

Puyallup Tribal Housing Authority NE Longhouse Project

Presented at the *Greener Homes National Summit*

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NE Longhouse Project Overview

- 20 living units; 10 one bedroom and 10 two bedroom – Built in two phases
- One bedrooms are ADA compliant
- Platinum Level LEED for Homes Certification
- Culturally responsive, longhouse –inspired design
- SIPS Panel construction / geothermal heating
- Gym renovations; flooring, heating, sound control
- Community Building
- Maintenance Building
- Park with walking trails, sweat lodge, dance area
- Renovation and Weatherization of NE Apartments



sweat enclosure

Phase 2 townhouses (7800 sf)

Phase 1 common house (6600 sf)

Existing townhouses 27 units (Phase 3-improvements)

Phase 1 townhouses (7800 sf)

project goals



CULTURALLY RESPONSIVE

FOSTER COMMUNITY

CREATE A SAFE ENVIRONMENT

ENHANCE WELL BEING

DURABLE & LOW MAINTENANCE BUILDINGS

PROTECT WILDLIFE HABITAT

REDUCE ENERGY CONSUMPTION

LEED FOR HOMES | PLATINUM RATING

Community Engagement



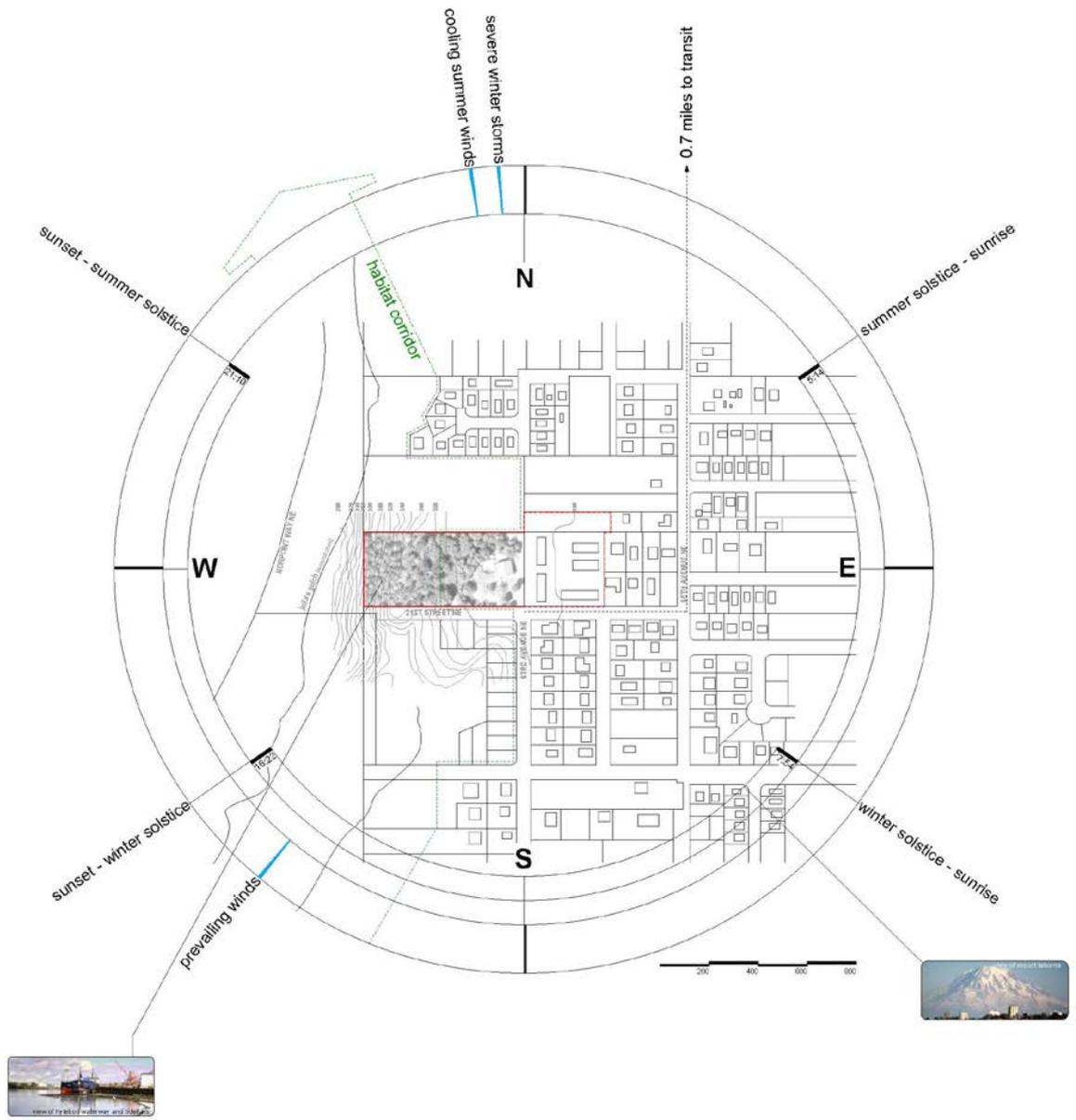
Community Engagement



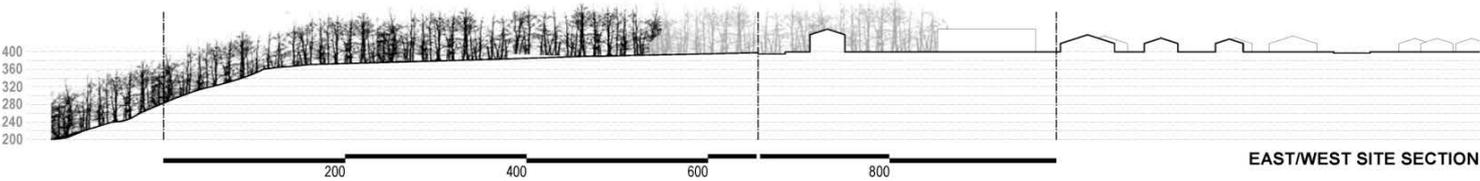
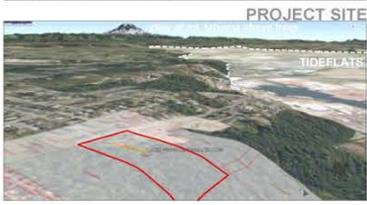
Community Engagement



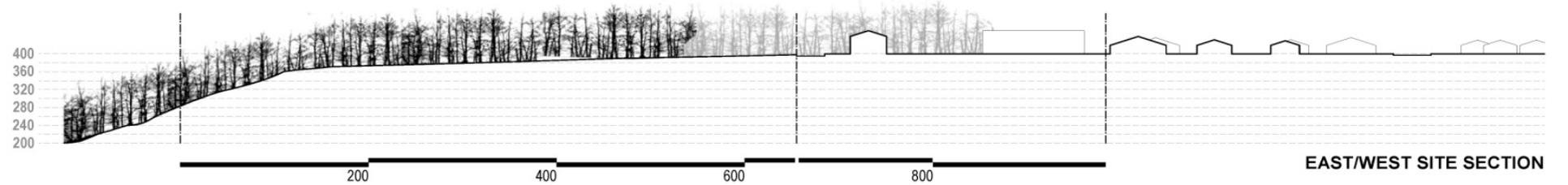
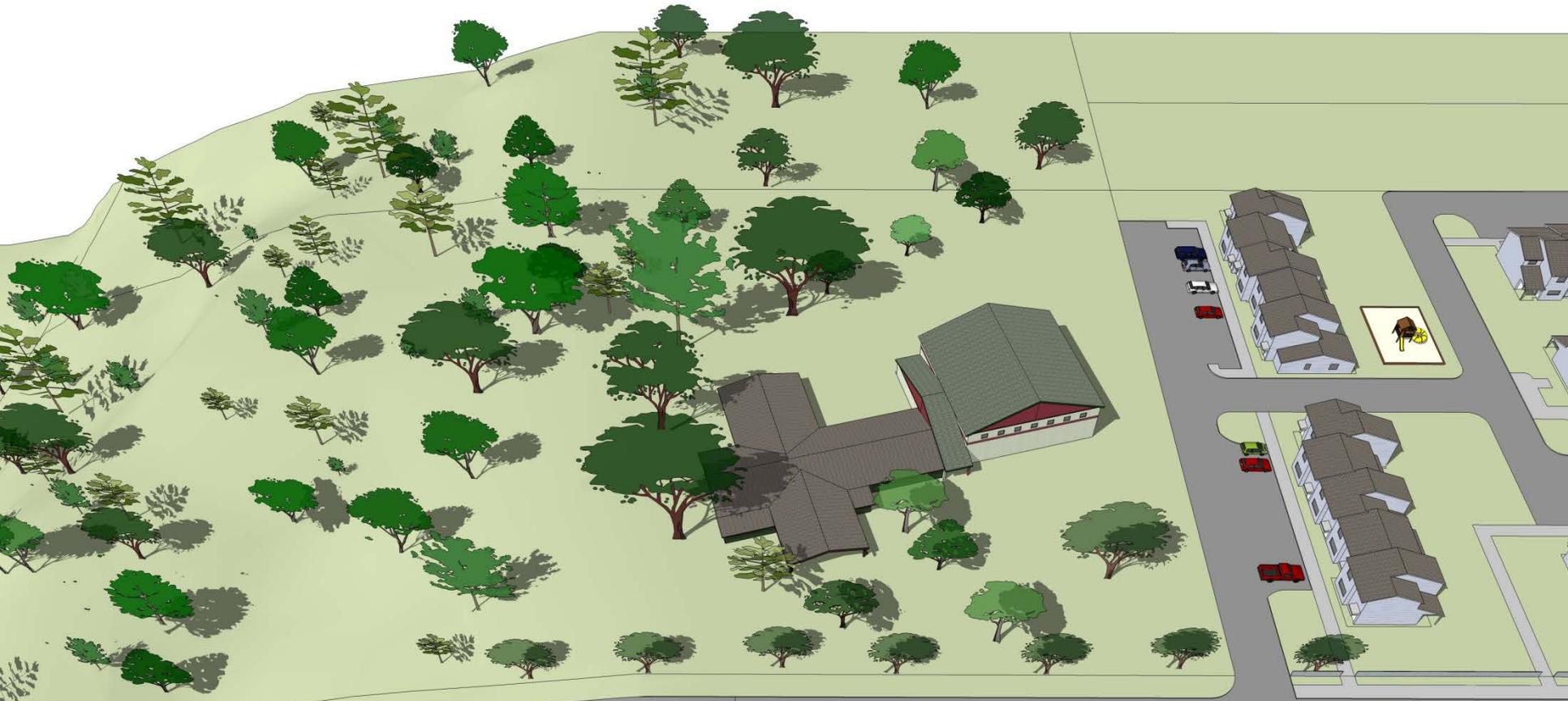
Culturally Responsive



site context



Existing site



EAST/WEST SITE SECTION

Master Plan

Phase One: 10 Units

Phase Two: 10 Units

Dance arbor / Playground

Park and Nature Trail

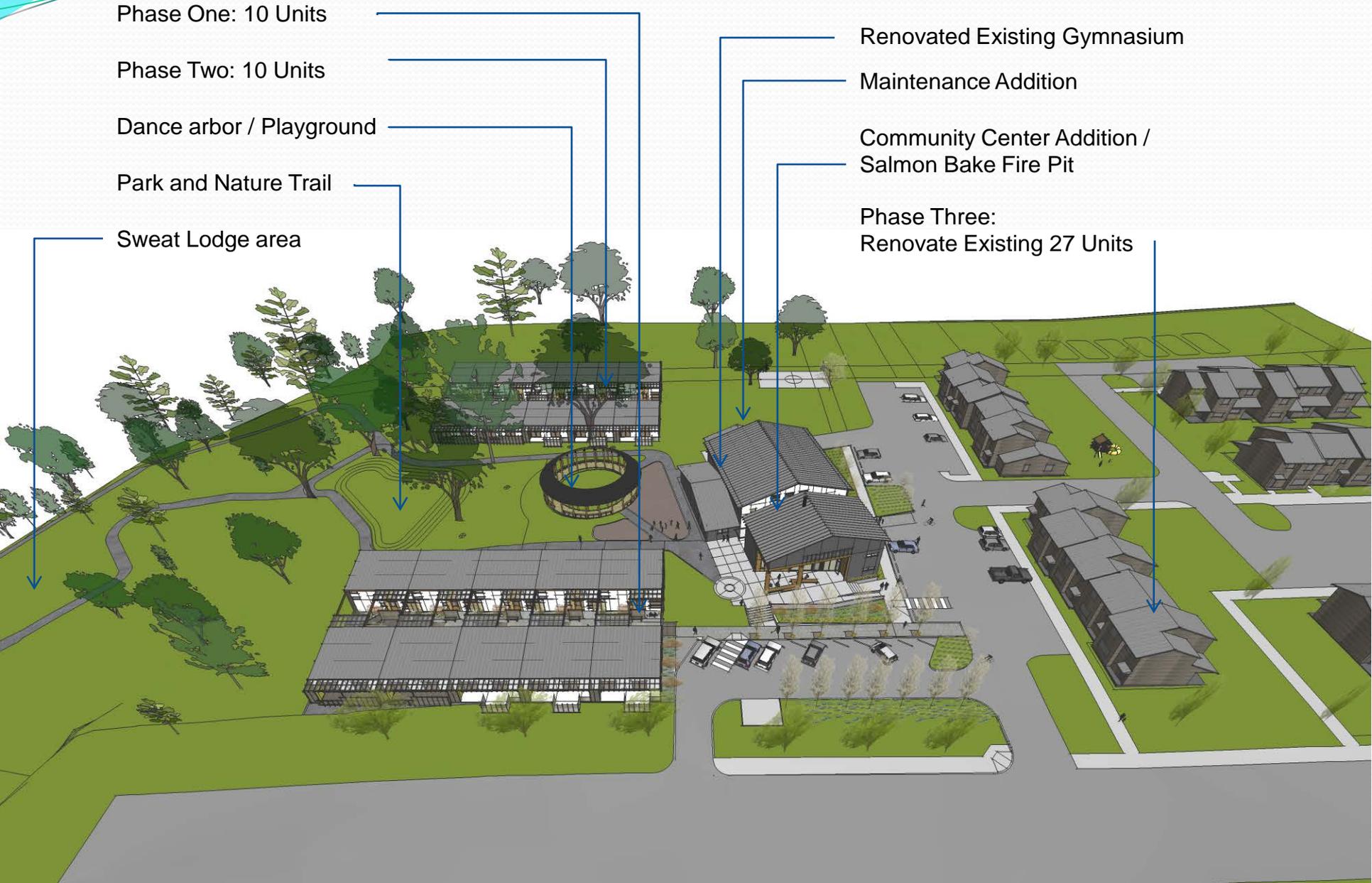
Sweat Lodge area

Renovated Existing Gymnasium

Maintenance Addition

Community Center Addition /
Salmon Bake Fire Pit

Phase Three:
Renovate Existing 27 Units



cultural precedents

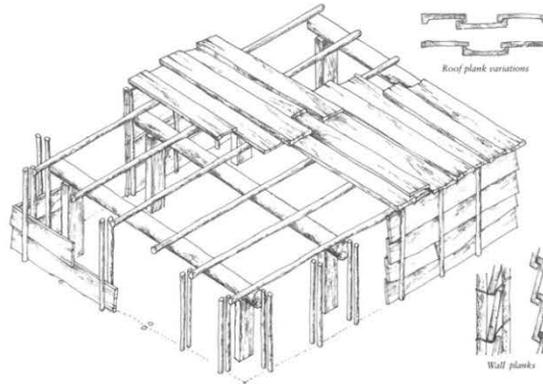
south coast salish longhouse

STRUCTURE

replicable
expandable
efficient

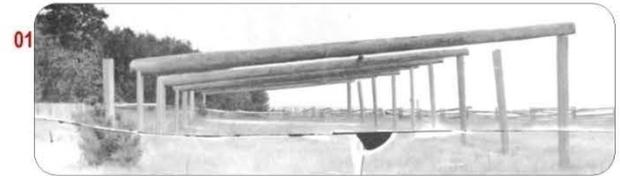
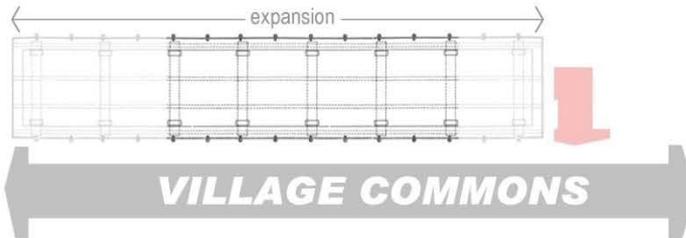
MATERIALS

advanced use of cedar
reconfigurable
[to accommodate light & ventilation needs]

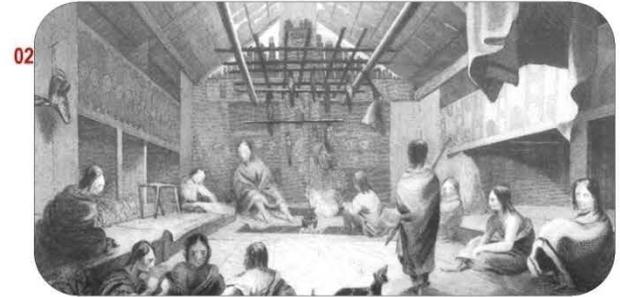


INTERIOR

flexible
partitioned
[for public / private separation]



SHEP STYLE FRAME . Lummi Washington



DAYLIGHT FROM ABOVE . Chinook



SHEP STYLE LONGHOUSE INTERIOR . Klallam Salish

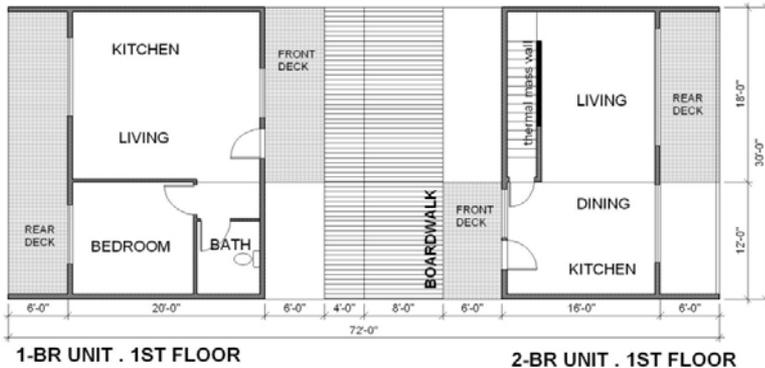
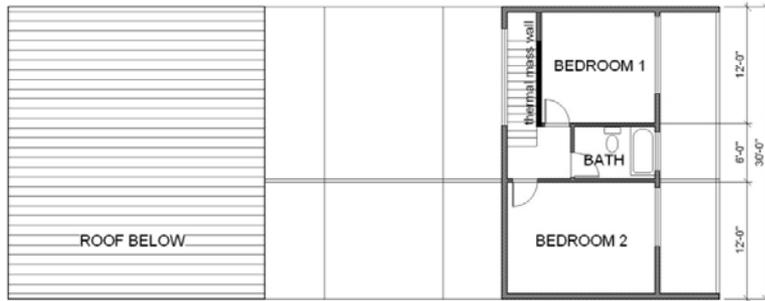
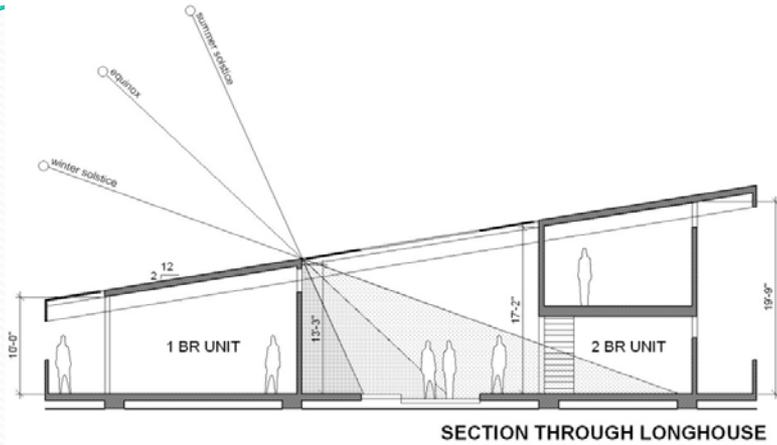


LONGHOUSE WALLS DEFINE VILLAGE COMMONS . Songhees village, Victoria

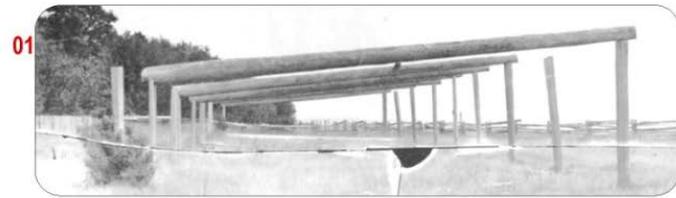


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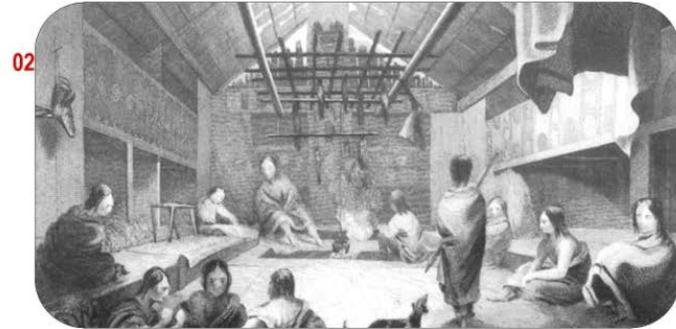
Culture: Longhouse design



REPLICABLE LONGHOUSE MODULE 1/8"=1'-0"



SHED STYLE FRAME . Lummi Washington



DAYLIGHT FROM ABOVE . Chinook



SHED STYLE LONGHOUSE INTERIOR . Klallam Salish



LONGHOUSE WALLS DEFINE VILLAGE COMMONS . Songhees village, Victoria

Culture: Longhouse design



Culture: Longhouse design









Community Center / Gymnasium



Community Center / Gymnasium







Site amenities



Community Center





Renovated gymnasium



Built by tribal members



lead for home platinum



INNOVATION & DESIGN PROCESS

LOCATION & LINKAGES

SUSTAINABLE SITES

WATER EFFICIENCY

ENERGY & ATMOSPHERE

MATERIALS & RESOURCES

INDOOR ENVIRONMENTAL QUALITY

AWARENESS & EDUCATION

Green and Energy Efficient Features

- LEED for Homes Platinum certification targeted
- Structural Insulated Panel construction
- High-efficiency heating systems
 - Geothermal heat pump combined with radiant floors
- Energy Star appliances, low-flow faucets and showerheads
- High quality windows
- Passive solar orientation / design
- Designed to accommodate future solar hot water and/or photovoltaic panels
- Wildlife habitat awareness and natural xerascaped landscaping
- Rain Gardens

the impacts



BUILDINGS USE

40% of the world's energy

75% of the world's wood

16% of the world's water



PEOPLE

72% of their time is spent Indoors...

30% of new and renovated buildings
have interior air quality (IAQ) problems

site - location and linkages



SITE SELECTION

not built on floodplain, near endangered habitat, within 100' of water, on public parkland, or prime soils

COMPACT DEVELOPMENT

high density – 10 units/acre (includes phase 2)

COMMUNITY RESOURCES / TRANSIT

resources and transit options within $\frac{1}{4}$ or $\frac{1}{2}$ mile of site

ACCESS TO OPEN SPACE

within $\frac{1}{2}$ mile of site, $\frac{3}{4}$ acre in size

innovation & process



HOME SIZE ADJUSTMENT

smaller than average homes reduce threshold for certification
+10 points

DESIGN CHARRETTE

(2) half-day charrettes

QUALITY MANAGEMENT FOR DURABILITY

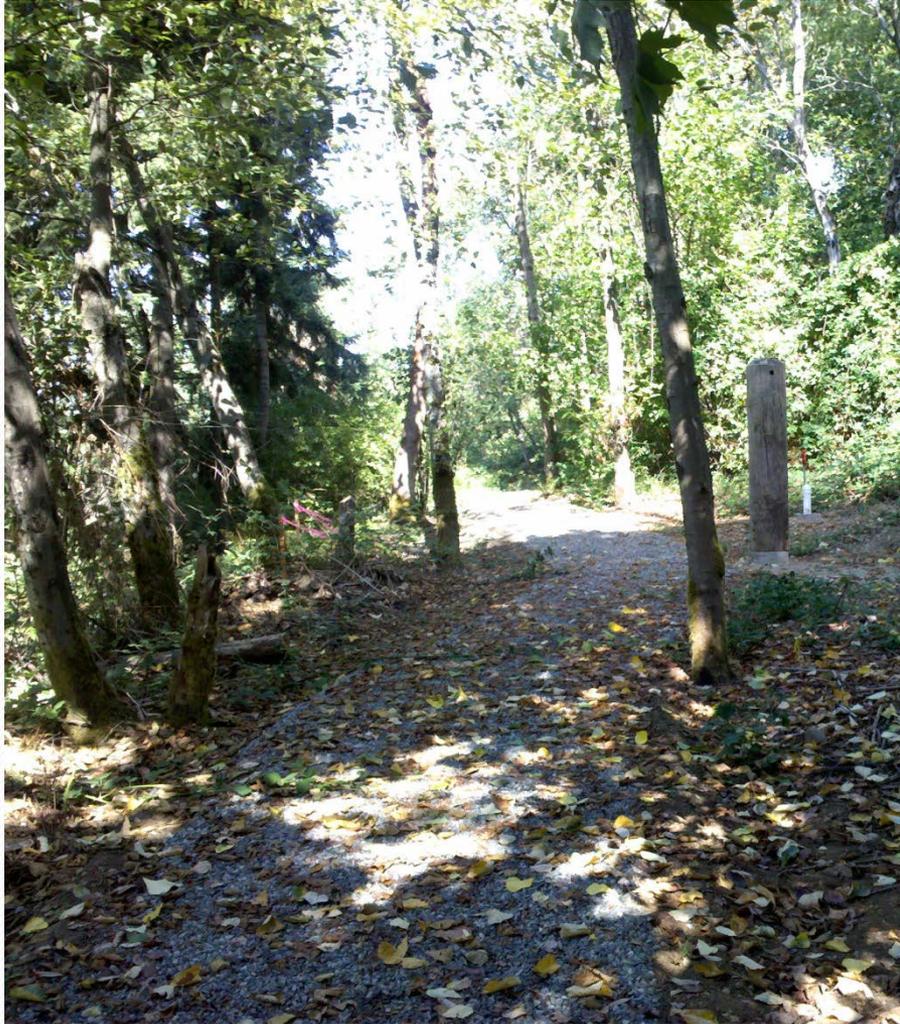
promote high performance

- .evaluate durability risks for the building
- .develop a plan to address those risks
- .address all wet room prerequisites

BUILDING ORIENTATION

north/south glazing and orientation
90% of south-facing glazing shaded in summer only

site stewardship - landscape



MINIMIZE DISTURBED AREA

minimize long-term environmental damage to the lot

- .tree/plant preservation plan
- .rehabilitate lot, undo soil compaction
- .remove invasive plants

NATIVE LANDSCAPING

avoid invasive species & minimize water & synthetic chemicals

- .drought tolerant turf, no shaded areas
- .percentage of drought-tolerant plants: 45-89% or +90%
- .community garden
- .edible plants (vegetables, fruits, herbs)

NONTOXIC PEST CONTROL

vegetated roof or permanent stormwater controls

- .wood removed from soil and concrete
- .seal cracks
- .mature plants are 24" from home

site stewardship



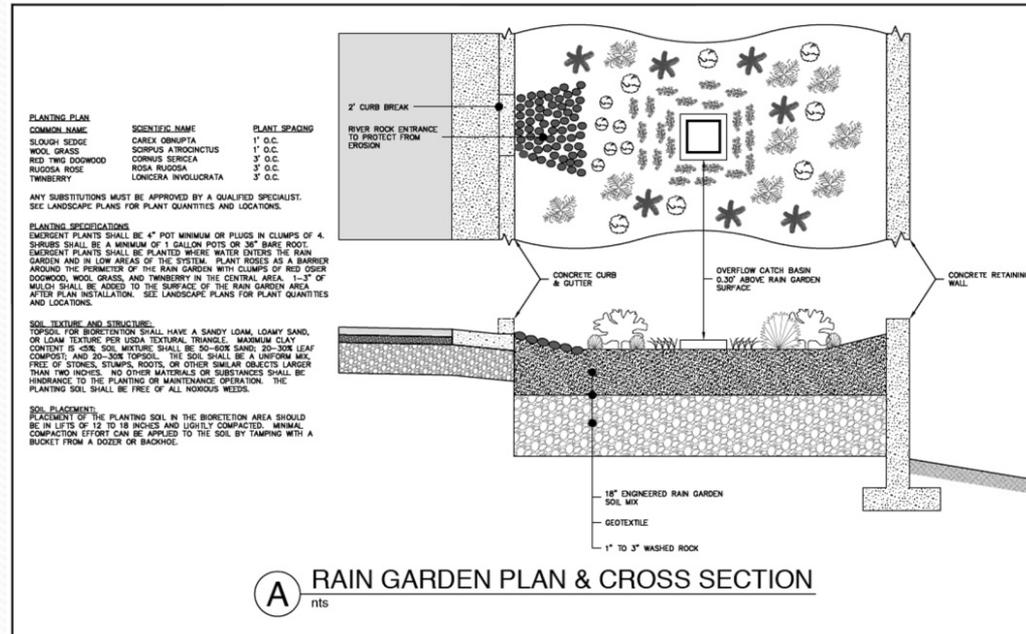
ON-SITE STORMWATER MANAGEMENT

vegetated roof or permanent stormwater controls

- .raingardens / bioswales slows flow and filters water
- .dry well
- .bioretention

IRRIGATION

- .percentage reduction in estimated irrigation water demand
- .works best with little turf
- .see water efficiency for synergies



water conservation



INDOOR WATER USE

very high efficiency fixtures and fittings

- .lavatory faucets <1.50 gpm (s)
- .OR EPA's water sense certification
- .showers <1.75 gpm (Niagara-Earth tested) (s)
- .toilets <1.10 gpf
- .dual flush 1.6/0.8
- .Sloan flushmate
- .energy star clothes washers
- .reduces demand for hot water (s)

HOT WATER SUPPLY

reduce demand for water and energy

- .high efficiency gas water heater 14% energy savings
- .tankless on-demand water heater
- .solar hot water

heating & cooling



HEATING

- .shared party walls reduces load
- .passive solar
- .heat recovery ventilator – utilizes waste heat
- .ground source heat pump

COOLING

- .natural ventilation / operable windows
- .ceiling fans
- .whole house exhaust
- .sunshades – exterior and interior
- .overhangs, awnings, canopies
- .vegetation - trees

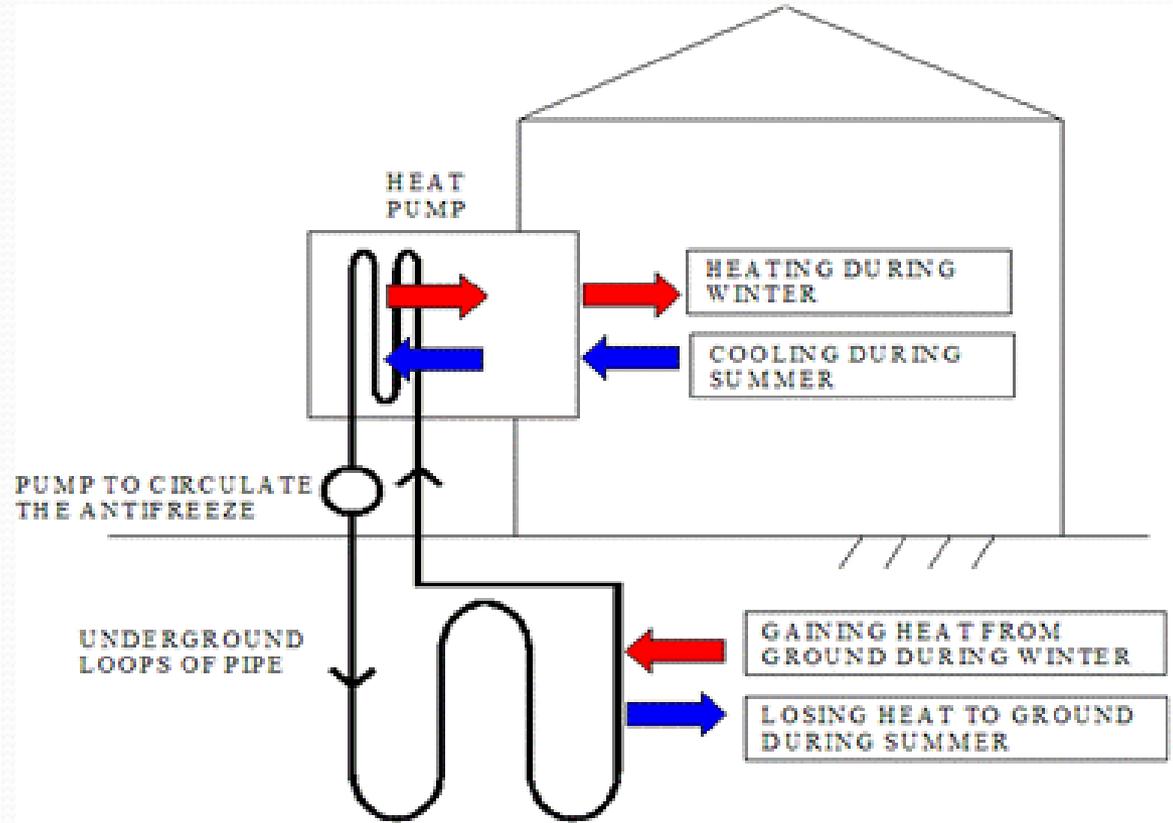
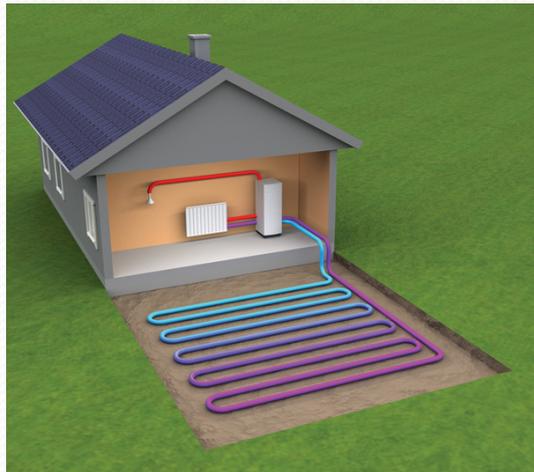
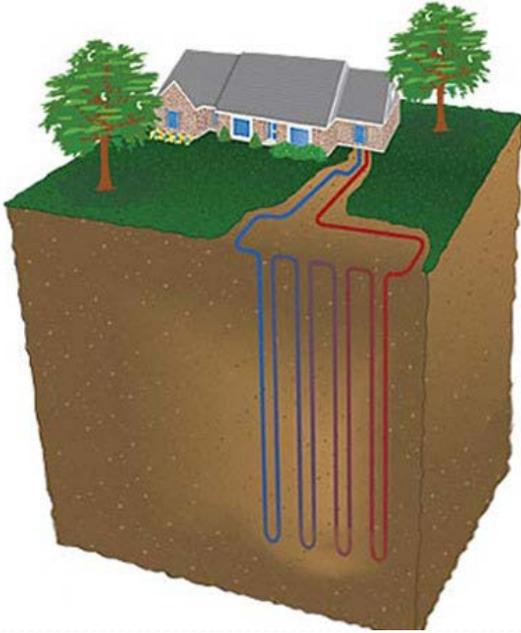
OTHER ENERGY REDUCTIONS & SYNERGIES

- .energy analysis required
- .energy star appliances
- .energy star lights (0.6W/SF)
- .low flow faucets for lav and shower save 1/3
- .ground source heat pump COP=2.5
- .effective ACH 0.25, 0.15, 0.1

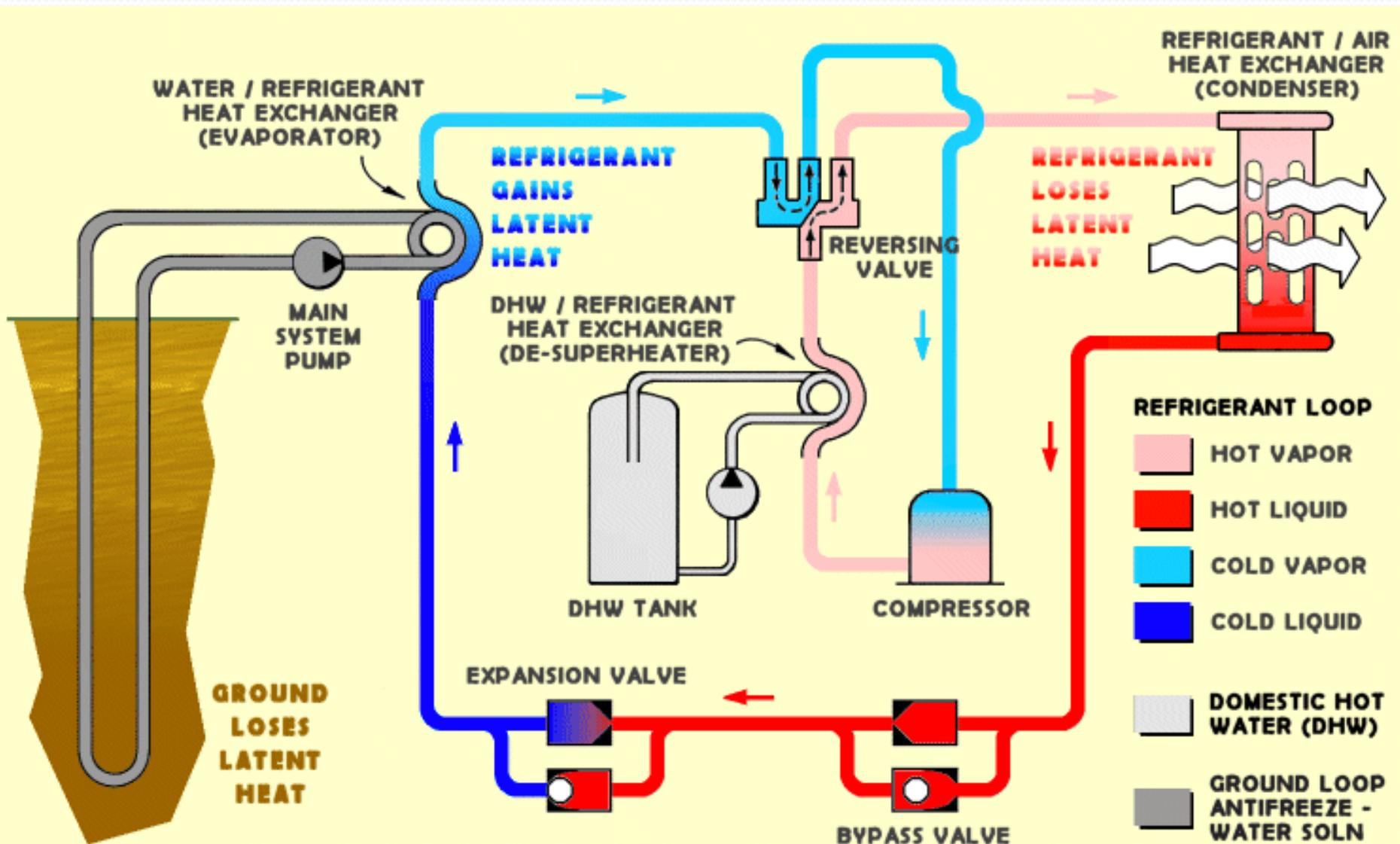
COMMISSIONING OF BUILDING SYSTEMS

ensure proper functioning and maximum efficiency

Ground source heat pump system



Ground source heat pump system



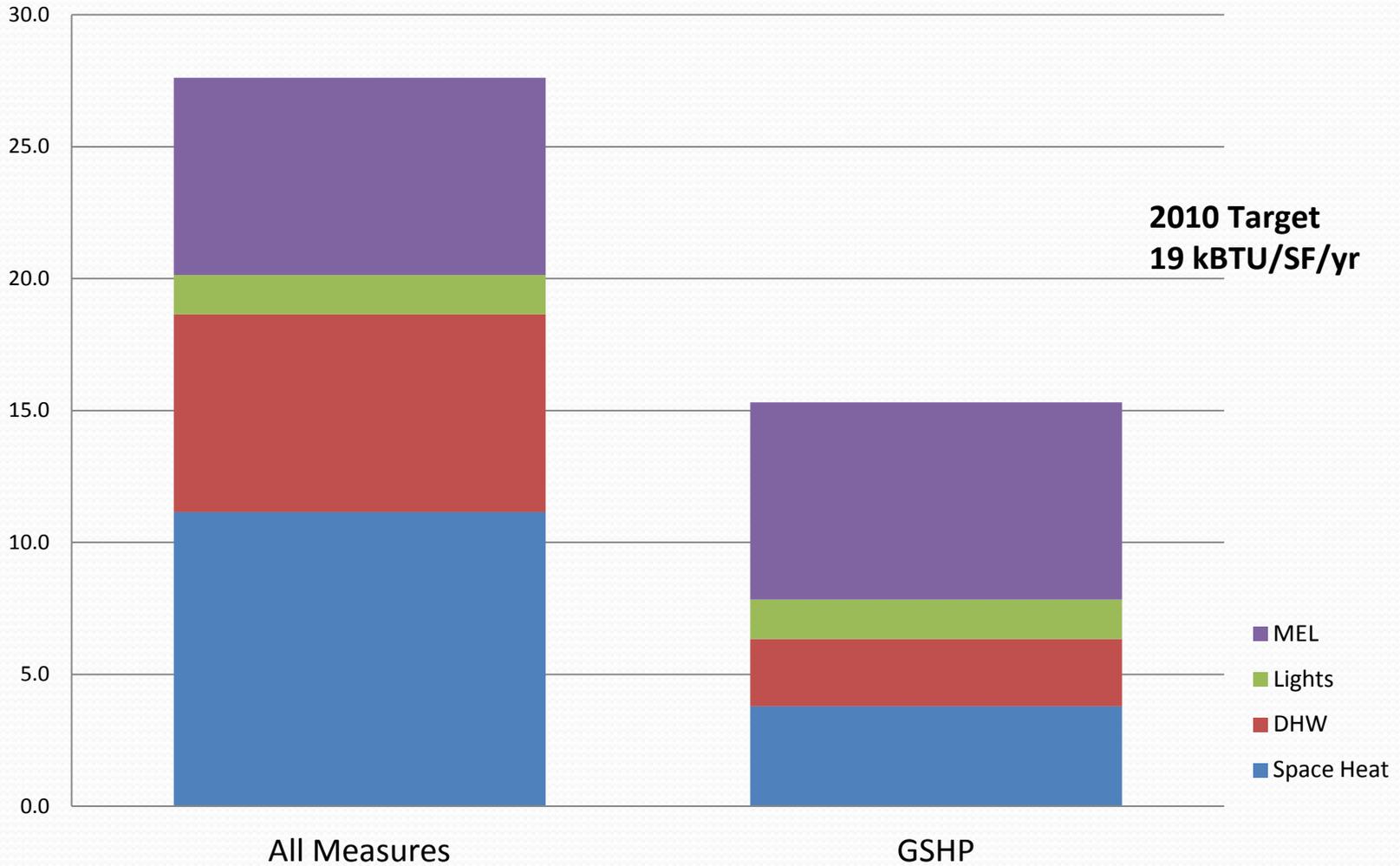
energy | fuel source

POWER DEMAND

1450 kWh PV for 600 SF Unit (1.5 kW PV)

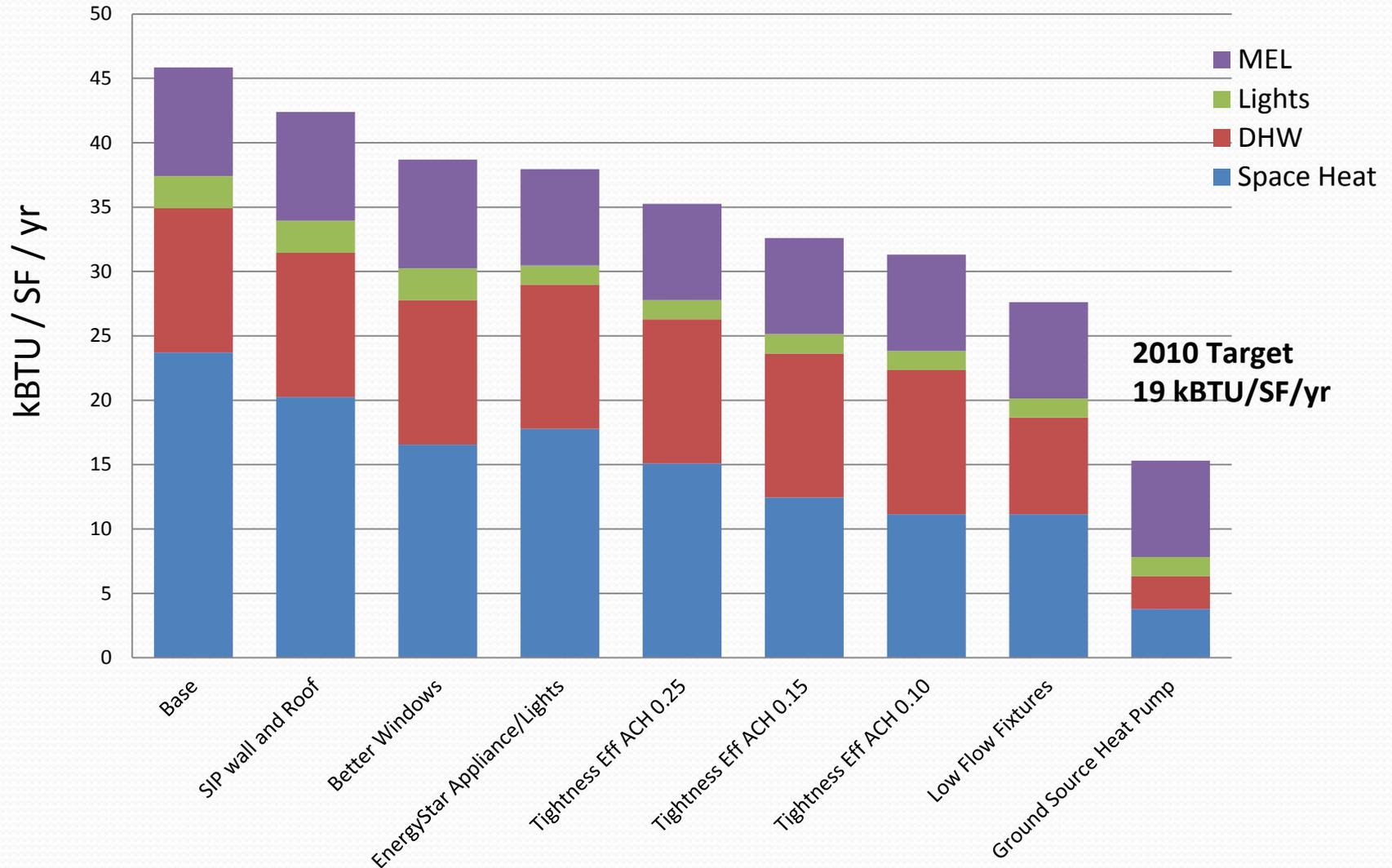
2300 kWh PV for 960 SF Unit (2.4 kW PV)

Gas + PV vs. Geo

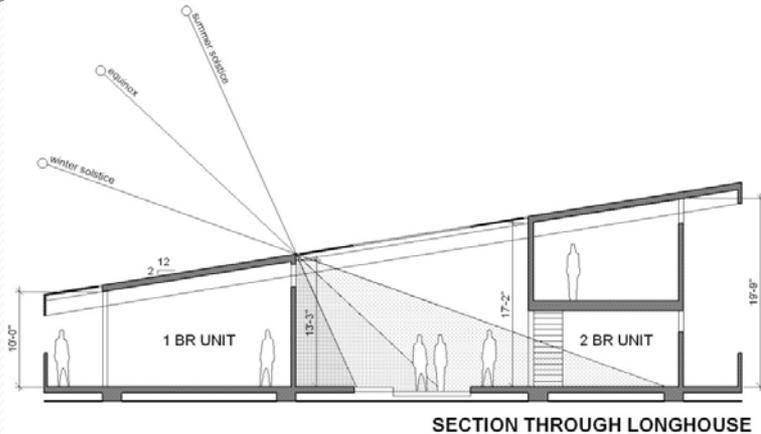


energy efficiency

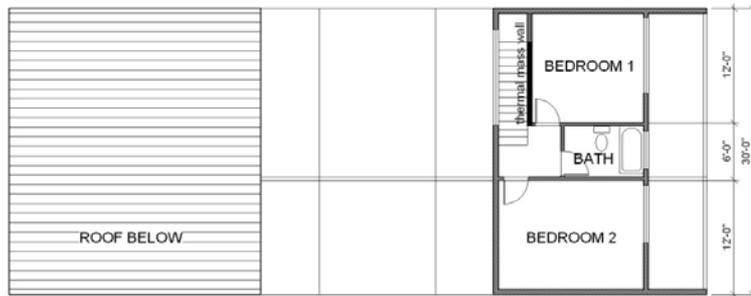
Energy Conservation Measures to Meet AIA 2030 Challenge



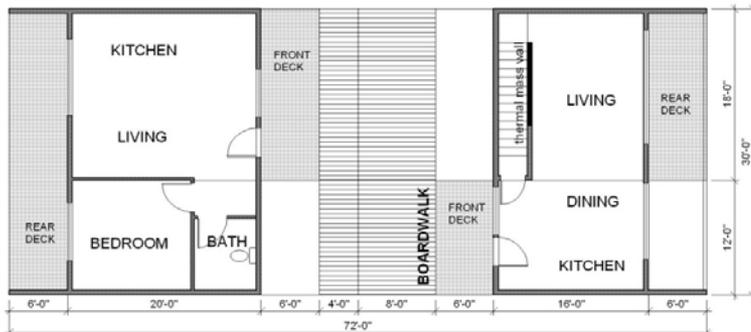
indoor environmental quality



SECTION THROUGH LONGHOUSE



2-BR UNIT . 2ND FLOOR



1-BR UNIT . 1ST FLOOR

2-BR UNIT . 1ST FLOOR

REPLICABLE LONGHOUSE MODULE 1/8"=1'-0"

COMBUSTION VENTING

- .carbon monoxide detectors each floor

MOISTURE CONTROL

- provide comfort, reduce mold risk (and illness)
- .dehumidify to <60%

OUTDOOR AIR VENTILATION

- reduce occupant exposure to indoor air pollutants
- .heat recovery system: pre-heat fresh air
- .trickle vents or wall ports in windows
- .cross ventilation with operable windows

LOCAL EXHAUST

- reduce moisture & exposure to indoor pollutants in kit & bath
- .kitchen exhaust or energy star rated hood
- .energy star rated exhaust fans with:
- .controls: timer, occupancy sensor, humidistat

AIR FILTERING

- reduce particulate matter from air supply system
- .exempt if using ductless or radian system
- .during construction: contractor IAQ Management Plan

indoor environmental quality



CONTAMINANT CONTROL

reduce exposure to contaminants through source control

- .walk-off mats at entries
- .shoe removal and storage at entryway
- .central vacuum system
- .preoccupancy "flush"

LOW-VOC and FORMALDEHYDE- FREE

creates a less toxic environment

- .formaldehyde-free composite wood
- .low-voc paints, adhesives & sealants
- .green seal approved carpets prevent off-gassing

DAYLIGHT

ample daylight and views increase quality of life

- .large windows in units and common spaces
- .window size, location and restrictions

VIEWS

ample daylight and views increase quality of life
most residences overlook the green space

material efficiency

EFFICIENT USE OF MATERIALS

reduce the use of materials; utilize salvage materials

- .panelized construction reduces waste
- .salvage previously used materials

LOCAL MATERIALS

manufactured within 500 miles of the project site

- carbon cost of transportation reduced by
- .purchasing local materials

SUSTAINABLY HARVESTED

wood products certified as sustainably harvested by the Forest Stewardship Council



materials: recycled, renewable



RECYCLED CONTENT

materials with recycled waste: must be 90% of component

- fly ash content in concrete
- .recycled carpet
- .metal siding/roofing – increases durability and life
- .FSC certified framing (+10-15% cost)
- .FSC plywood (+10%-15% cost)
- .linoleum or composite flooring – healthier

RENEWABLE MATERIALS

products that are rapidly renewable

DURABLE MATERIALS

long life, low maintenance, low emissions

- .metal roofing
- .cement siding (Hardy Board)
- .concrete slab

CONSTRUCTION WASTE

- .waste management plan
- .waste reduction
- .new CIRs make it difficult to achieve all 3 points
- .best strategy is reduced waste 0.5lb/sf

energy performance



BUILDING ENVELOPE

exceed the performance of an energy star home

.CBECS Basecase = 48.5KBtu/SF/yr

Base assumes WA State Energy Code w/ Gas hydronic heat and gas hot water 85% efficiency, standard fixtures, standard lights and appliances

2010 Target = 19.4KBtu/SF/yr

need projected HERS rating to determine LEED points

BUILDING INSULATION

exceed the performance of an energy

code construction assemblies:

R-21 walls

R-30 roof

R-10 slab

.29 U-value fixed windows

.30 u-value operable windows

.SIPS is R-27 walls, R-40 roof

.better windows are U=0.25

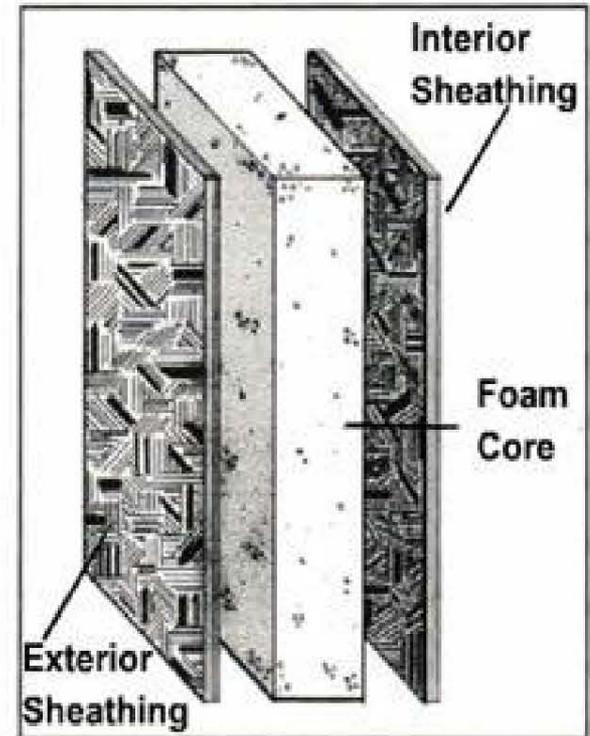
.air sealing details & types of insulation

.thermal bypass checklist



Structural Insulated Panels

- EPS insulation laminated between OSB sheathing
- Each panel is custom built for each home
- Custom fabricated rough openings, electrical chases & knock-out boxes provided
- Bottom sill plate, double top plates, panel sealant and fasteners are included

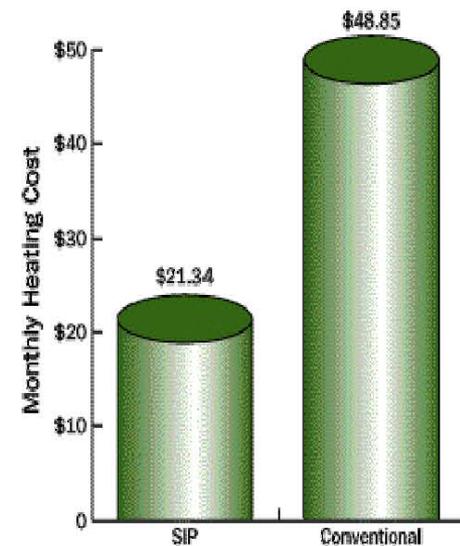


Structural Insulated Panels

- SIPS have superior insulating & air infiltration qualities
- 40% More Efficient than regular construction
- 6" SIP wall beats 6" stud wall by more than R-7
- A Quieter, healthy home with lifetime energy savings

Heating Cost Comparison

(Two identical 1,040 square foot homes)





NE Longhouse Phase I

Sources of Funds

ARRA Formula	\$ 883,573
ARRA Competitive	\$3,000,000
IHBG	\$ 384,317
TOTAL	\$4,217,317

- 10 townhome units
- Community Building and Longhouse housing
- Park w/ walking trails, dance area, sweat lodge and playground
- Traditional Coast Salish design
 - Open roof of the courtyard promotes ventilation and illumination. Central, linear common area for gathering

Phase II Funding; \$3 Million

- Low Income Housing Tax Credits
- State Housing Trust Fund
- Phase I Longhouses Funding (as leverage)
- Federal Home Loan Bank
- ICDBG
- *Chosen sources:*
 - *ICDBG & IHBG for Apartment Renovations*
 - *IHBG for Phase II Longhouse, 10 Units*

Potential Project Expansion

- Phase II of Longhouses – the second 10 unit building
- Renovation of NE Townhomes:
 - Improvements to Exterior – New porches, landscaping, lighting, fencing
 - New Siding, Roofs, Window and Doors
 - Energy Efficiency Improvements
 - Reduction of 37% in energy costs
 - Water Efficiency Improvements
 - Reduction of 27% in water costs

Opportunity

- Use the funding for Phase I as leverage to qualify for more funding for Phase II and Townhouse Renovation
- Requires that the project be done in 2011
- Last Chance for State funding until 2013

Cost to Apply for Funds

- Step 1 - \$35,000 to apply for Tax Credits and bonds (includes the \$18,000 contract for Common Ground)
- Step 2 - \$20,000 to apply for State Housing Trust Fund
- These costs are reimbursed by grants/Tax Credits if awarded.

a national model



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