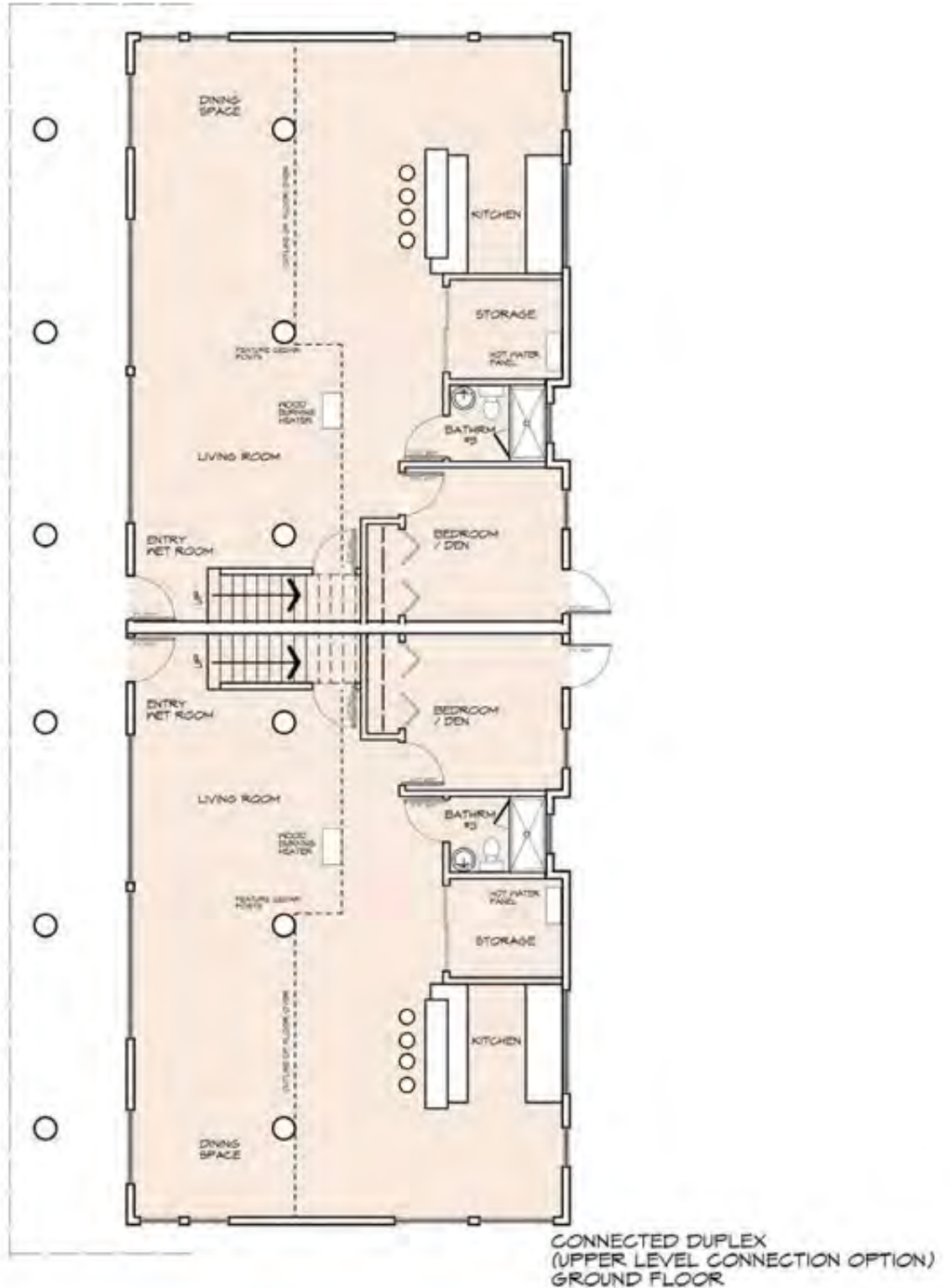
Mirroring along short axis to create a **Duplex**

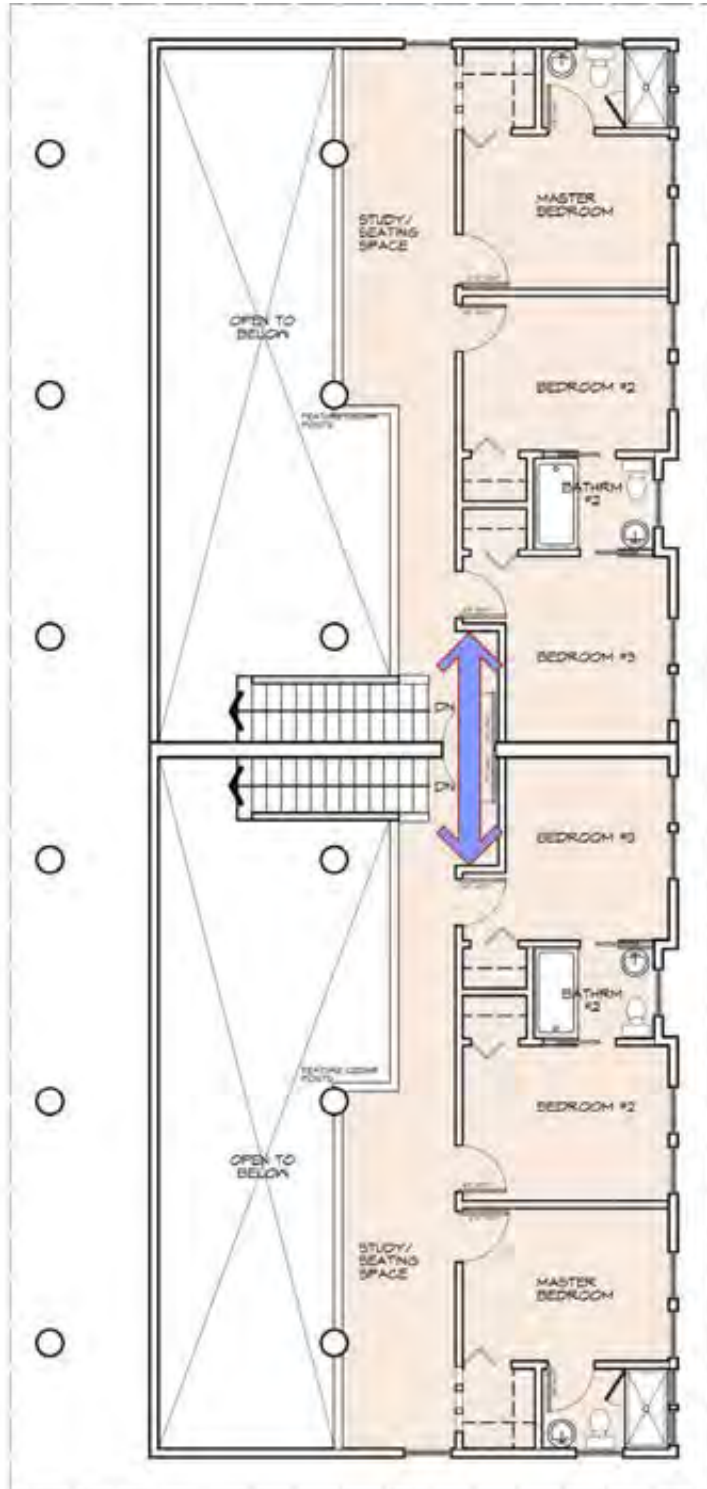


Mirroring Duplex along long axis
to create a **Fourplex**



An optional layout of a **Duplex**, mirrored along opposite end



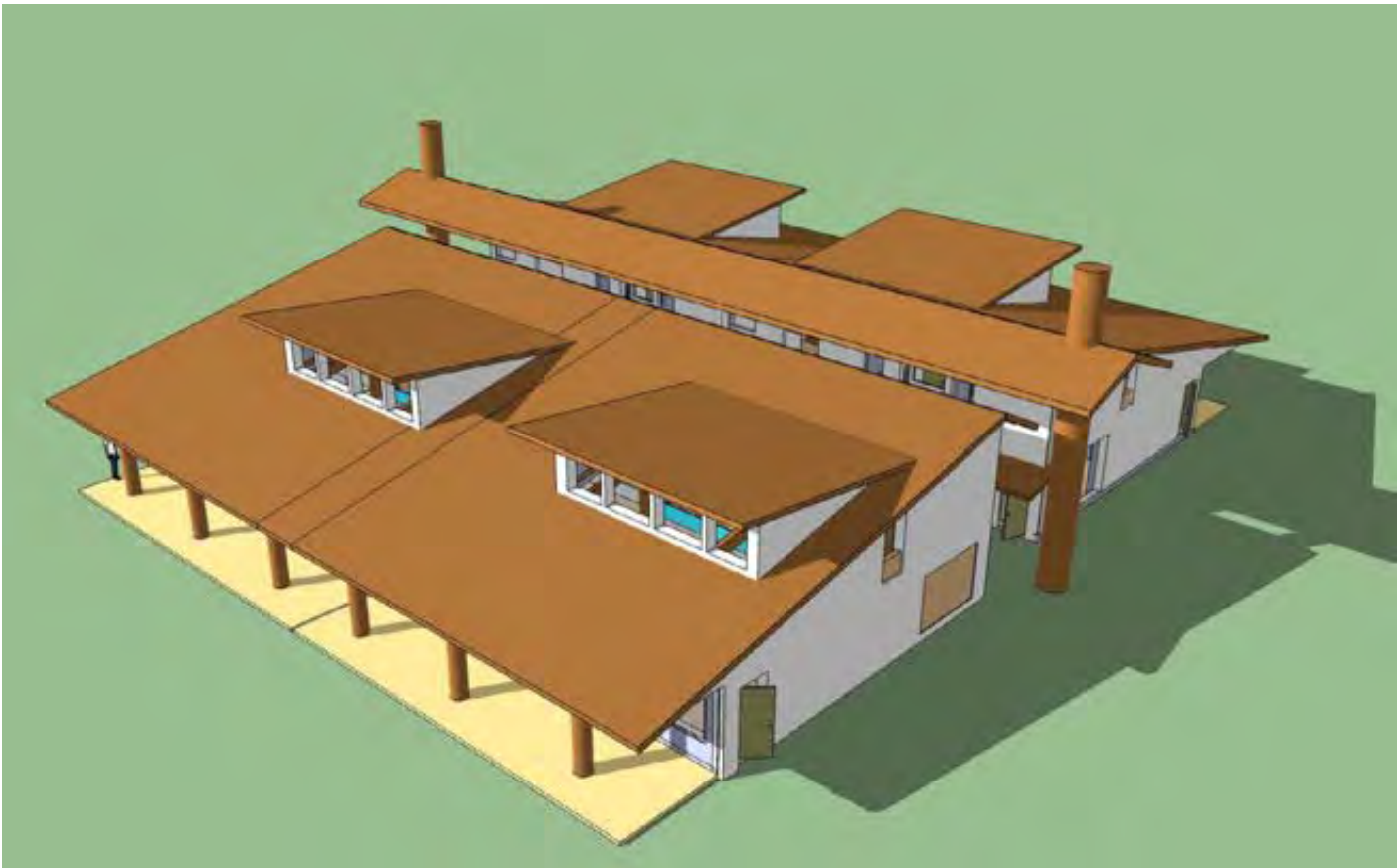


CONNECTED DUPLEX
(UPPER LEVEL CONNECTION OPTION)
SECOND FLOOR

Fourplex personalized, echoing the **Longhouse**



Covering the breezeway for weather protection



Prototype for a Green and Culturally Appropriate home design for today's Nuuchahnulth people
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