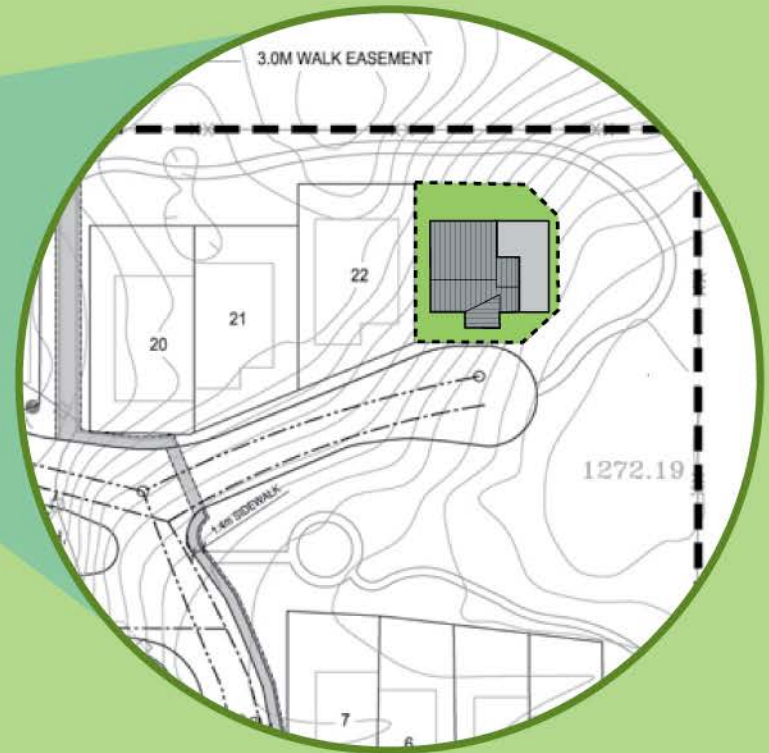




*Living Lightly on the Land*

**EchoHaven and NetZero – for Professionals**  
**Wildsight Kimberley February 19**



**The Site: Rocky Ridge Royal Oak NW Calgary**  
**Local Amenities**



Wetland areas in the spring and autumn  
Unique 'knob and kettle' geophysical area







Aspen stands and  
pristine prairie







## Development Patterns

## Site Plan



- innovative green neighborhood for 25 homes and related amenities
- 6.4 acres knob and kettle terrain
- 60% of natural features to be preserved
- small lots RS-2
- maximum density for area structure plan



# Environmental Site Initiatives

- 100% storm water retention on-site
- grey water treatment and surface dispersion system
- balanced water management strategy
- common shared renewable energy generation on-site
- greenhouse, permanent demonstration centre and guest suites in the community building
- reduced utility and development costs for all homeowners
- zero greenhouse gas emissions
- construction management requirements
- preservation of native plants



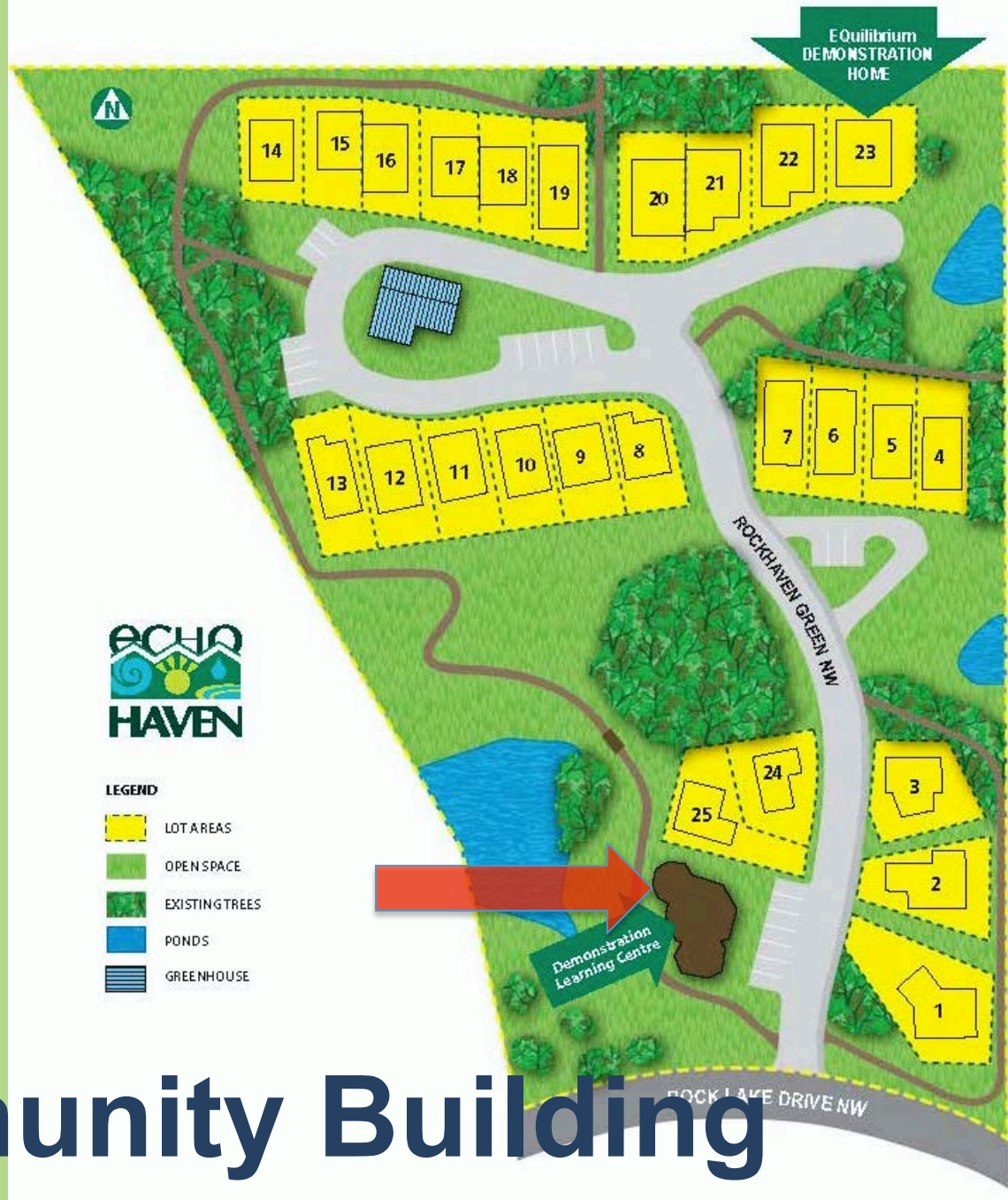
## Project Features - continued

- solar access and site-friendly orientation for all home sites
- site close to LRT station
- shared transportation
- opportunities for community-based employment
- community composting and recycling
- variety of housing choices
- public access through site and transit shelter at the access road

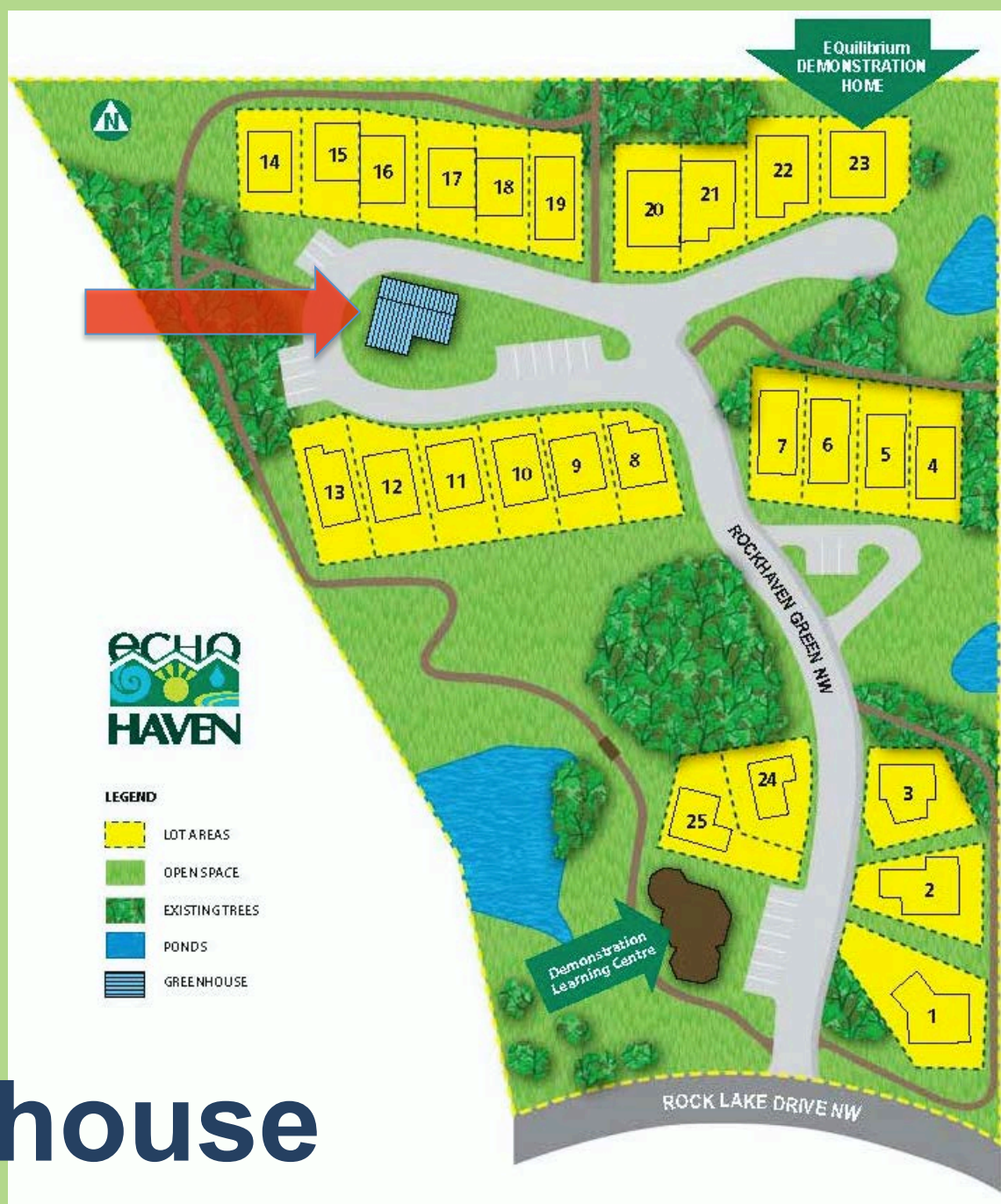




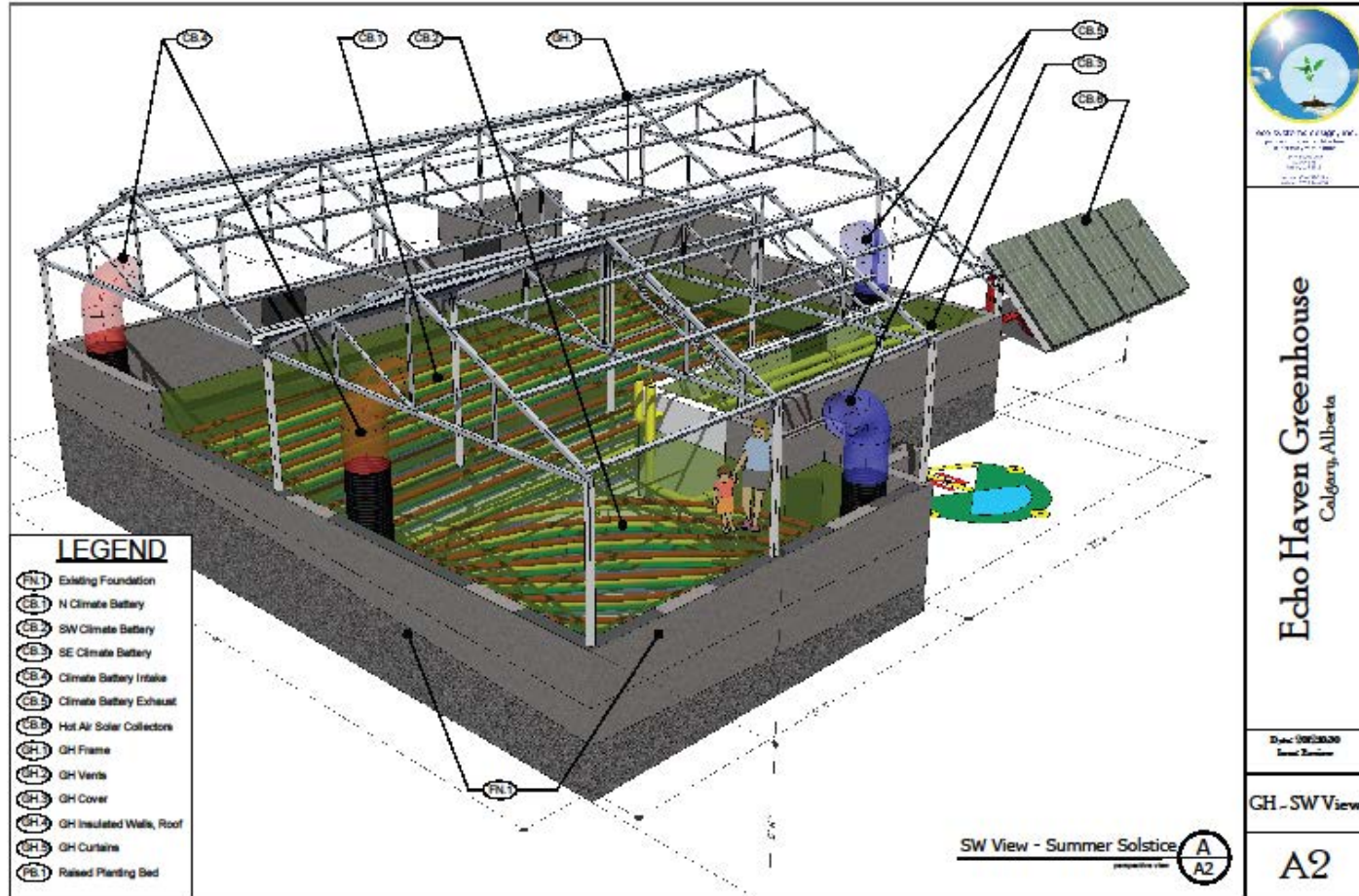
# Community Building



# Greenhouse







# Greenhouse

# Mandatory Home Requirements

- Energuide certified 84 minimum
- rainwater harvesting and re-use
- grade-adaptive site design
- no invasive landscape species, drought tolerant landscape
- architecturally integrated renewables
- solar passive/active heating (no gas to property)





APPENDIX  
ECHOHAVEN  
CONSTRUCTION MANAGEMENT GUIDELINES

1

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# Waste Management

## 4.7.5 Debris and Trash Removal – Recycling

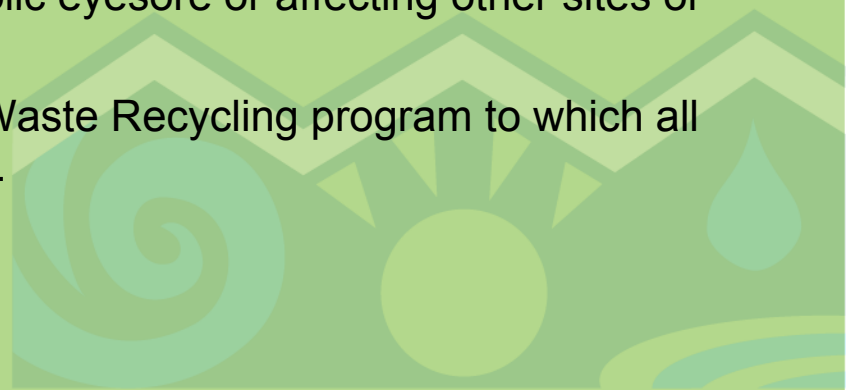
Debris and trash removal for a Project shall be undertaken by the Contractor, who shall clean up all trash and debris on the construction site at the end of each day. Trash and debris shall be removed from each site frequently and shall not be permitted to accumulate. The Contractor shall provide trash containers suitable for the quantity and type of refuse generated by the construction activities being undertaken on the Site at all stages of construction. Lightweight materials, packaging, and other items shall be covered or weighted down to prevent being blown off the construction site.

The Contractor is encouraged to recycle materials, such as wood, drywall, cardboard, glass, paper and tin.

Contractors are prohibited from dumping or burying any materials anywhere within Echo Haven.

During the construction period, each site shall be kept neat and clean, and shall be properly policed to prevent it from becoming a public eyesore or affecting other sites or any other area of Echo Haven.

Echo Haven will participate in a Construction Waste Recycling program to which all Builders and Associated Contractors must adhere.



# Storm Water





## Stewardship

- Water Management Strategy requires Rainwater Harvesting to achieve zero discharge from site
- Infiltration and ground water recharge

## Nutrients/contaminants

*Streets contribute higher pollutant loads than any other source area*

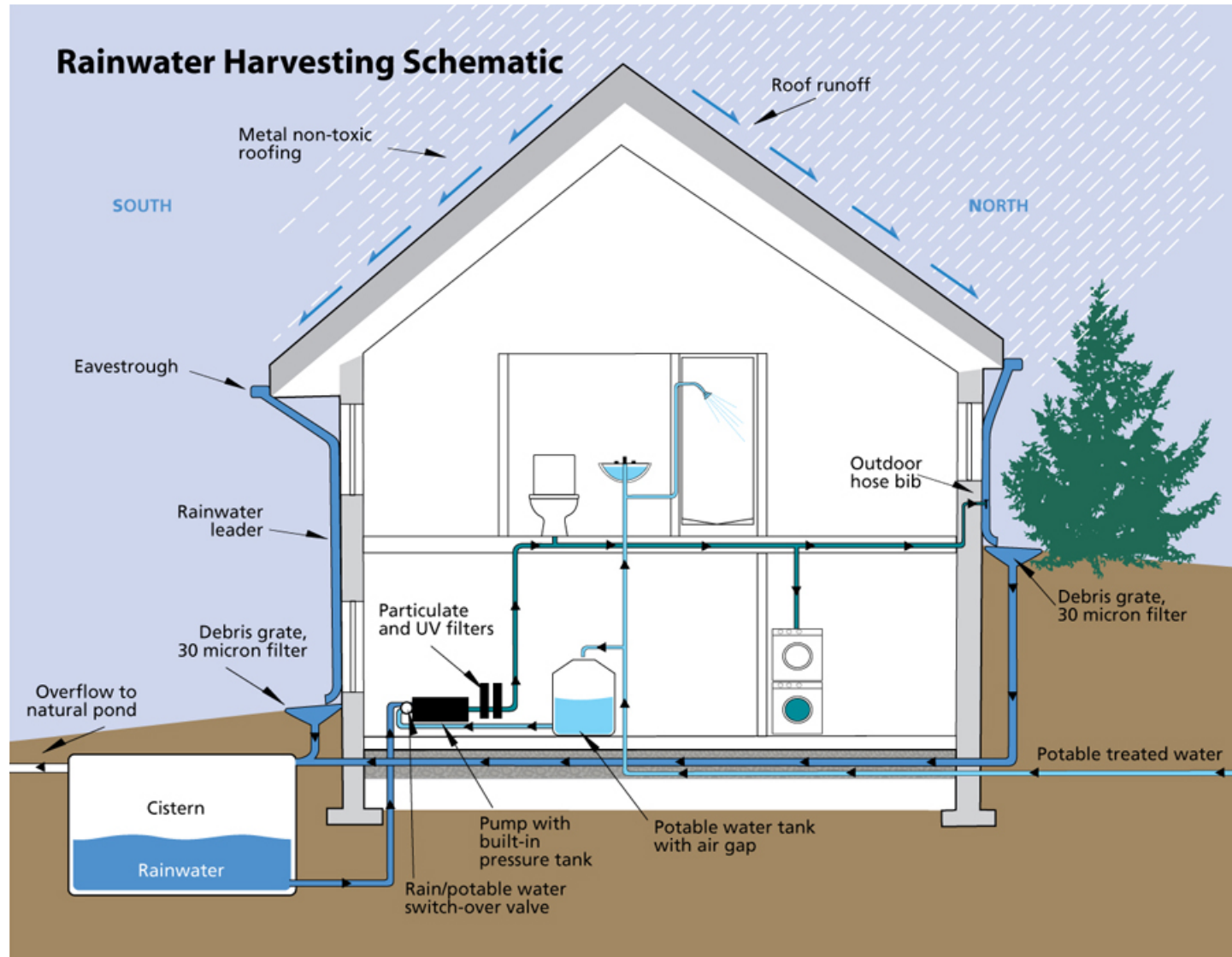
## Site Plan



# Rain Water Harvesting



# Rainwater Schematic







# Rain Water Harvesting





Filter basin





Cistern under driveway



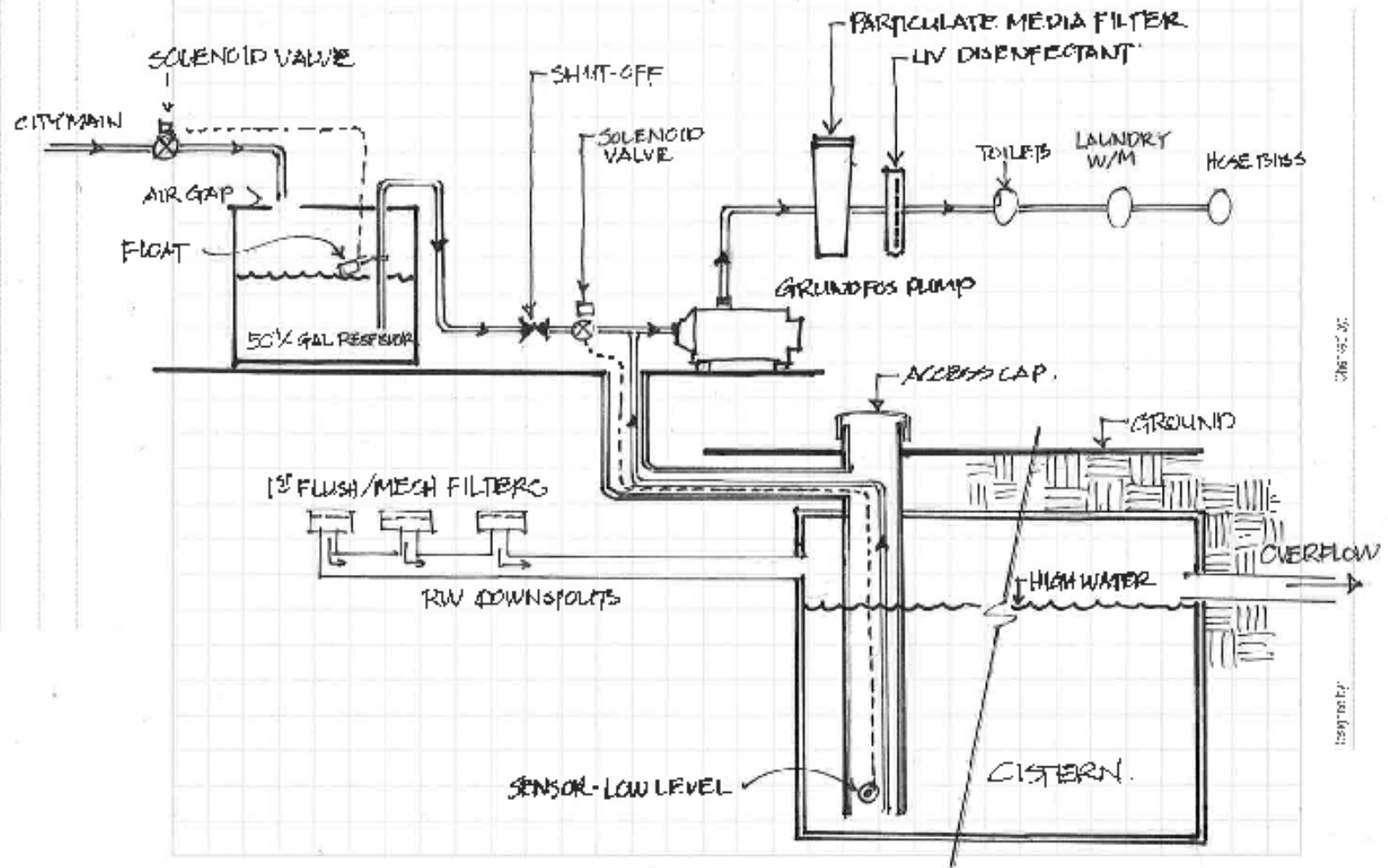


# Rainwater Harvesting Mechanical



# RAINWATER SYSTEM SCHEMATIC...

DESIGN: DAVE SPENCER

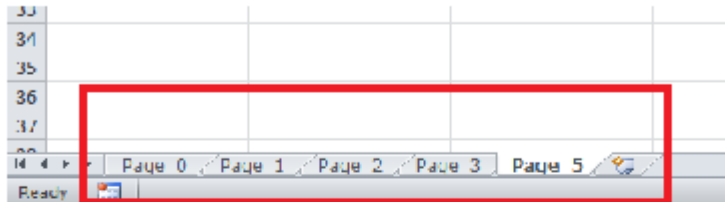


For the kitchen sink, I have not added a separate line to the main line.

DAVE SPENCER  
DESIGNER

## How to View the Design & Costing Tool Report

This report consists of several pages or "tabs". To navigate the pages, click on the tabs located at the bottom of the Excel workbook. The report pages are marked "Page\_1", "Page\_2", etc., and the page tabs will appear as follows:



## Printing the Report

To print the entire report:

For users of Microsoft Excel 2003 (or earlier versions) click on the 'File' drop-down menu item, and then click on Print. Under the "Print what" heading, change "Active sheet(s)" to "Entire workbook". Select the desired printer and click the OK button. For users of Microsoft Excel 2010 click 'File' (Microsoft Excel 2007 users click on the Office Button in the top-left corner of the screen) and then click on Print. Under the "Settings" heading change "Print Active Sheets" to "Print Entire Workbook". Select the desired printer and click the OK button.

To print just one page of the report:

Select the desired report page by clicking on the appropriate tab at the bottom of the screen. For users of Microsoft Excel 2003 (or earlier versions) click on the 'File' drop-down menu item, and then click on Print. Select the desired printer and click on the "OK" button. For users of Microsoft Excel 2010 click 'File' (Microsoft Excel 2007 users click on the Office Button in the top-left corner of the screen) and then click on Print. Select the desired printer and click the OK button.

## Saving the Report

### **Rainwater Harvesting Design & Costing Tool Report**

Once you have viewed the report, be sure to save the workbook if you wish to view the report in the future. To save the file in Microsoft Excel 2003 (or earlier versions), click on the 'File' drop-down menu item, and click on 'Save as' and specify the desired file name and location. In Microsoft Excel 2010 click on 'File' (or click on the Office Button in the top-left corner of the screen in Microsoft Excel 2007), and click on 'Save as' and specify the desired file name and location.

# Rainwater Harvesting Connect-the-Drops



# Practical Results?

Uncertain – Rules keep changing

Currently – No clothes washing both hot and cold  
No hose bibbs as of 2015



**WARNING!** NON-POTABLE WATER  
DO NOT DRINK

## Rain Water Harvesting

# Drought resistant landscape

30 Native Species



The EchoHaven House used less potable water than all the other 12 demonstration homes – 120 Liters per person per day

Average Calgary water consumption is 230 litres per person per day

# Water Conservation























# The Net Zero House

## OVERVIEW





# CMHC EQuilibrium Program

## **THEMES:**

Energy  
Health/Comfort  
Resources  
Environment  
Affordability





## Phase 1 - Charrette Process



# The Net Zero House

## ENERGY OVERVIEW



# Energy Model

## Calculated requirements

Space heating: 6,494 MJ / yr. (1803.7 kWh / yr)

Whole house energy: 27,627 MJ/ yr. (7674 kWh / yr)  
Includes all energy requirements: hot water, lights, appliances,.....

## Quick Facts





# Energy Model

## Energy requirements by floor area:

Space heating:

$1804 \text{ kWh} / 231 \text{ sq.m.} = 7.8 \text{ kWh} / \text{square meter}$

Whole house:

$7674 \text{ kWh} / 231 \text{ sq.m.} = 33.2 \text{ kWh} / \text{square meter}$

**Total Energy requirement: = 41 kWh / square meter  
(Renewables not included)**

Quick Facts



# Energy Model

Heat Load @ -30°C to maintain 21°C indoor temperature

**3000 Watts**

=



+



**Quick Facts**



# Energy Model

## Passive Solar Gain

**Provides 60% of heating requirements**

Quick Facts





5.2 kW Photovoltaic System

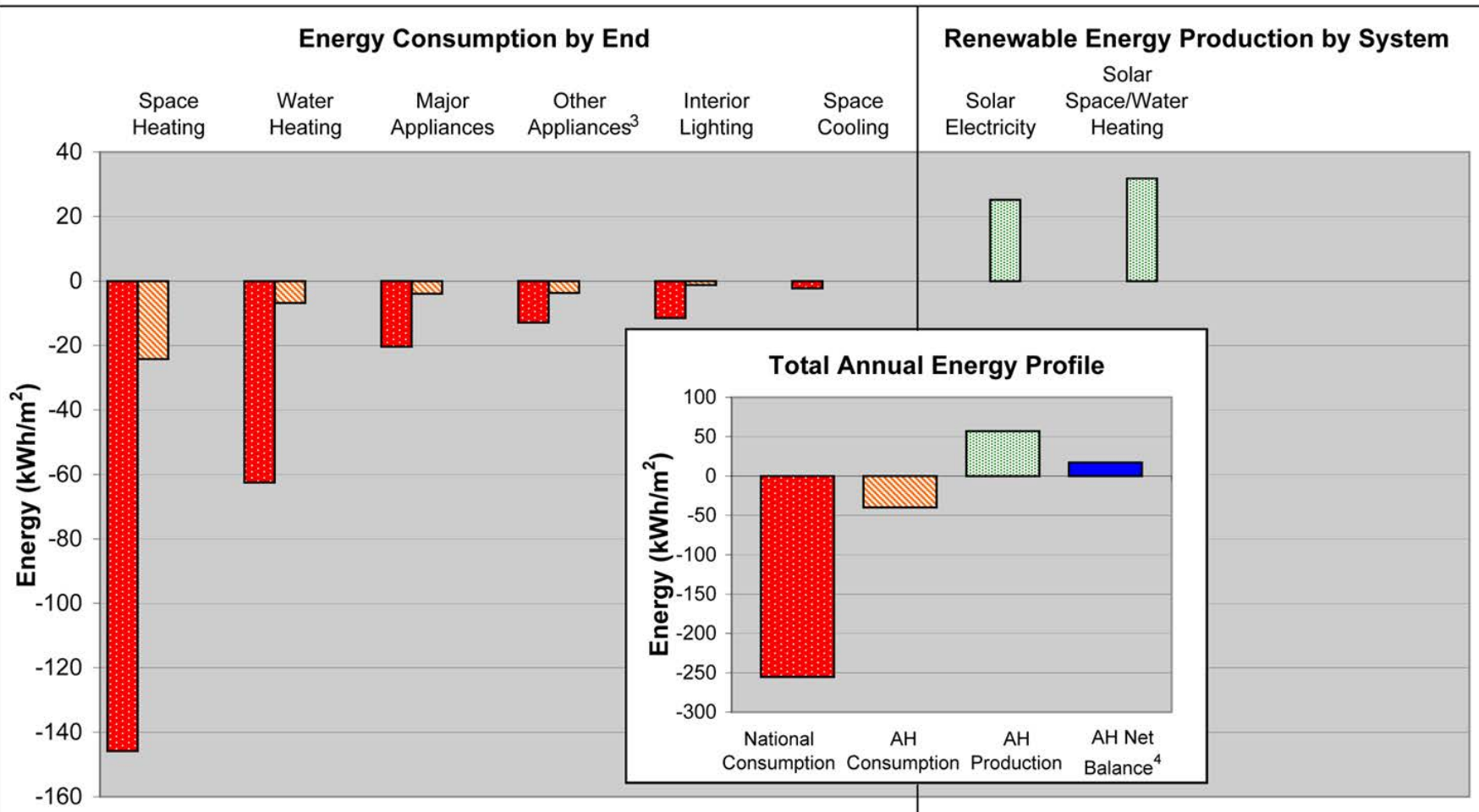


Solar Thermal  
Collectors

Renewable Energy

# CMHC Equilibrium Housing Initiative

## Comparison of Canadian National Average<sup>1</sup> and Echo Haven<sup>2</sup> (EH) Annual Residential Energy Profile



- National Energy Consumption
- Echo Haven Energy Consumption
- Echo Haven Renewable Energy Production
- Echo Haven Net Balance

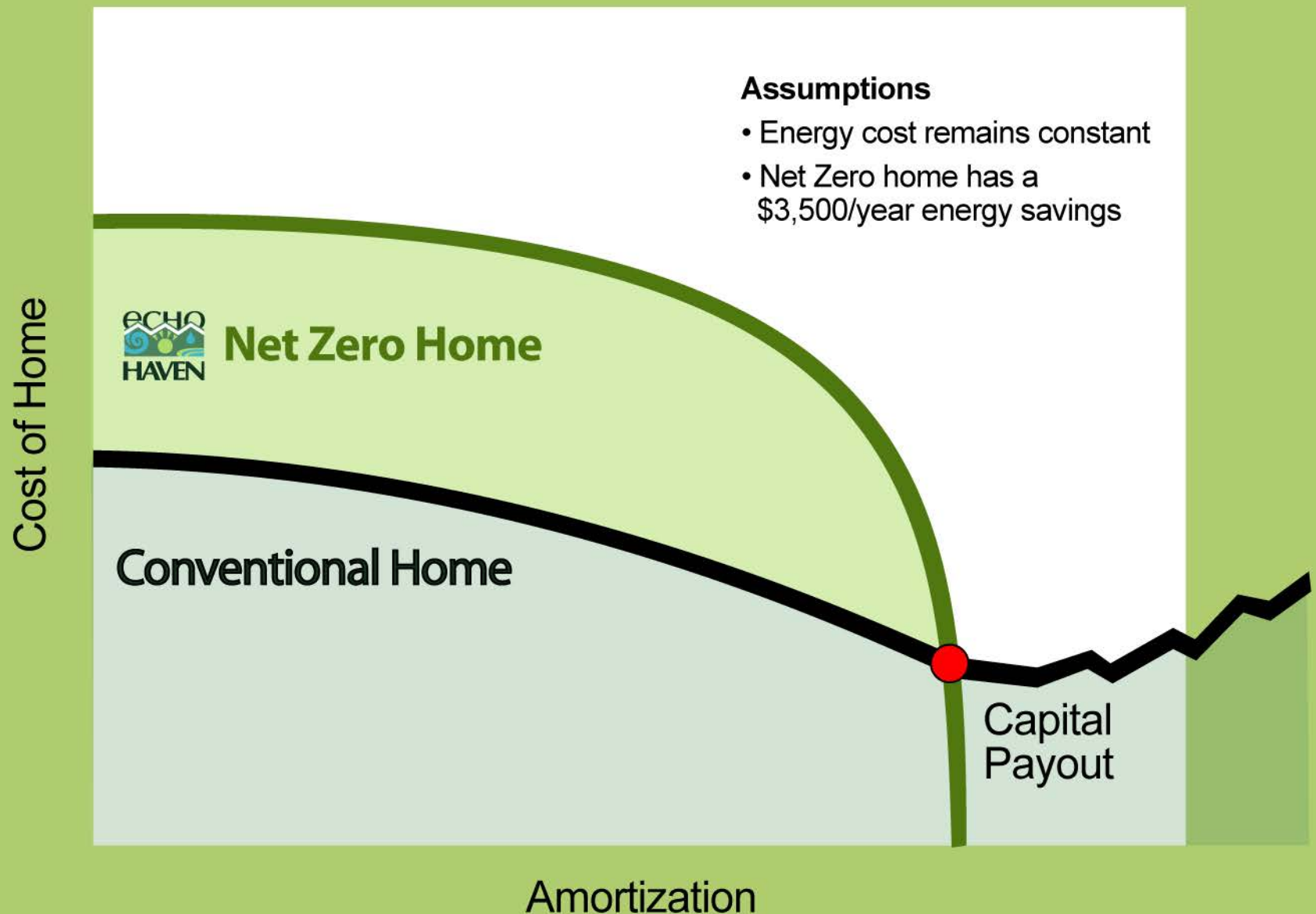
<sup>1</sup> Source for Canadian Residential Sector Energy Data: Residential Secondary Energy by End Use, 2004; *Energy Use Handbook Data: 1990 and 1998 to 2004*, Natural Resources Canada, 2006.

<sup>2</sup> Values are predicted based on Hot2000 modelling - **TG**

<sup>3</sup> "Other Appliances" includes small appliances such as televisions, video cassette recorders, digital video disc players, radios, computers and toasters.

<sup>4</sup> Net Balance = Energy Consumption + Renewable Energy Production

# Home as an Investment





How do I sell a high performance  
home?  
What motivates buyers?

**Why are we here???**



- Saving money
- Concerned about climate change
- Reducing my environmental footprint
- Healthier family
- Because I can

**Why are we here???**



## AVERAGE SUNSHINE

Cranbrook: Latitude 49.530

	% Sun	Hours	Days
Jan	24	64	20
Feb	38	107	24
Mar	44	163	28
Apr	52	215	29
May	54	257	30
June	55	268	29
Jul	64	315	30
Aug	68	303	30
Sept	58	218	29
Oct	48	159	29
Nov	25	70	20
Dec	20	52	17
<b>Annual</b>	<b>46</b>	<b>2191</b>	<b>315</b>

Calgary: Latitude 51.039

% Sun	Hours	Days
46	120	27
51	145	26
48	177	27
53	220	28
52	249	29
55	270	28
63	314	31
63	284	30
54	207	27
53	175	29
45	121	25
46	114	27
<b>52</b>	<b>2396</b>	<b>333</b>

# Good News: Cost of PV



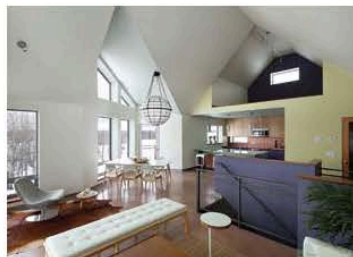












# Living naturally

EchoHaven presents a community in harmony with the environment ■ By Pepper Rodriguez

As Seen in  
New Home  
Living Magazine

newhome  
living

SUSTAINABILITY IN EVERY way, environmental thinking in every acre; EchoHaven puts the logic in ecologic when it comes to building a community that leaves the smallest environmental footprint in the province.

This picturesque parcel of land (just under three hectares) of 25 home lots set in the rolling hills of the northwest community of Rocky Ridge promises to be not only ecologically-sustainable, but as luxurious and comfortable as any modern community can be.

"By employing practical design ideas that maximize both the natural terrain and energy-saving technology, we can deliver a better performing home," says Dave Spencer, one of the partners of Echo-Logic Land Corp., the company developing the area.

"Large, north-facing windows are not practical with the kind of weather we have in Alberta," he says. "At EchoHaven, we 'echo' the proven successful designs from the past 20 years and update them using today's technologies."

One thing of note, EchoHaven sits on the highest natural elevation site in all of Calgary, and its ambitions are set just as high. "I've

owned several homes in Calgary, and nothing ever really suited me. I was looking for more functionality and sustainability," Spencer says.

He has built his own 2,700-square-foot home in EchoHaven — its first occupant — and it served for a time as the show home to give interested buyers a glimpse of what new earth-friendly technology and a little imagination can come up with. "It is a true Net Zero home where we produce as much energy as we use which is achieved using a combination of passive and active solar technologies and other strategies, including a ventilation design that maintains a comfortable temperature inside, no matter the weather outside," he says.

His vision for EchoHaven is a collection of homeowners who want the quality of life that a high-performance home in harmony with nature can provide. "These will all be custom-designed homes that have at minimum Energuide rating of 86," he says.

Unlike most move-up communities, garages won't be taking up most of the home's frontage, and there will be few north-facing windows, as each home will be designed to make the most of solar access. "I see homes as a big investment, and your home has to pay you back. Saving energy is one way to do it," he says.

Homes here will reduce reliance on grid power by 80 per cent compared to the average home, will have zero greenhouse gas emissions and employ rainwater harvesting to reduce treated water consumption by 72 per cent.

## IT CONNECTS RESIDENTS TO NATURE IN MORE THAN ONE WAY.

Homes here will be energy producers by maximizing the use of solar energy. They will also have a balanced water management strategy — relying on rainfall and snowmelt to reduce consumption of city-supplied water. Each home will have cisterns to store and re-use collected rainwater.

Lots range from 31 to 37-foot frontages. Homes including the lot start at \$650,000. Jigsaw Homes and Jan Star Homes are two of the homebuilders at EchoHaven. Spencer says "There are only 17 lots left and there is interest, mainly from young professionals who want a better quality of life and expect more from their homes."

EchoHaven has preserved over 60 per cent of the existing natural landscape, preserving the thick, natural stands of aspen trees throughout the community. It has natural ponds within the community to add to its idyllic nature and will have an amenities building that will feature two guest suites and a communal greenhouse where residents could grow their own produce.

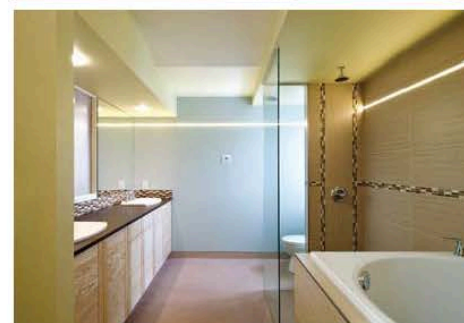
It connects residents to nature in more than one way, as the natural vistas of the community attract an assortment of wildlife in the community, including deer, moose and a wide variety of birds. "You also get terrific mountain views from our vantage point," Spencer adds.

"EchoHaven is meant for people looking for a high quality of life that gives back to nature without giving up comfort or convenience," he says. NL



As Seen in  
New Home  
Living Magazine

newhome  
living



### ECHOHAVEN COMMUNITY

DEVELOPER: UnRed Communities

STYLE: Custom-built single-family or semi-detached homes stressing high performance features

SIZE: Lots range in size from 31- to 37-foot frontages

PRICE: Homes start at \$650,000

ADDRESS: 42 Rocky Ridge Crescent NW.

DIRECTIONS: From Country Hills Boulevard, turn left on Rocky Ridge Road, turn right on Rockyridge Crescent and follow the signs

WEB SITE: [www.echohaven.ca](http://www.echohaven.ca)















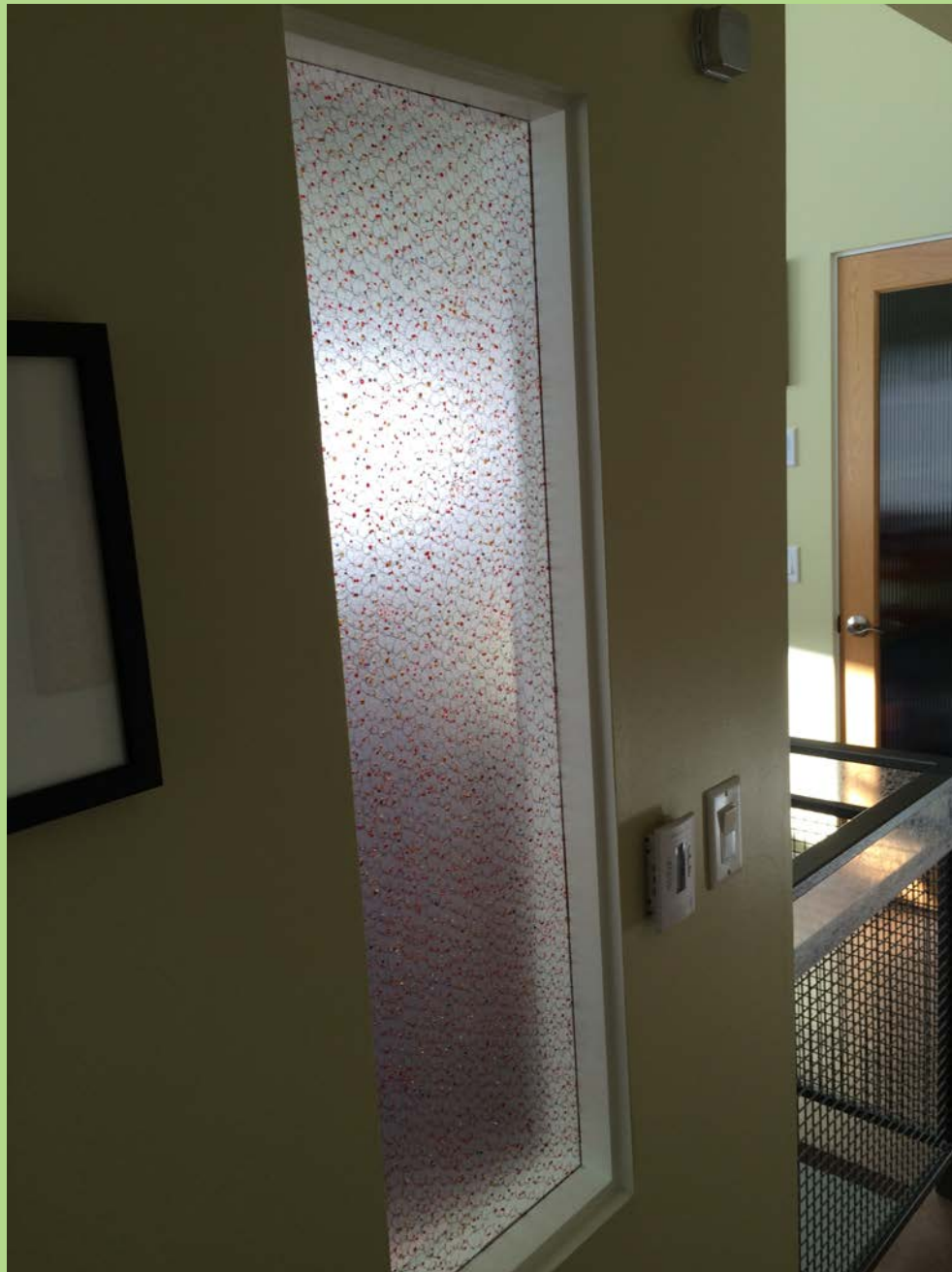








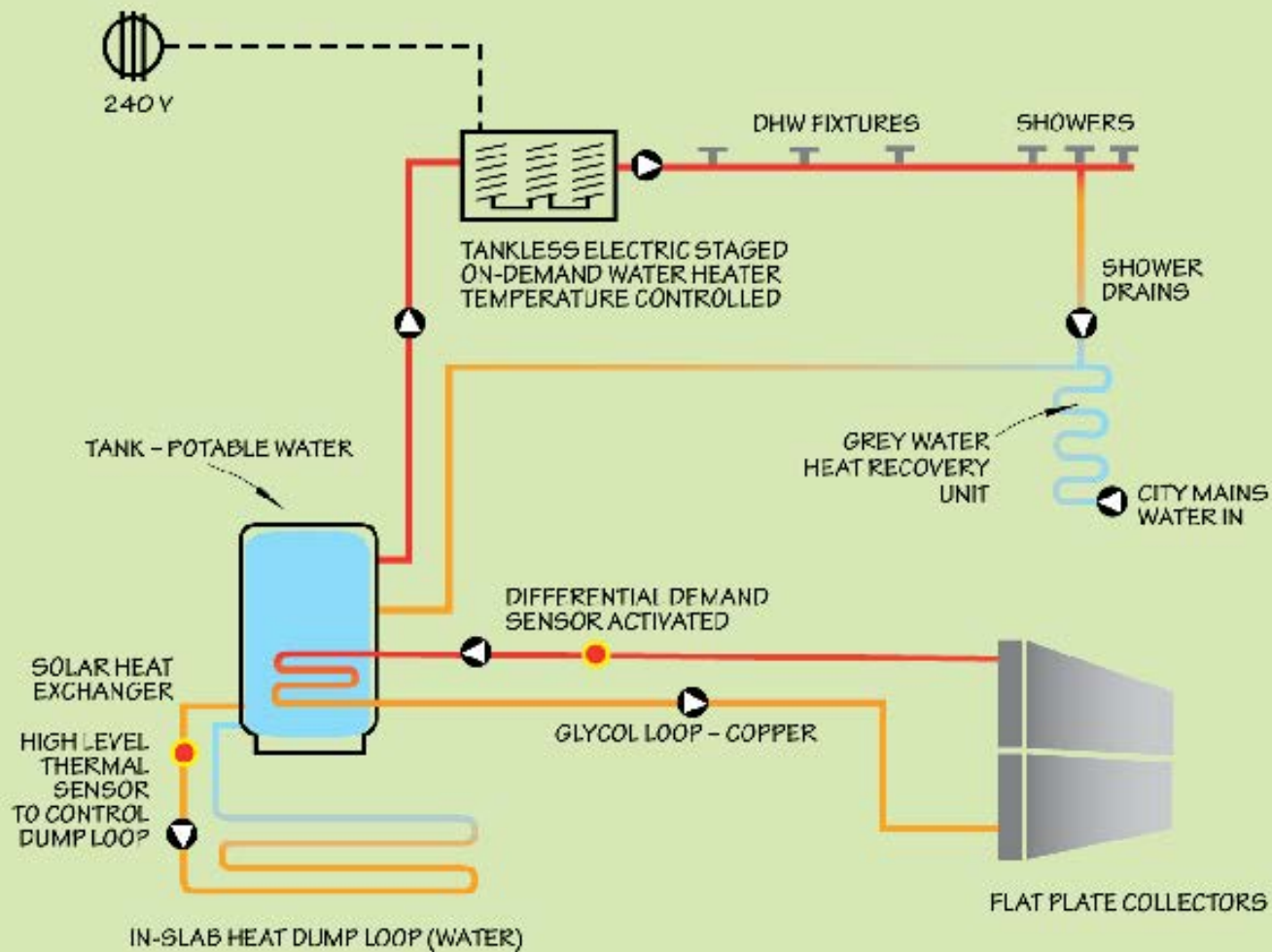












**Mechanical Schematic**



## net-zero mechanical room



Heat recovery ventilator

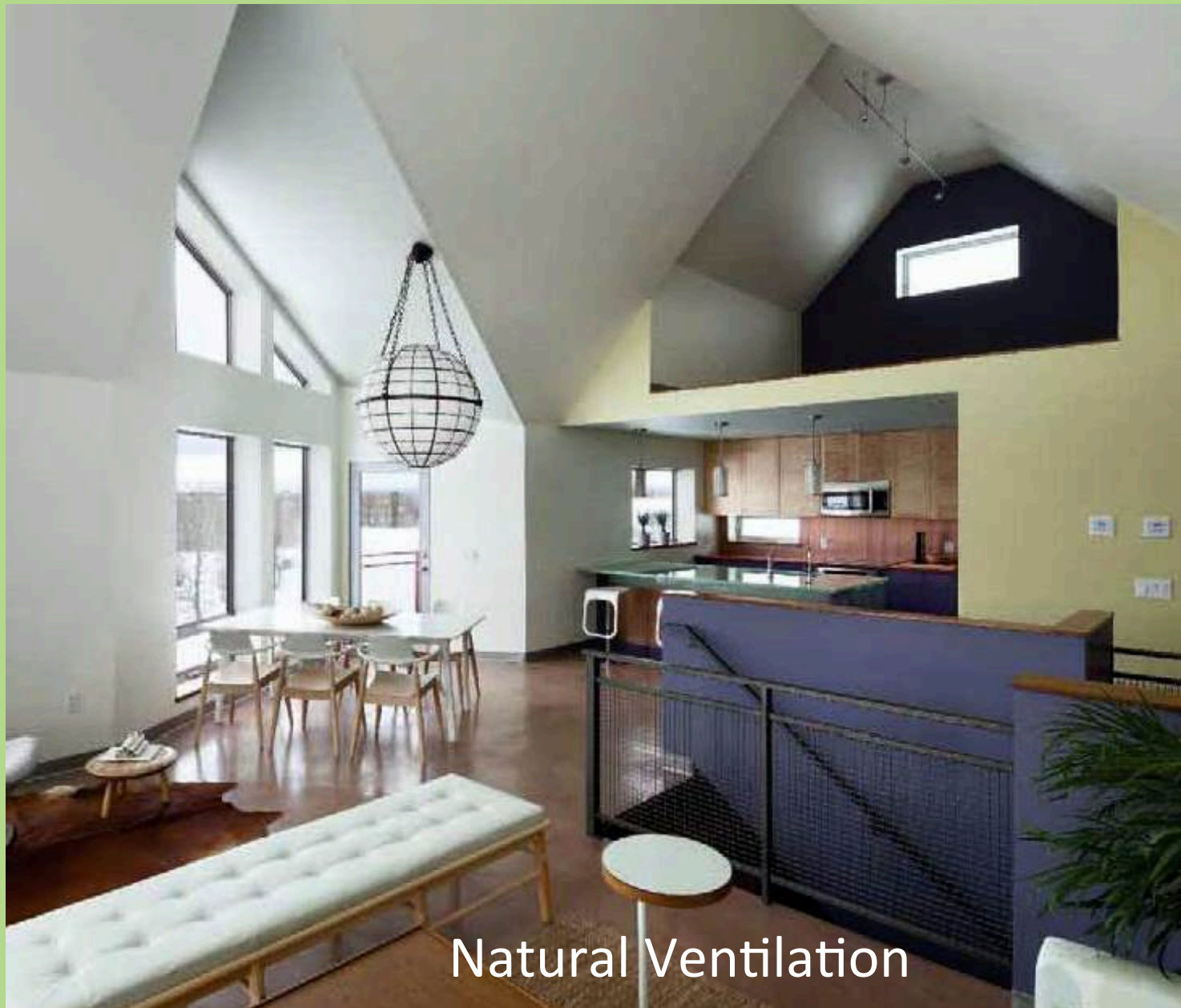
Flow metre

Pressure tank

Grey water heat recovery

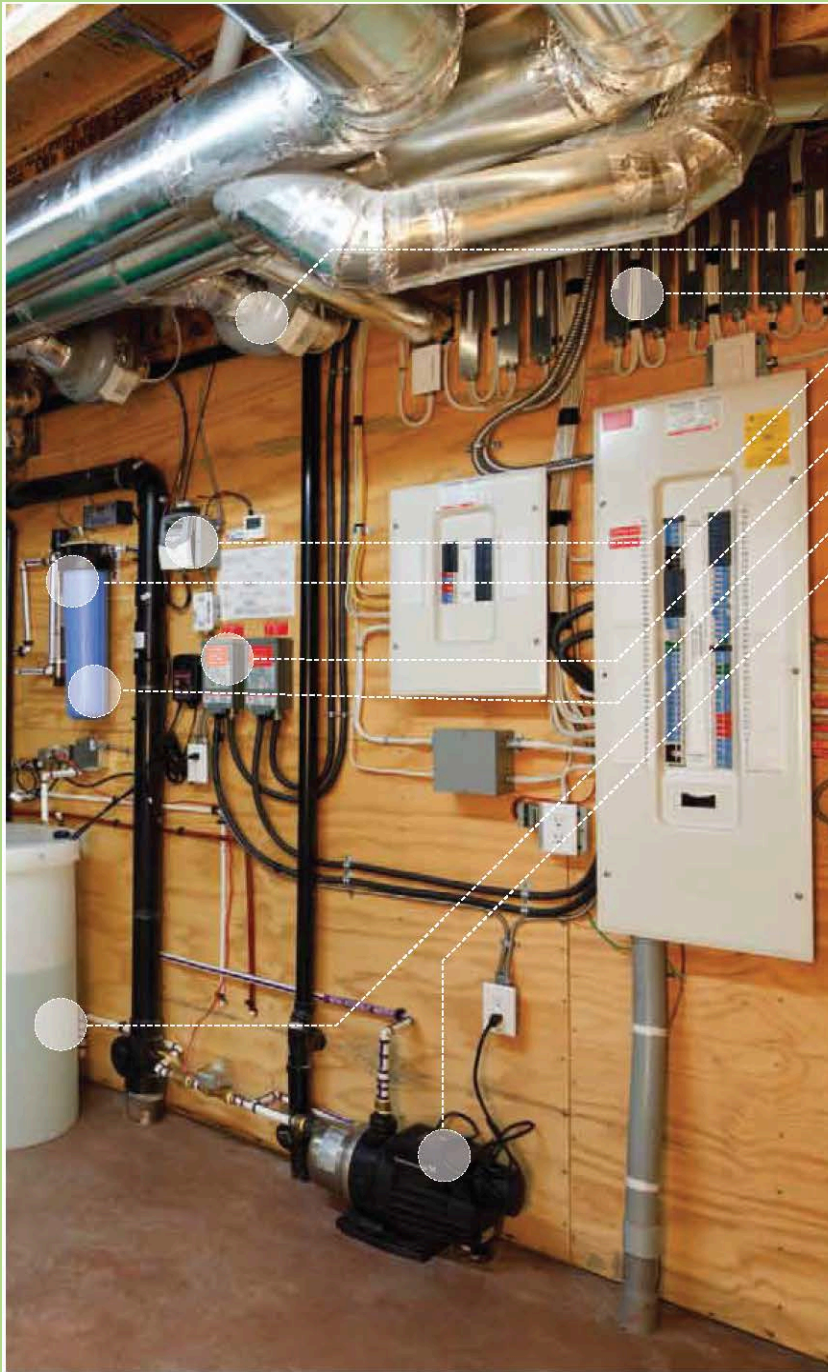
On-demand heater

Insulated, single coil  
storage tank



Natural Ventilation





Booster fan

Drivers for LED  
lighting

Solar thermal controller

UV filter

PV junction boxes

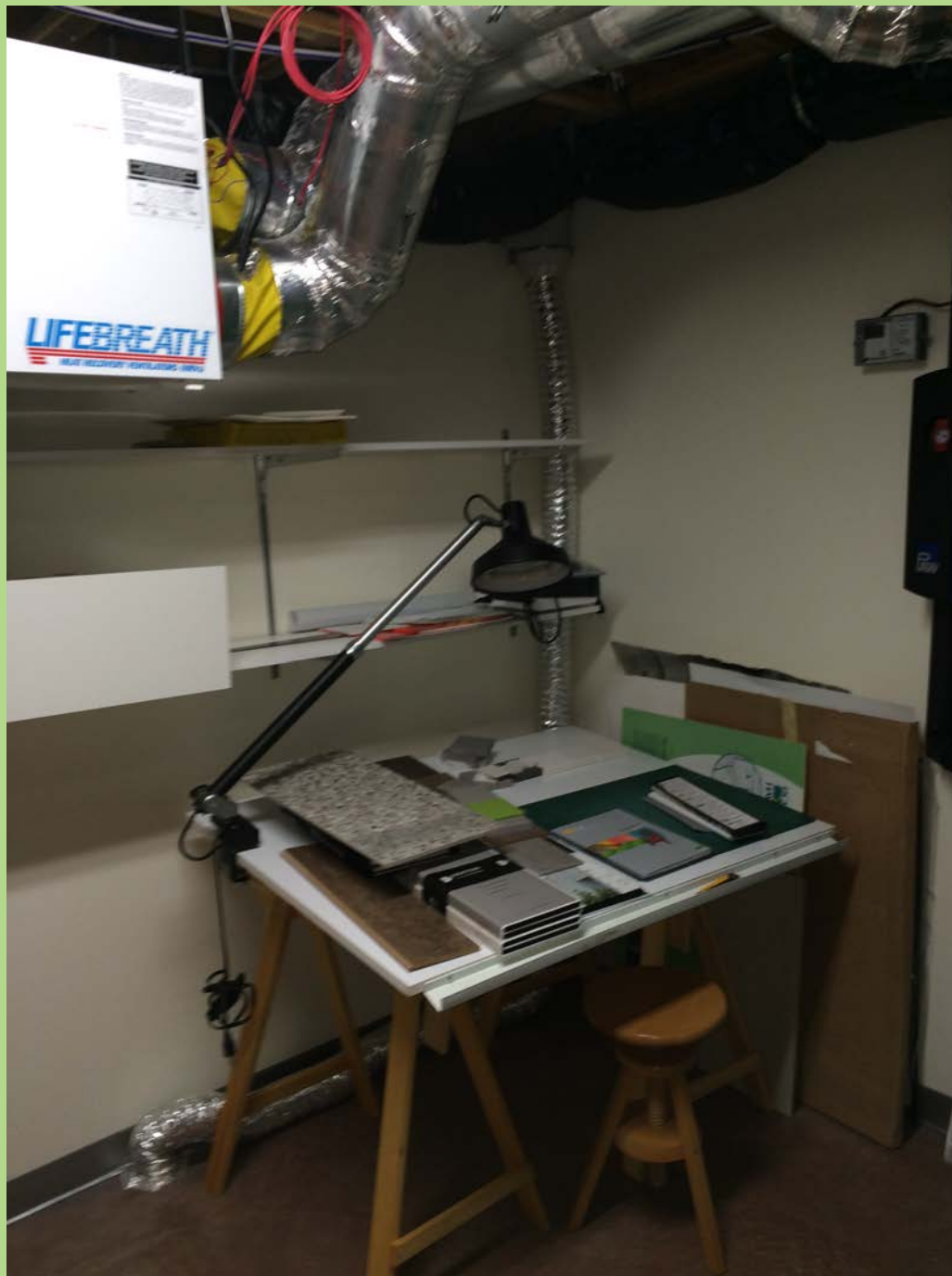
Particulate filter

Rainwater holding tank

Pump for rainwater

# Keep it simple





# Radon



Excavation October 1, 2010





Point Load PT Pad Footings





Prefab walls on wood footing





PT Basement walls on wood footings





Detail of footings and foundation





Dec 2009 Winter Shutdown





March preparation for Frost  
Removal





Frost Removal





Underslab 8" Insulation

Electric service over foam





# Compacting 7" gravel over foam







Rebar placement





SDHW dump loop





Echo Have wedge anchors on sheer walls1





Installing basement walls

Geotextile over  
footing gravel







Door Buck



# Urethane in sheer wall







Joisting





Rigid Insulation Apron





Lower Slab Pour



# Pre-fabricated Truss walls







Cold room insulation



Walltite









30" Ceiling and wall cellulose





Radiant heaters



Radiant heaters



# Floor protection



# Drawings and Details





[www.echohaven.ca](http://www.echohaven.ca)



*Living Lightly on the Land*

[dave.spencer@stantec.com](mailto:dave.spencer@stantec.com)