School Building as Teacher

Better Buildings by Design

Burlington VT

04 Febuary 2015

Ben Freeman and Randall Walter

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•Credit(s) earned on completion of this course will be reported to AIA CES for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.

•This course is registered with AIA CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

•Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

Learning Objectives

1. Understand outcomes of promoting social change through synergistic curriculum and building/campus design

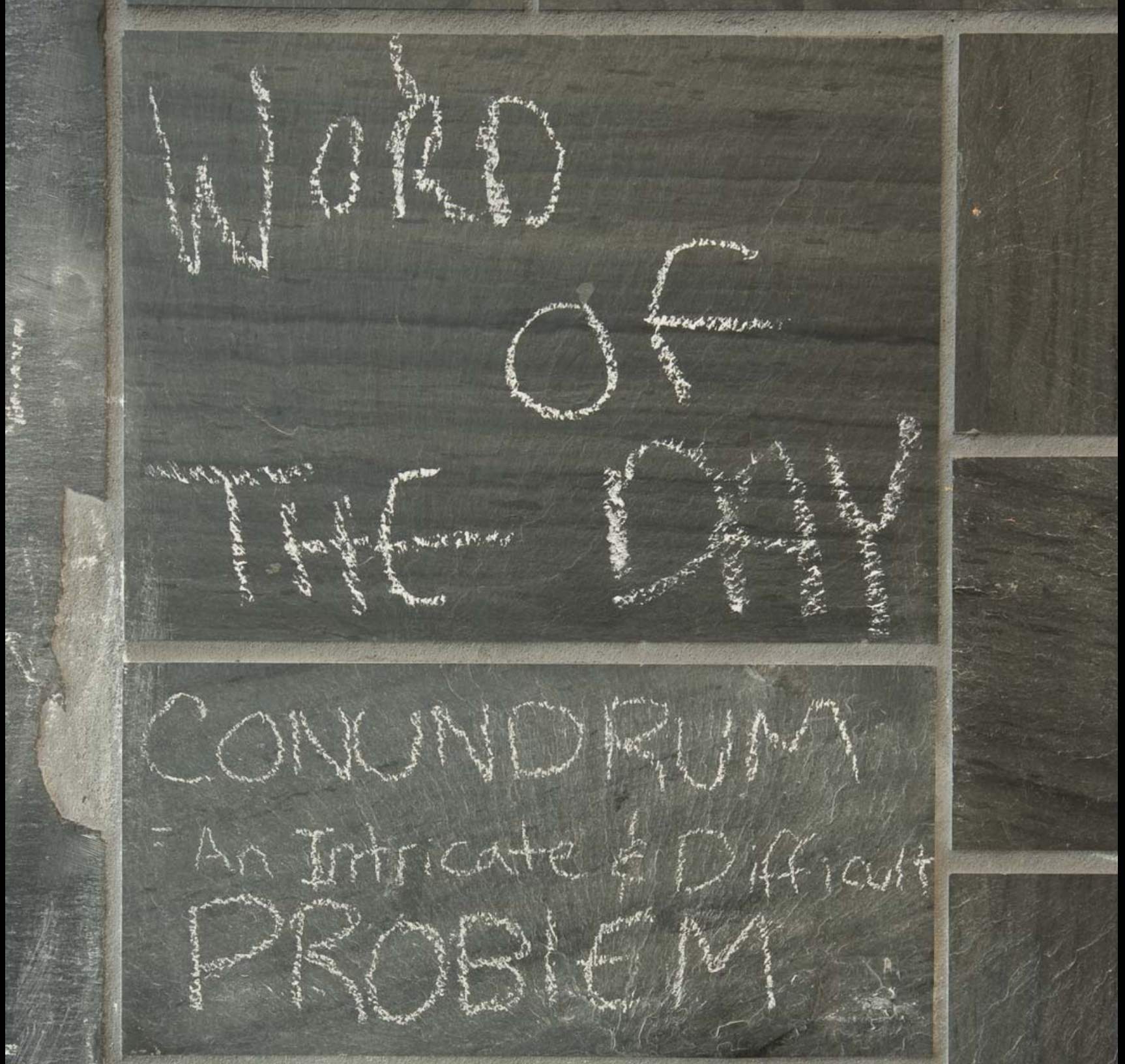
2. Describe the impacts of building systems and resource transparency; on student learning

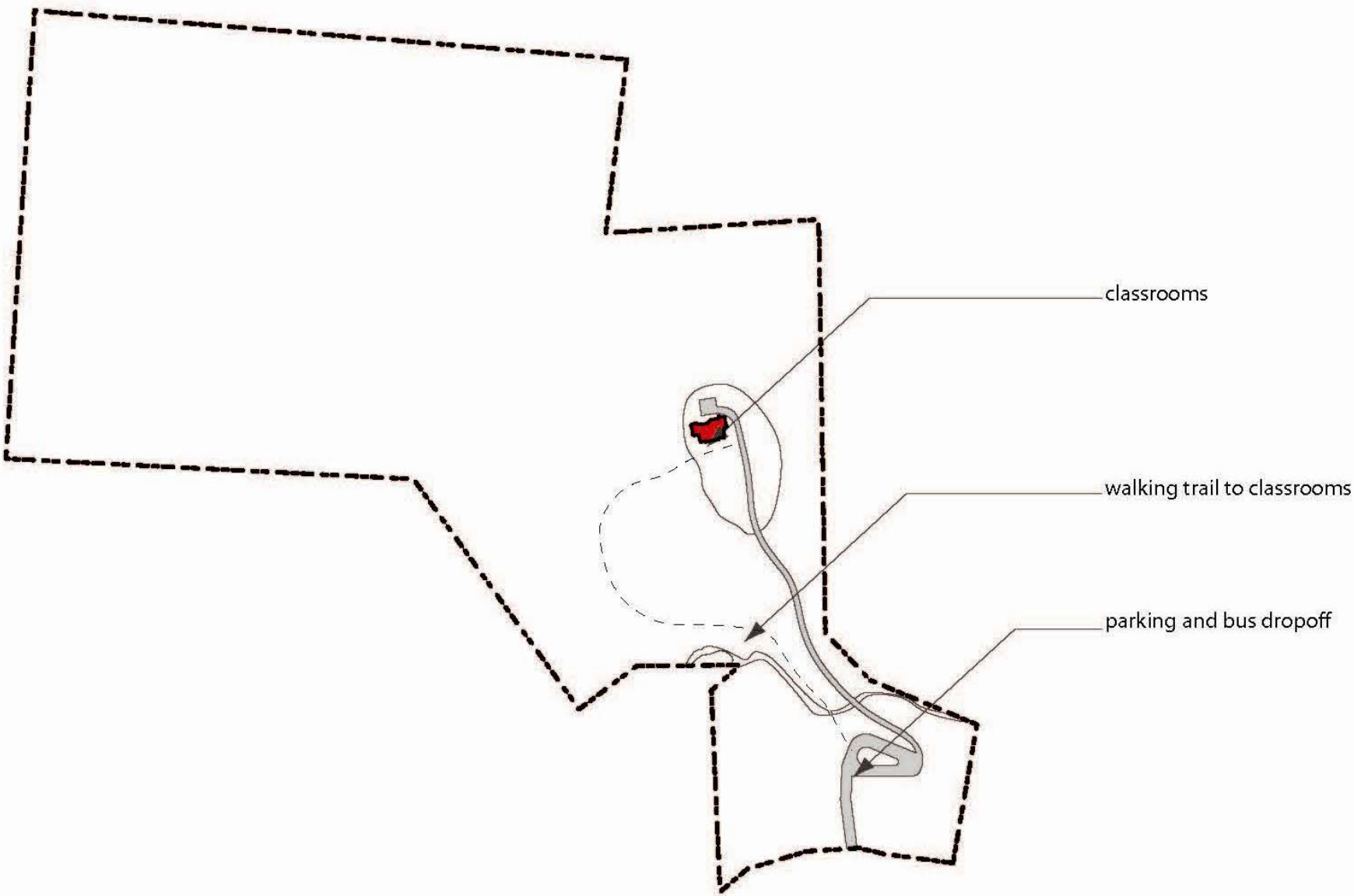
3. Explain the synergies between green building and impacts on student learning

4. Define unintended consequences and learning opportunities from this project

Course Description

Built and opened to students in 2012, Burr and Burton Academy's Mountain Campus is an innovative model for place-based environmental education. From campus design and construction to curriculum design and execution, all elements of the process have worked to maximize the success of the program mission: to be a catalyst for student growth as individuals, members of communities, and citizens of a sustainable world. Presenter will discuss design concepts that helped the campus achieve "net zero" targets, as well as biophilic design, student experiences monitoring the buildings' energy performance, living in and caring for the space, and the ripple effects of student experiences. Planned dialog with presenter will bring to life the design, construction and active use process, including initial design goals, site evaluation, review of LEED criteria, design process charette, site schedule and assembly of the building, occupation, and daily and seasonal changes during the first two years of operation. Exhibits will include resource maps showing the distance and local impact of native materials on fabrication and architectural detailing, while showcasing advanced building strategies such as off-site fabrication of the insulated shell, detailed material recycling and waste stream separation and recycling of all site waste, minimal site disturbance during the build phase, renewable energy exploration and implementation. Embedded pedagogical aspects of the building will also be highlighted, including declination angles, biomorphic-inspired framing, tactile surface installations, local material celebrations, salvaged wood and insulation strategies, building reuse examples, and the recycling content of building materials. Data gathered by students tracking daily "resources in/resources out" underscores the connection between the goals of the program and the building's ongoing significance and positive impact on daily routines. This award winning project exemplifies how a school design can benefit both students and education professionals. Emphasis on the connections between effective learning environments, innovative green design, and the natural environment are at the heart of the educational program and creative process for this building.

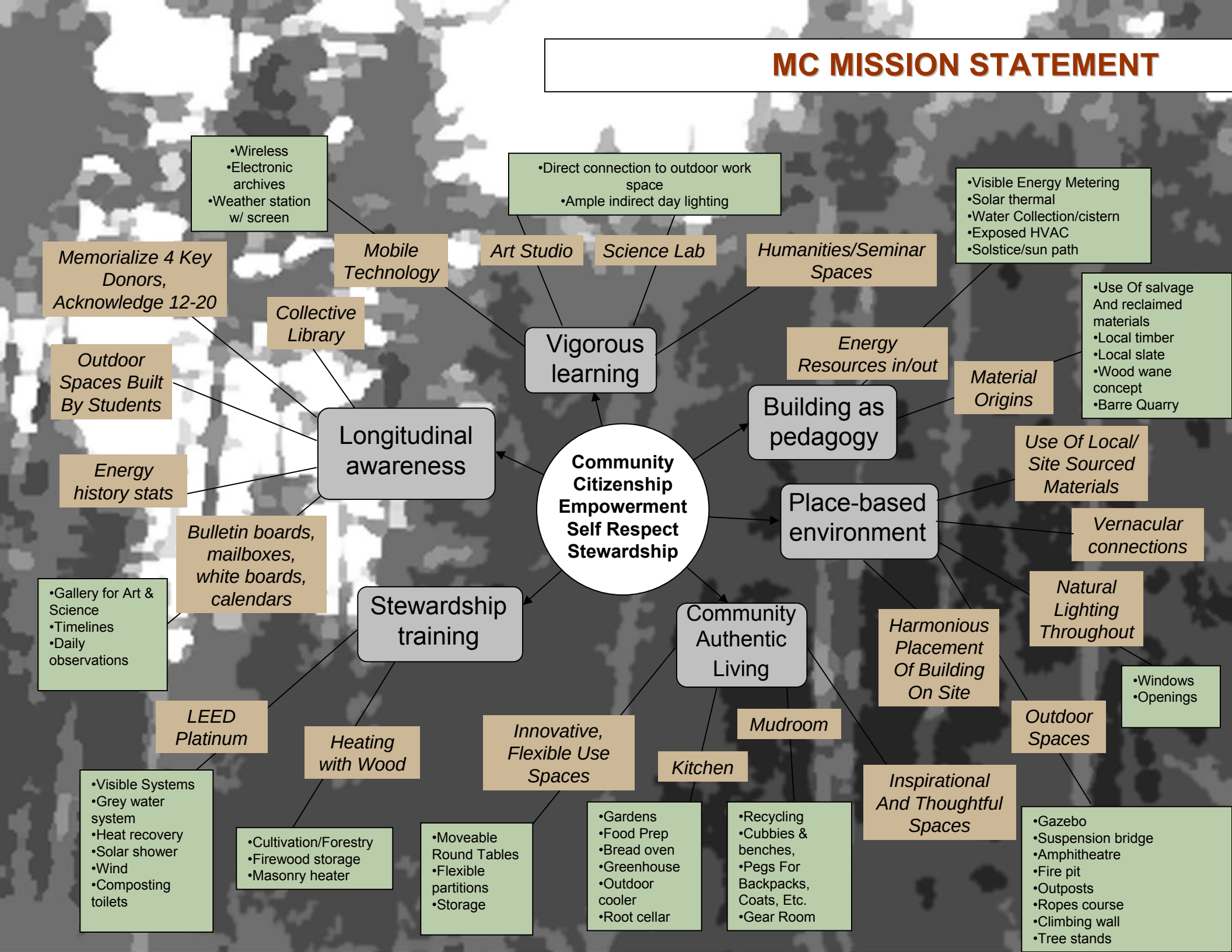

Word
OF
THE DAY
CONUNDRUM
An Intricate & Difficult
PROBLEM


classrooms
walking trail to classrooms
parking and bus dropoff

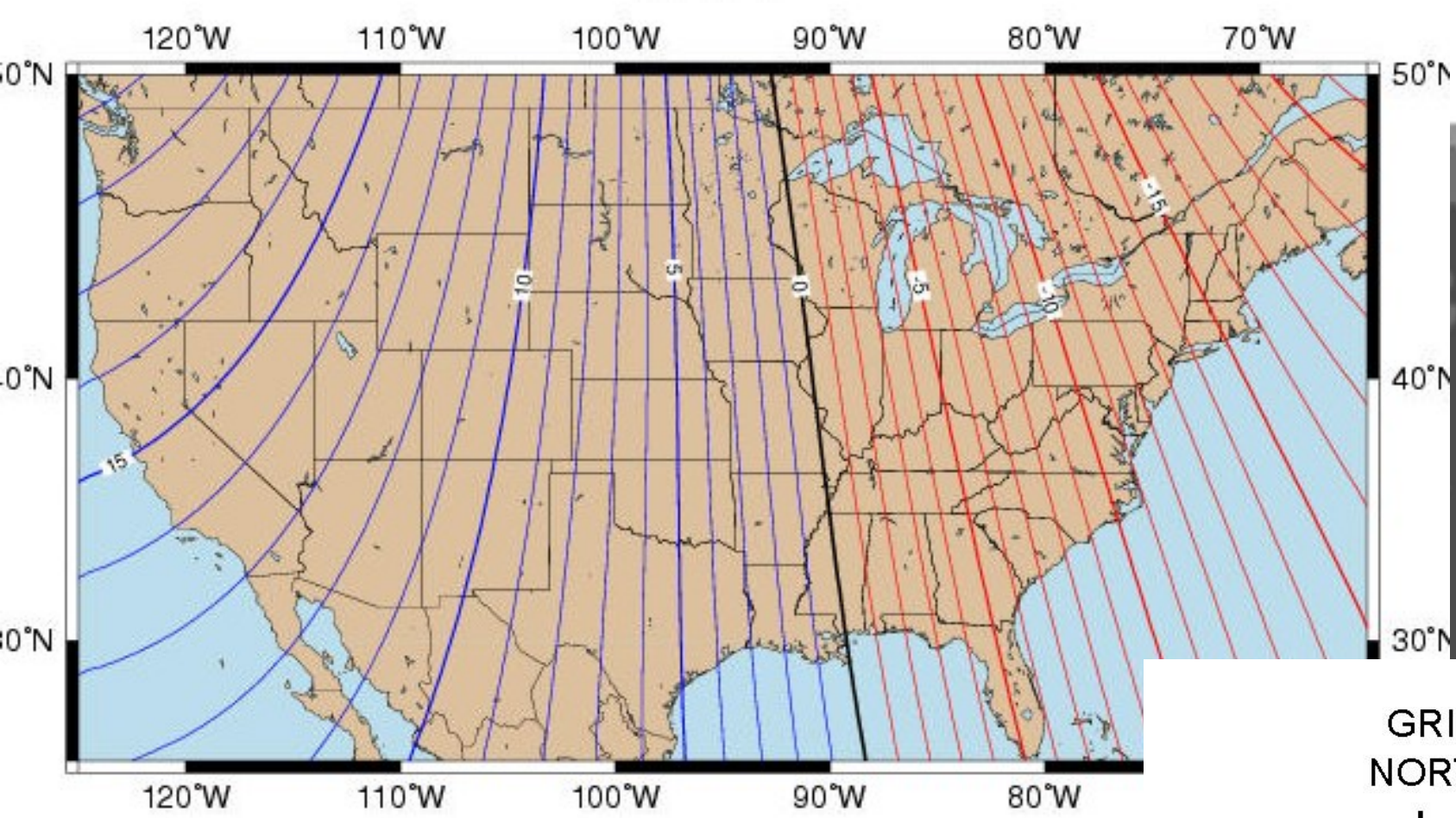

The Wright Way

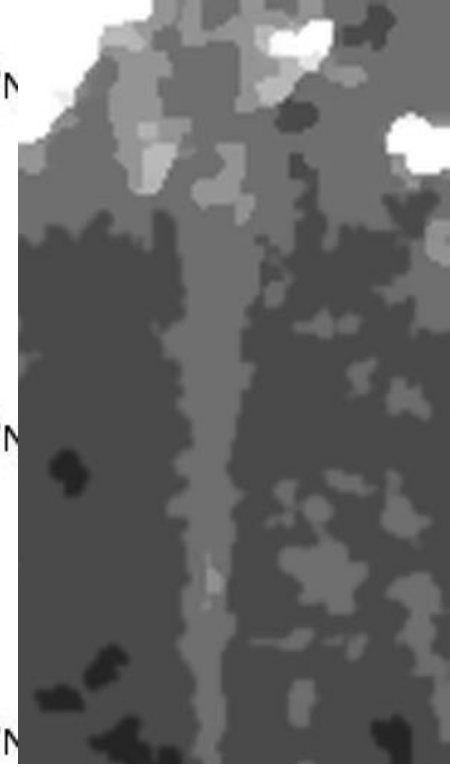

Community
Community
Community
Leadership
INTEGRITY
Authenticity
Inspiring
Self
Humility

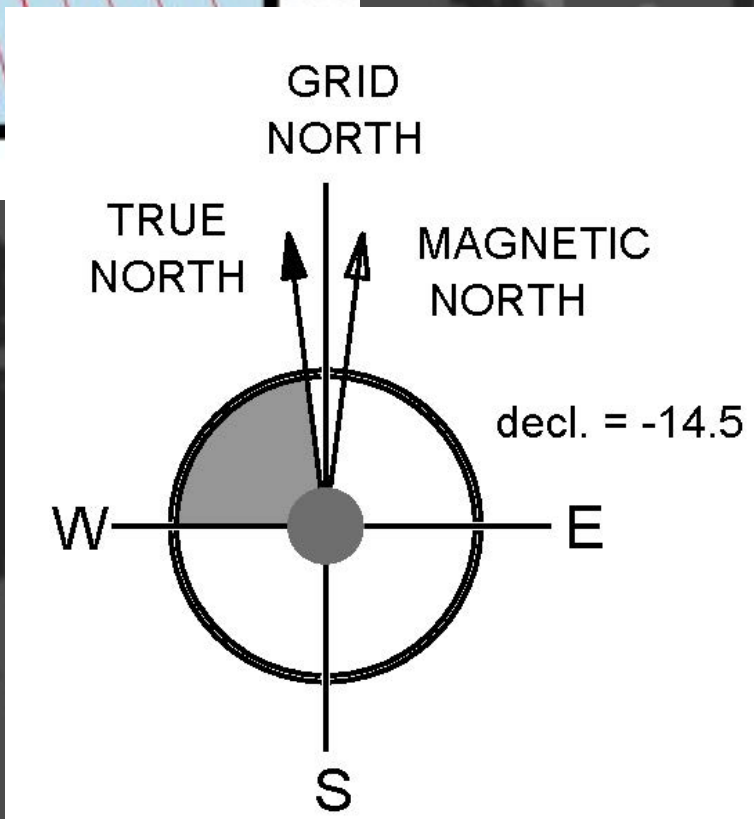
MC MISSION STATEMENT

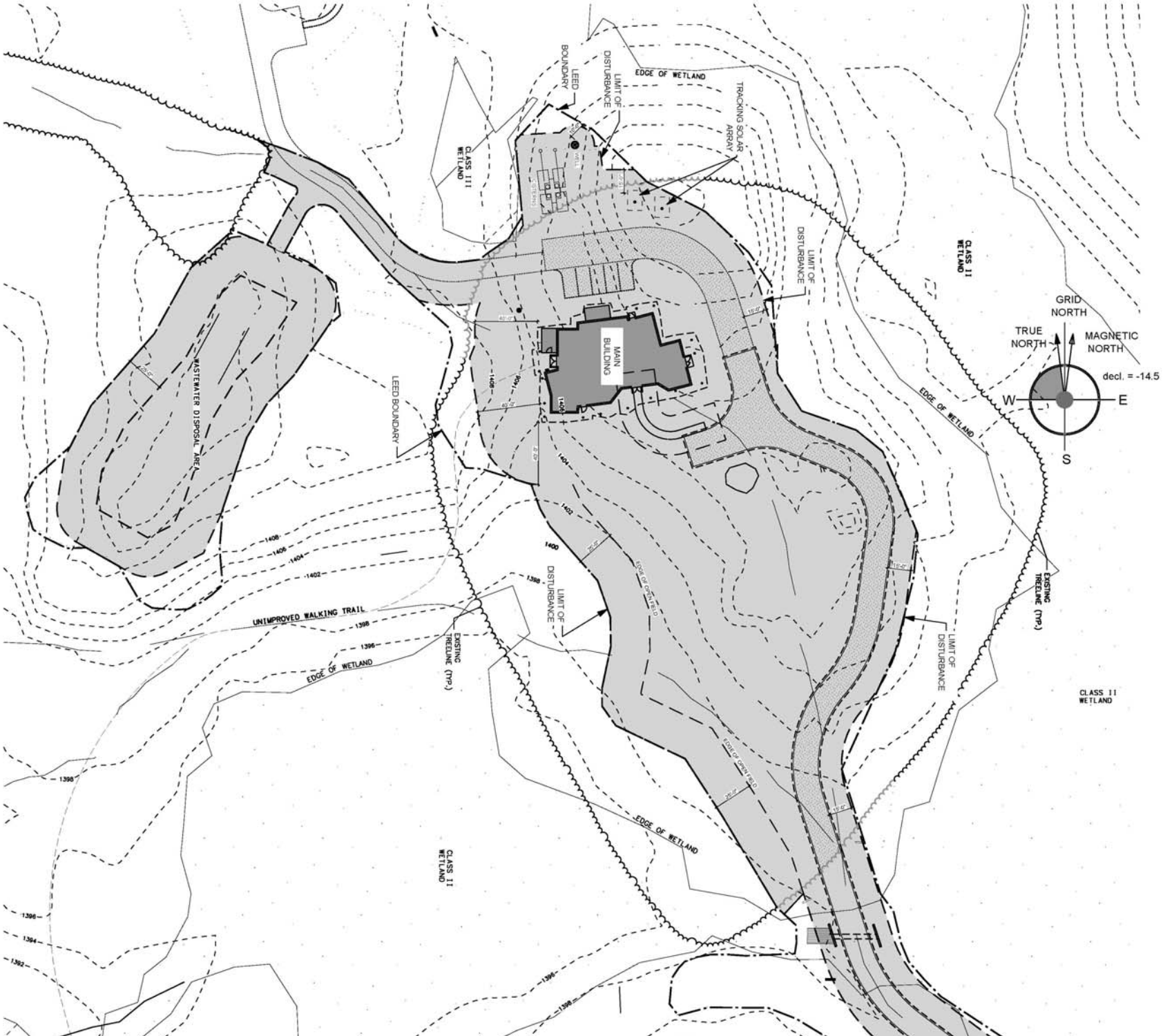


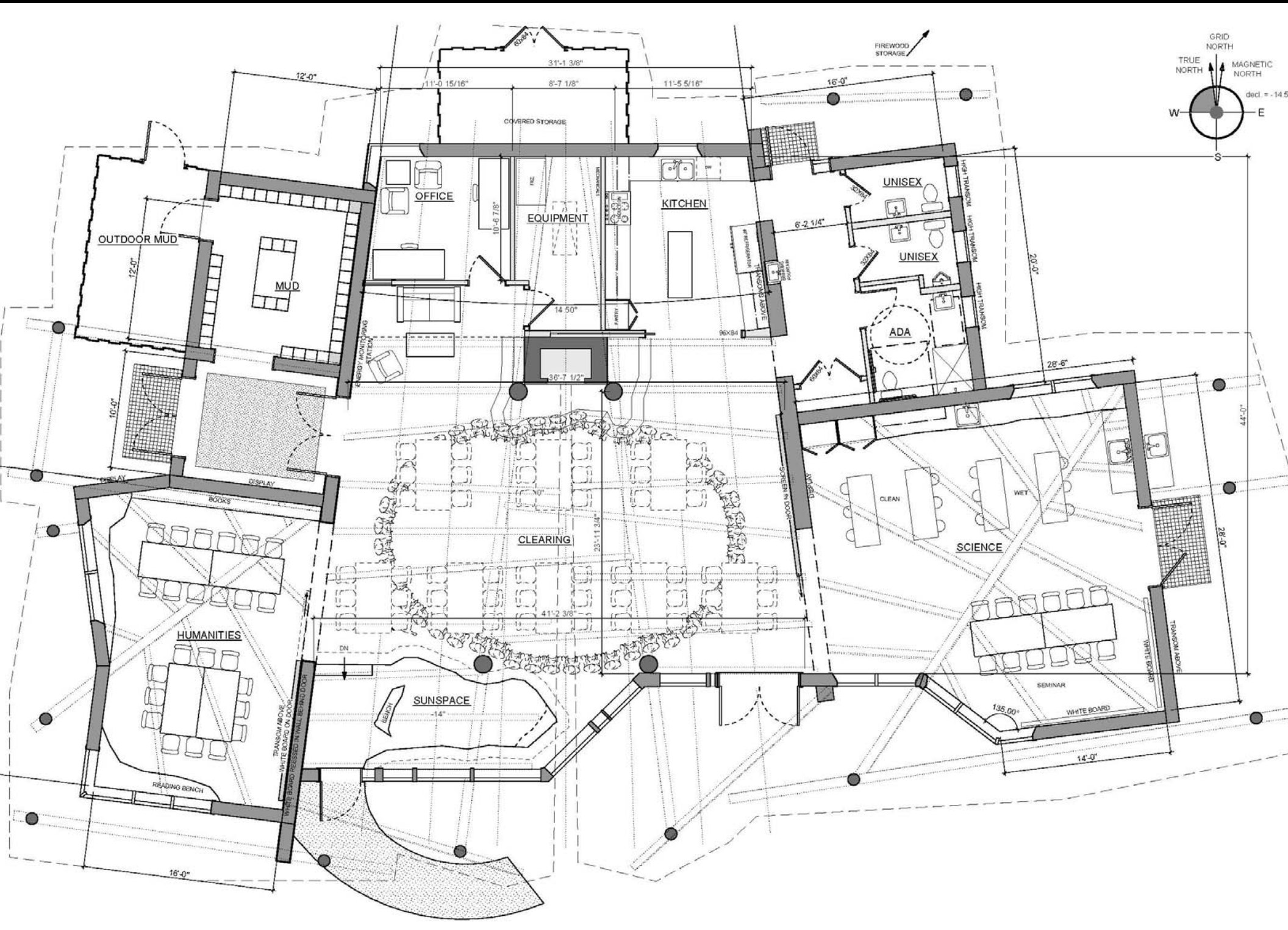

MONA GARONE
OUTSTANDING SPORTSMANSHIP AWARD
19 99
VERMONT BASKETBALL
REFEREES
HOME OF THE
BULLDOGS
HOME PERIOD GUEST
FOULS PLAYER FOUL FOULS
BBA
euphoria

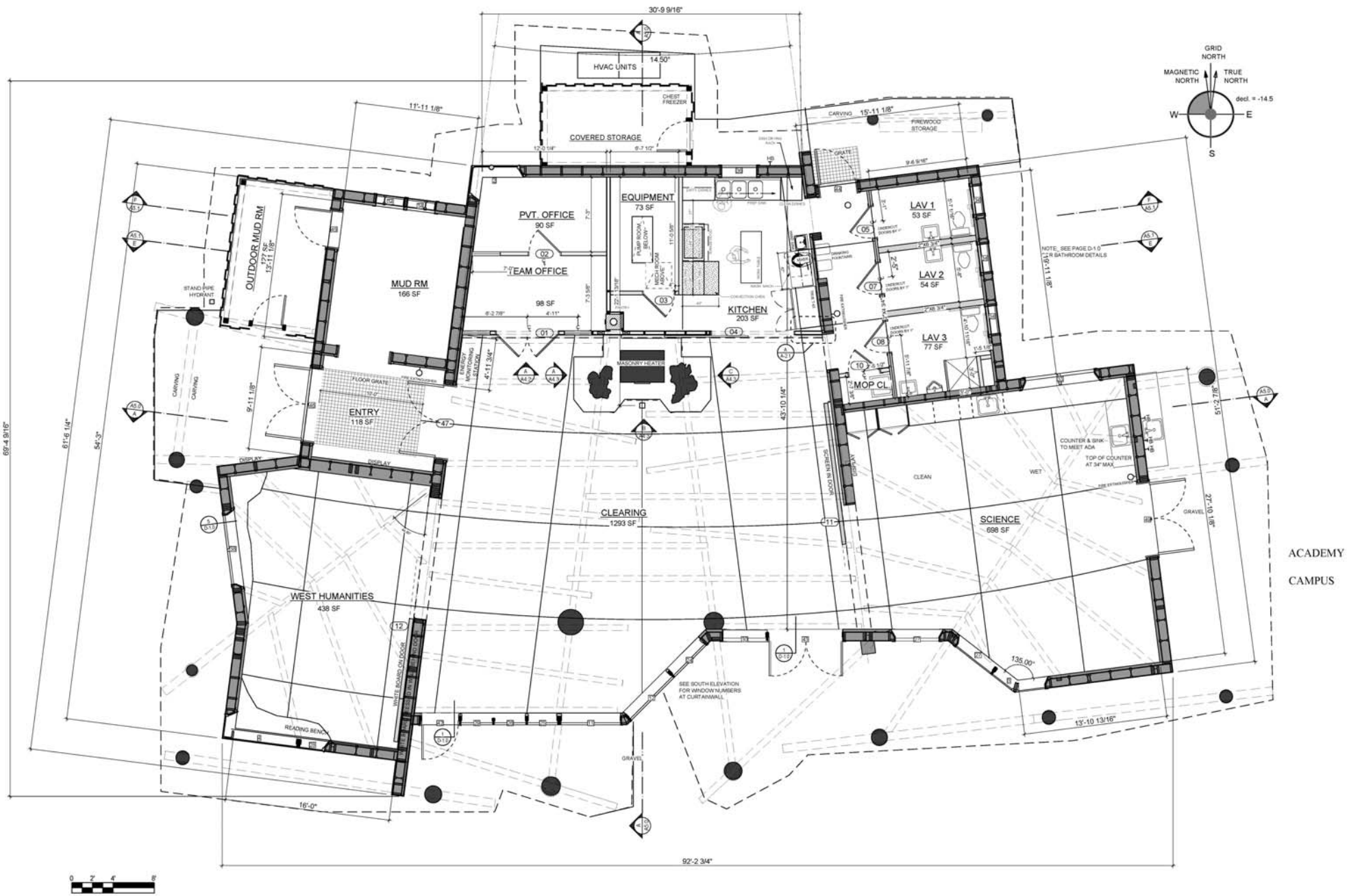

120°W
110°W
100°W
90°W
80°W
70°W
50°N
40°N
30°N
15
10
5
0
-5
-10
-15




GRID
NORTH
TRUE
NORTH
MAGNETIC
NORTH
decl. = -14.5
W
E
S

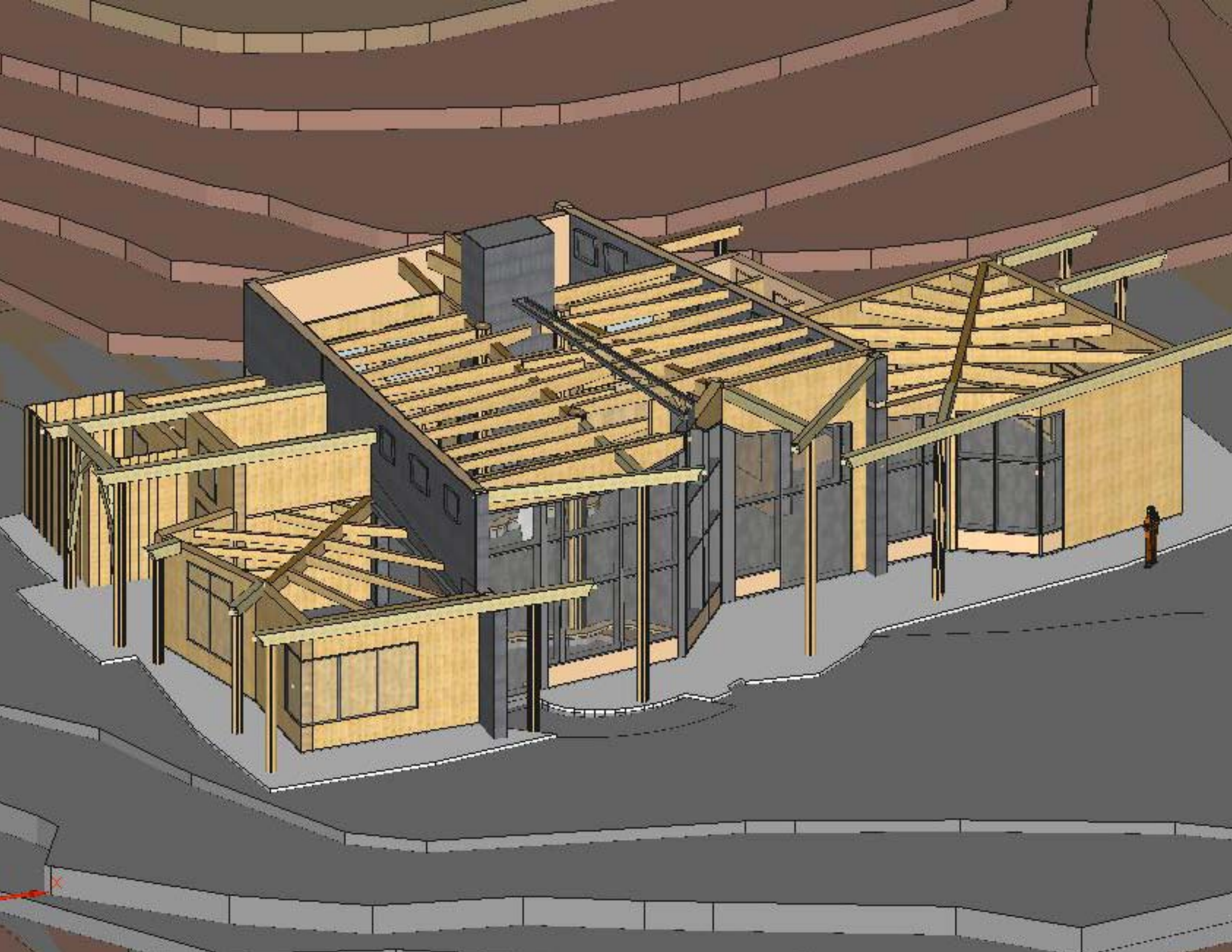

LEED BOUNDARY
LIMIT OF DISTURBANCE
EDGE OF WETLAND
TRACKING SOLAR ARRAY
CLASS III WETLAND
CLASS II WETLAND
MAIN BUILDING
WASTEWATER DISPOSAL AREA
UNIMPROVED WALKING TRAIL
EXISTING TREELINE (TYP.)
EDGE OF CROPFIELD
GRID NORTH
TRUE NORTH
MAGNETIC NORTH
decl. = -14.5
W
E
S

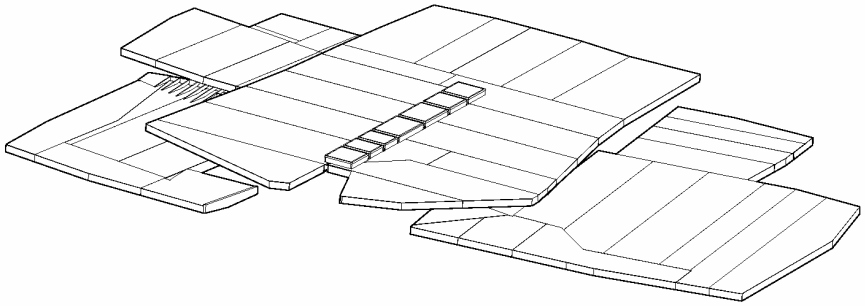

GRID NORTH
TRUE NORTH
MAGNETIC NORTH
decl. = -14.5
W
E
S
FIREWOOD STORAGE
31'-1 3/8"
11'-0 15/16"
8'-7 1/8"
11'-5 5/16"
12'-0"
16'-0"
COVERED STORAGE
OFFICE
EQUIPMENT
KITCHEN
OUTDOOR MUD
MUD
12'-0"
10'-6 7/8"
UNISEX
UNISEX
ADA
6'-2 1/4"
22'-0"
HIGH TRANSOM
HIGH TRANSOM
HIGH TRANSOM
TRANSOM ABOVE
14'-50"
96X84
36'-7 1/2"
ENERGY MONITORING STATION
60X84
26'-6"
44'-0"
10'-0"
DISPLAY
DISPLAY
BOOKS
CLEARING
23'-11 3/4"
SCREEN IN DOOR
CLEAN
WET
SCIENCE
28'-0"
41'-2 3/8"
HUMANITIES
DN
SUNSPACE
-14"
BENCH
TRANSOM ABOVE
WHITE BOARD PRESSED IN WALL BEHIND DOOR
WHITE BOARD
SEMINAR
135.00°
WHITE BOARD
TRANSOM ABOVE
READING BENCH
14'-0"
16'-0"

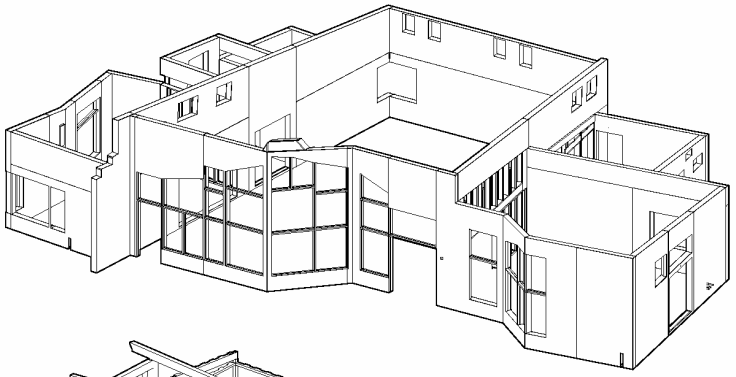


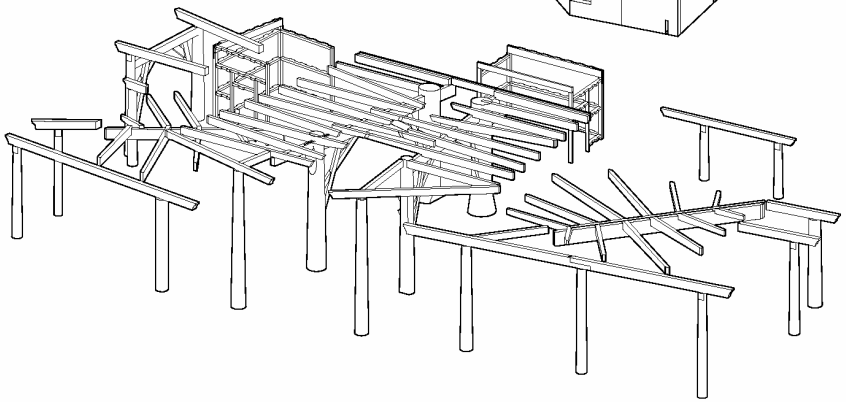
ACADEMY

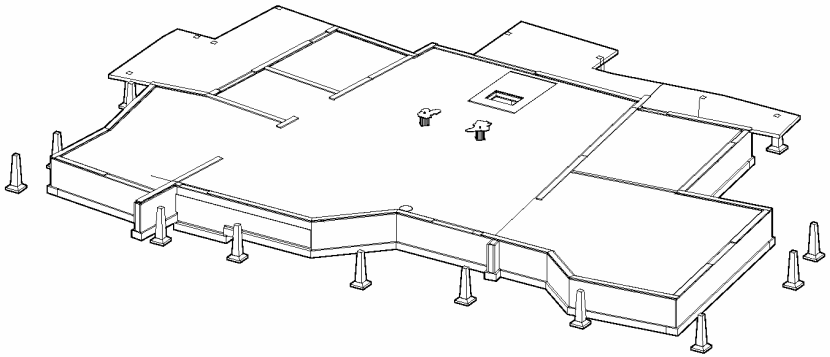
CAMPUS

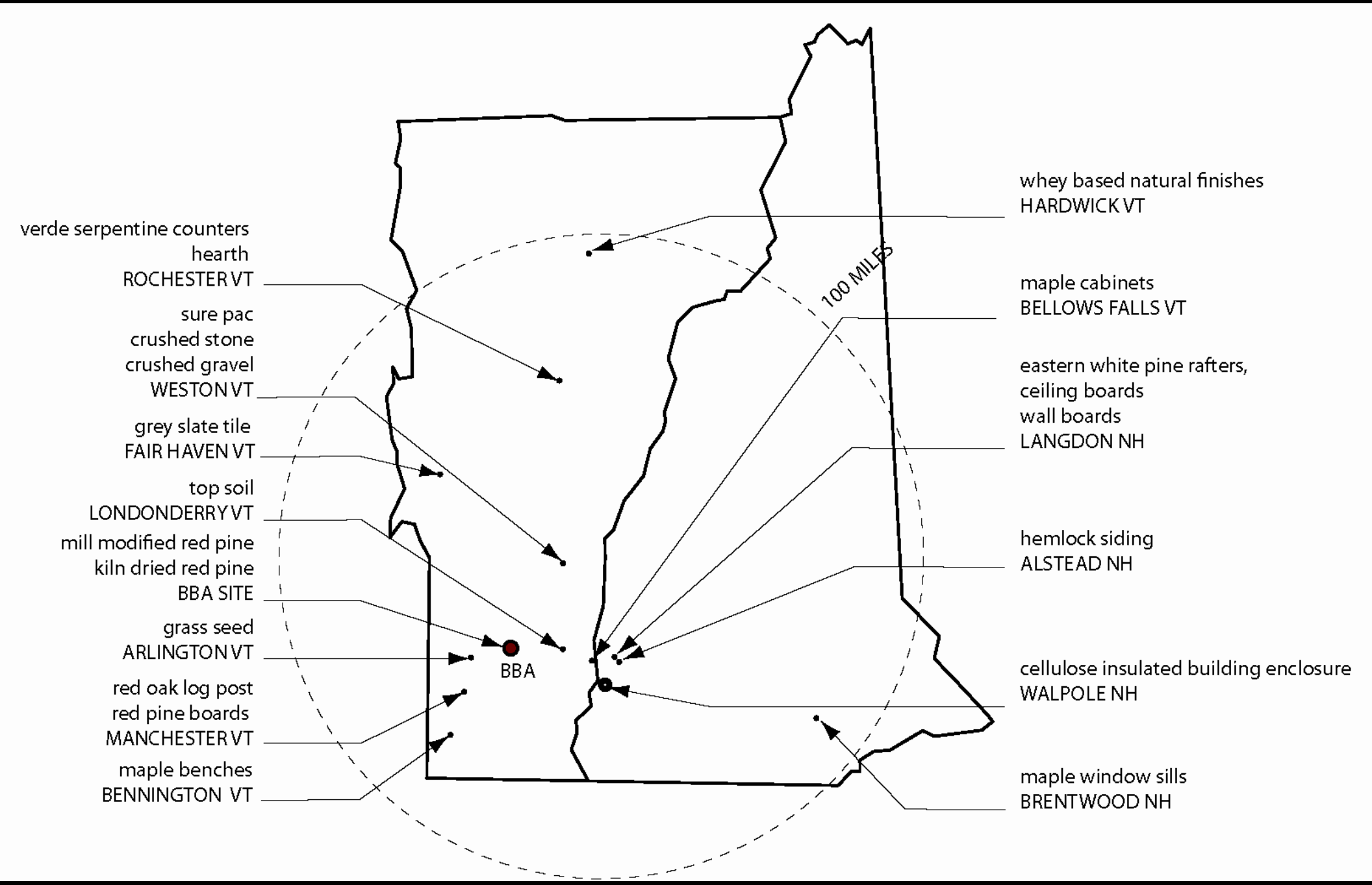











verde serpentine counters
hearth
ROCHESTER VT
sure pac
crushed stone
crushed gravel
WESTON VT
grey slate tile
FAIR HAVEN VT
top soil
LONDONDERRY VT
mill modified red pine
kiln dried red pine
BBA SITE
grass seed
ARLINGTON VT
red oak log post
red pine boards
MANCHESTER VT
maple benches
BENNINGTON VT
BBA
100 MILES
whey based natural finishes
HARDWICK VT
maple cabinets
BELLOWS FALLS VT
eastern white pine rafters,
ceiling boards
wall boards
LANGDON NH
hemlock siding
ALSTEAD NH
cellulose insulated building enclosure
WALPOLE NH
maple window sills
BRENTWOOD NH

LEED Certification Review Report

This report contains the results of the technical review of an application for LEED® certification submitted for the specified project. LEED certification is an official recognition that a project complies with the requirements prescribed within the LEED rating systems as created and maintained by the U.S. Green Building Council® (USGBC®). The LEED certifcation program is administered by the Green Building Certification Institute (GBCI®).

Burr and Burton Academy Mountain Campus

Project ID	1000022071
Rating system & version	LEED-NC v2009
Project registration date	02/01/2012

CERTIFIED SILVER GOLD PLATINUM

Certified (Platinum)

CERTIFIED: 40-49, SILVER: 50-59, GOLD: 60-79, PLATINUM: 80+

LEED FOR NEW CONSTRUCTION & MAJOR RENOVATIONS (V2009)

ATTEMPTED: 83, DENIED: 0, PENDING: 0, AWARDED: 83 OF 110 POINTS

SUSTAINABLE SITES — 11 OF 26

SSp1 Construction Activity Pollution Prevention	Y
SSc1 Site Selection	0 / 1
SSc2 Development Density and Community Connectivity	0 / 5
SSc3 Brownfield Redevelopment	0 / 1
SSc4.1Alternative Transportation-Public Transportation Access	0 / 6
SSc4.2Alternative Transportation-Bicycle Storage and Changing Rooms	0 / 1
SSc4.3Alternative Transportation-Low-Emitting and Fuel-Efficient Vehicles	3 / 3
SSc4.4Alternative Transportation-Parking Capacity	2 / 2
SSc5.1Site Development-Protect or Restore Habitat	1 / 1
SSc5.2Site Development-Maximize Open Space	1 / 1
SSc6.1Stormwater Design-Quantity Control	0 / 1
SSc6.2Stormwater Design-Quality Control	1 / 1
SSc7.1Heat Island Effect, Non-Roof	1 / 1
SSc7.2Heat Island Effect-Roof	1 / 1
SSc8 Light Pollution Reduction	1 / 1

WATER EFFICIENCY — 10 OF 10

WEp1 Water Use Reduction-20% Reduction	Y
WEc1 Water Efficient Landscaping	4 / 4
WEc2 Innovative Wastewater Technologies	2 / 2
WEc3 Water Use Reduction	4 / 4

ENERGY AND ATMOSPHERE — 33 OF 35

EAp1 Fundamental Commissioning of the Building Energy Systems	Y
EAp2 Minimum Energy Performance	1 / 0
EAp3 Fundamental Refrigerant Mgmt	1 / 0
EAc1 Optimize Energy Performance	19 / 19
EAc2 On-Site Renewable Energy	7 / 7
EAc3 Enhanced Commissioning	2 / 2
EAc4 Enhanced Refrigerant Mgmt	0 / 2
EAc5 Measurement and Verification	3 / 3
EAc6 Green Power	2 / 2

MATERIALS AND RESOURCES — 6 OF 14

MRp1 Storage and Collection of Recyclables	Y
MRc1.1Building Reuse-Maintain Existing Walls, Floors and Roof	0 / 3
MRc1.2Building Reuse, Maintain 50% of Interior	0 / 1
MRc2 Construction Waste Mgmt	2 / 2
MRc3 Materials Reuse	1 / 2
MRc4 Recycled Content	1 / 2

MATERIALS AND RESOURCES — CONTINUED

MRc5 Regional Materials	2 / 2
MRc6 Rapidly Renewable Materials	0 / 1
MRc7 Certified Wood	0 / 1

INDOOR ENVIRONMENTAL QUALITY — 14 OF 15

IEQp1 Minimum IAQ Performance	Y
IEQp2 Environmental Tobacco Smoke (ETS) Control	1 / 0
IEQc1 Outdoor Air Delivery Monitoring	1 / 1
IEQc2 Increased Ventilation	0 / 1
IEQc3.1Construction IAQ Mgmt Plan-During Construction	1 / 1
IEQc3.2Construction IAQ Mgmt Plan-Before Occupancy	1 / 1
IEQc4.1Low-Emitting Materials-Adhesives and Sealants	1 / 1
IEQc4.2Low-Emitting Materials-Paints and Coatings	1 / 1
IEQc4.3Low-Emitting Materials-Flooring Systems	1 / 1
IEQc4.4Low-Emitting Materials-Composite Wood and Agrifiber Products	1 / 1
IEQc5 Indoor Chemical and Pollutant Source Control	1 / 1
IEQc6.1Controllability of Systems-Lighting	1 / 1
IEQc6.2Controllability of Systems-Thermal Comfort	1 / 1
IEQc7.1Thermal Comfort-Design	1 / 1
IEQc7.2Thermal Comfort-Verification	1 / 1
IEQc8.1Daylight and Views-Daylight	1 / 1
IEQc8.2Daylight and Views-Views	1 / 1

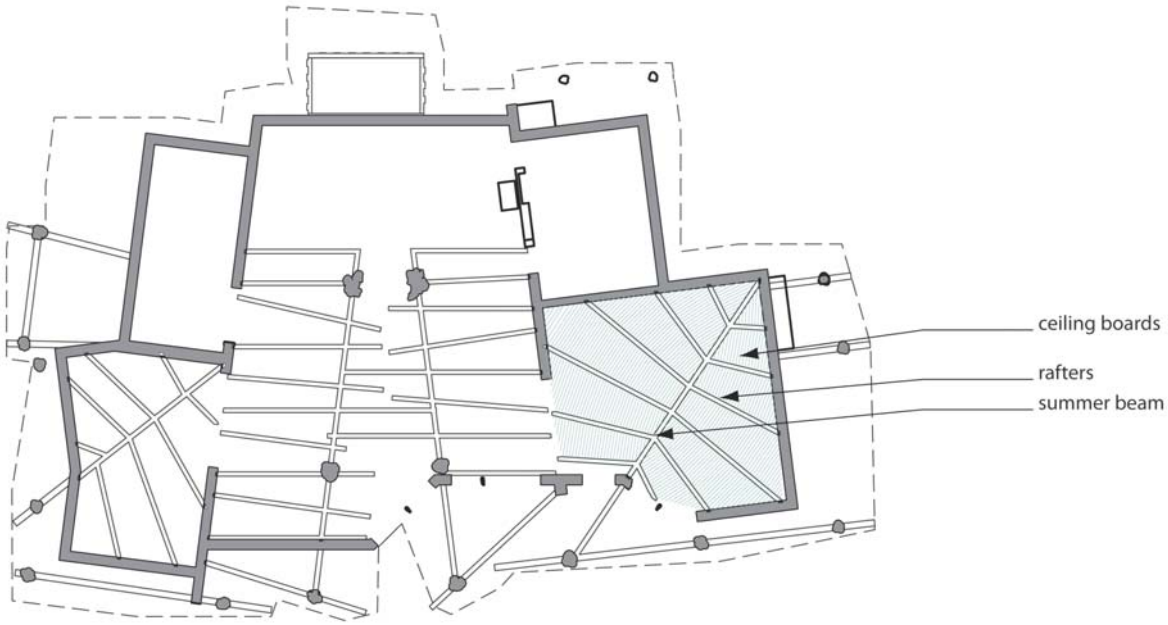
INNOVATION IN DESIGN — 6 OF 6

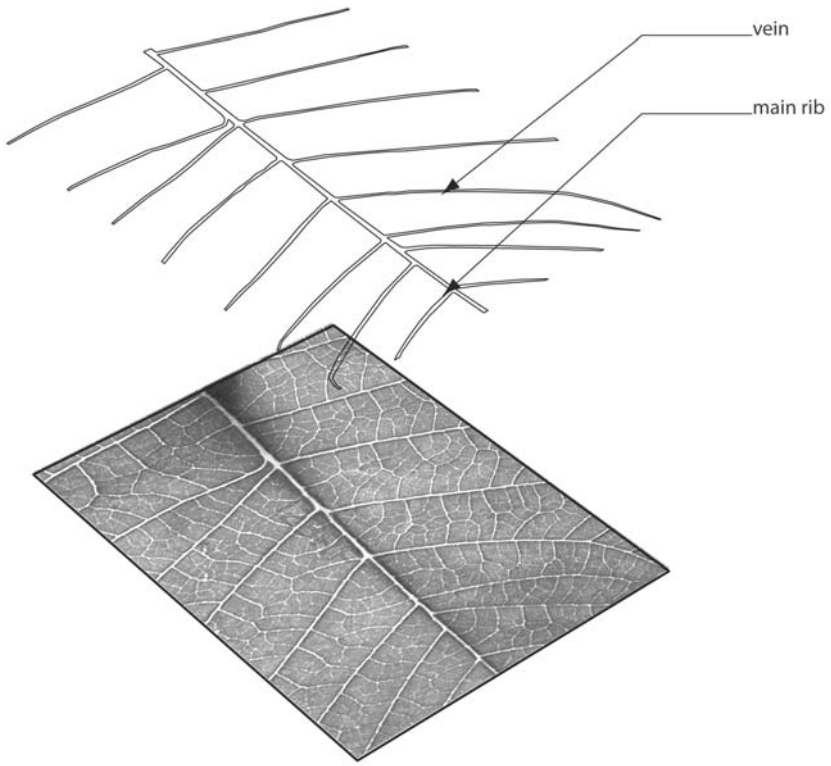
IDc1.1 Innovation in Design	1 / 1
IDc1.1 Innovation in Design	0 / 1
IDc1.2 Innovation in Design	0 / 1
IDc1.2 Innovation in Design	1 / 1
IDc1.3 Innovation in Design	0 / 1
IDc1.3 Innovation in Design	1 / 1
IDc1.4 Innovation in Design	1 / 1
IDc1.4 Innovation in Design	0 / 1
IDc1.5 Innovation in Design	0 / 1
IDc1.5 Innovation in Design	1 / 1
IDc2 LEED® Accredited Professional	1 / 1

REGIONAL PRIORITY CREDITS — 3 OF 4

SSc2 Development Density and Community Connectivity	0 / 1
SSc3 Brownfield Redevelopment	0 / 1
SSc6.2 Stormwater Design-Quality Control	1 / 1
WEc2 Innovative Wastewater Technologies	1 / 1
EAc2 On-Site Renewable Energy	1 / 1
MRc1.1Building Reuse-Maintain Existing Walls, Floors and Roof	0 / 1

TOTAL — **83 OF 110**

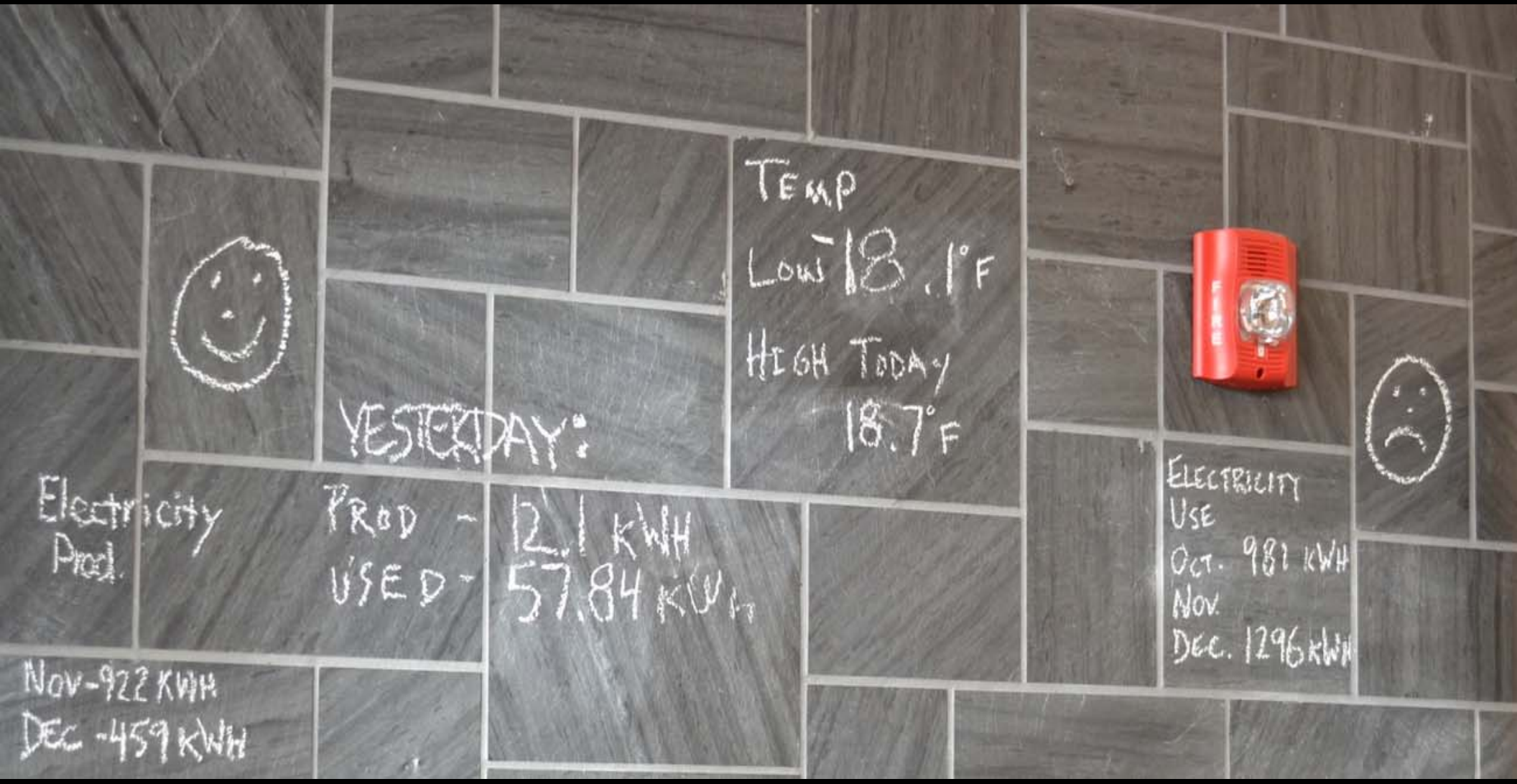

ceiling boards
rafters
summer beam


vein
main rib

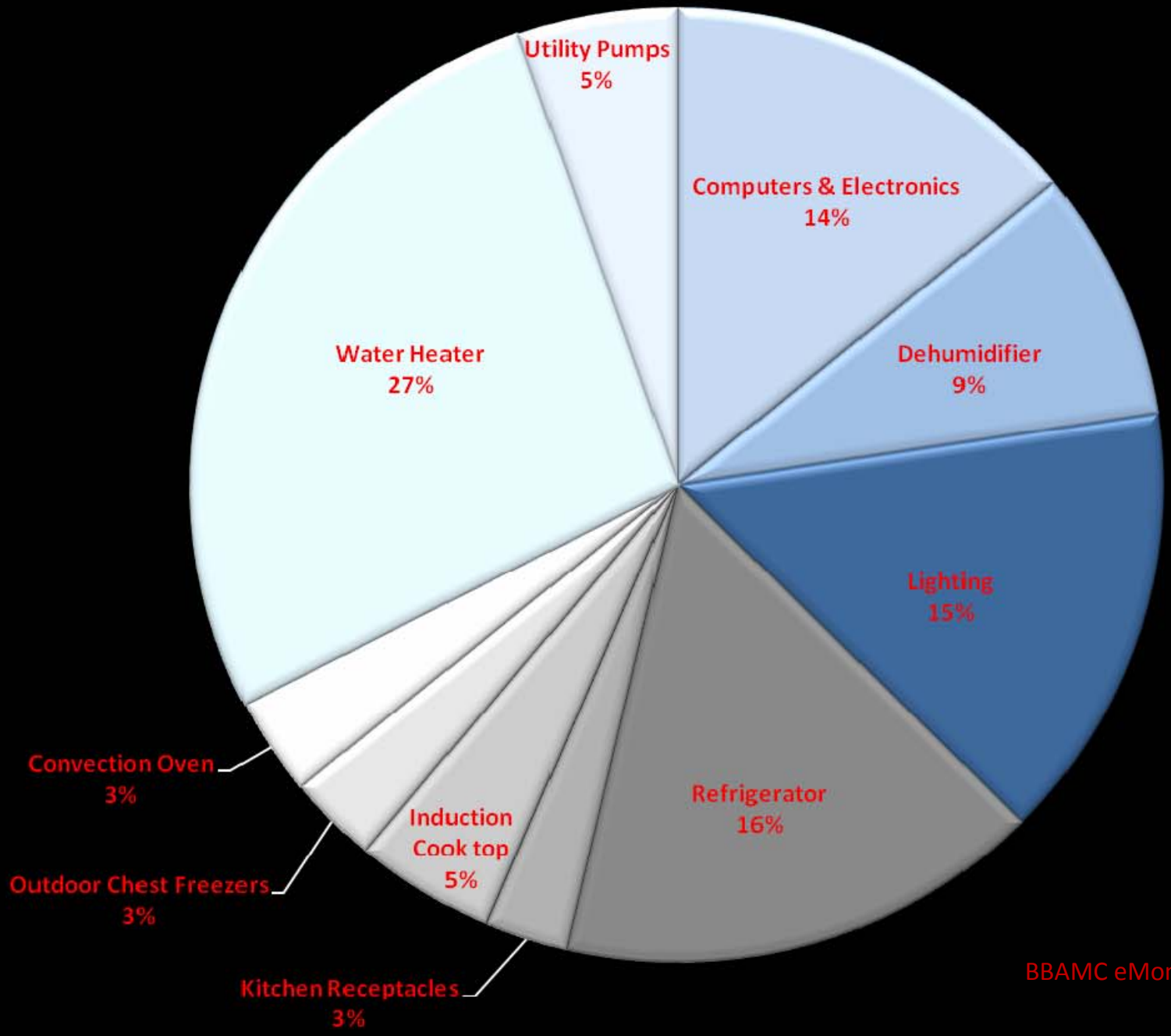

8x4 11/4x2
8x4 11/4x2
8x4 11/4x2


EXIT


NES Rentals
NES Rentals


TEMP
LOW -18.1°F
HIGH TODAY
18.7°F
YESTERDAY:
Electricity Prod.
PROD - 12.1 KWH
USED - 57.84 KWH
NOV-922 KWH
DEC-459 KWH
ELECTRICITY USE
OCT. 981 KWH
NOV.
DEC. 1296 KWH

Electrical Consumption



BBAMC eMonitor data, 2013


RESERVED
CARPOOL
AND
VANPOOL
PARKING
ONLY
RESERVED
CARPOOL
AND
VANPOOL
PARKING
ONLY
DAIKIN
VRV III-S
R410A
DAIKIN
R410A


DG-700 Pressure & Flow Gauge
DEVICE
CONFIG
MODE
TIME AVG
DEVICE
UNITS
CONFIG
MODE
CLEAR
TIME AVG
BASE LINE
START
ENTER
ON/ OFF
LIGHT
HOLD
INPUT
A
REF
B
REF
The ENERGY CONSERVATORY
DIAGNOSTIC TOOLS TO MEASURE BUILDING PERFORMANCE
LOW
HIGH
OFF


ZIPsystem
ESR #1473,
ESR #1474,
ESR #2227.


RF J01


Makita


MAXIMUM LOADING LEVEL
800-847-5303
MAXIMUM LOADING LEVEL
603-352-7177
800-399-7969
MAXIMUM LOADING LEVEL
800-847-5303
CLEAN
WOOD

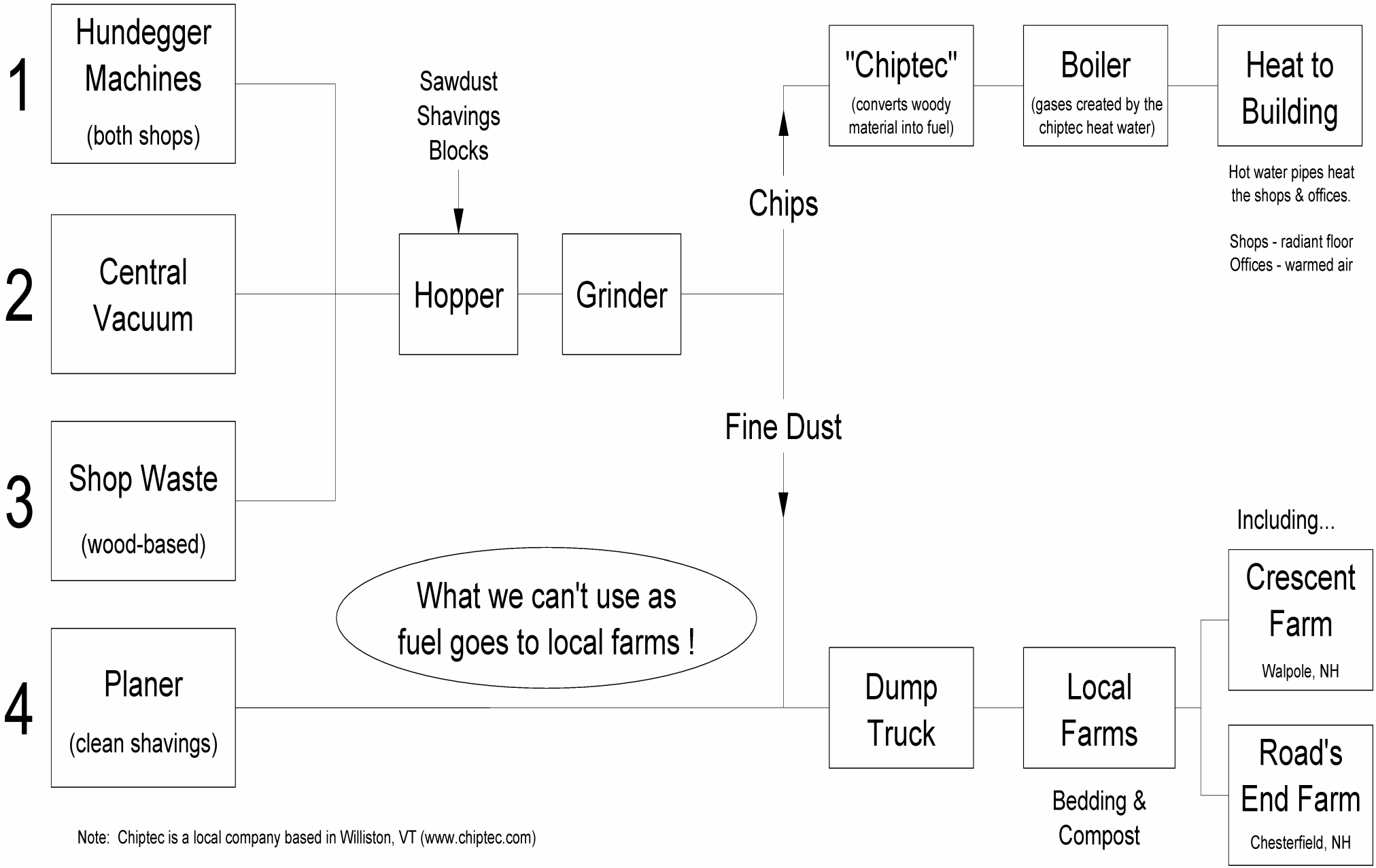

MEZCLA DE CONCRE
Set fast-bearing posts and poles
Pour slabs, steps, walks and drives
50 lbs. Net
22.7 KG


BBA
~~OSB~~
ONLY

Waste Management for Burr and Burton Mountain Campus

Component	Weight in Pounds	Where did it go?	% Diverted
Huber Zip and OSB	725	Construction Container	WM Ticket # 2281754 83% diverted
Clean wood waste	1100	Stored on Site for Heating	100%
Cellulose Bags	52	Price Chopper	100%
Miscellaneous Trash	5	Construction Container	WM Ticket # 2281754 83% diverted
Huber Zip and OSB	705	Construction Container	WM Ticket # 2281754 83% diverted
Hopper full of scraps and trash	1050	Construction Container	WM Ticket # 2281754 83% diverted
Huber Zip and OSB	825	Construction Container	WM Ticket # 2281754 83% diverted
Bark from trees	435	Used for mulch at facility and by employees	100%
Speed Cutter Scraps and Shavings	4000	Stored on Site for Heating	100%
Above is Waste produce during manufacturing, below is Waste produce on site.			
Cardboard Dumpster to be emptied 6/25/2012			100% - per ticket #447657

Convert Shop Waste into Fuel ?

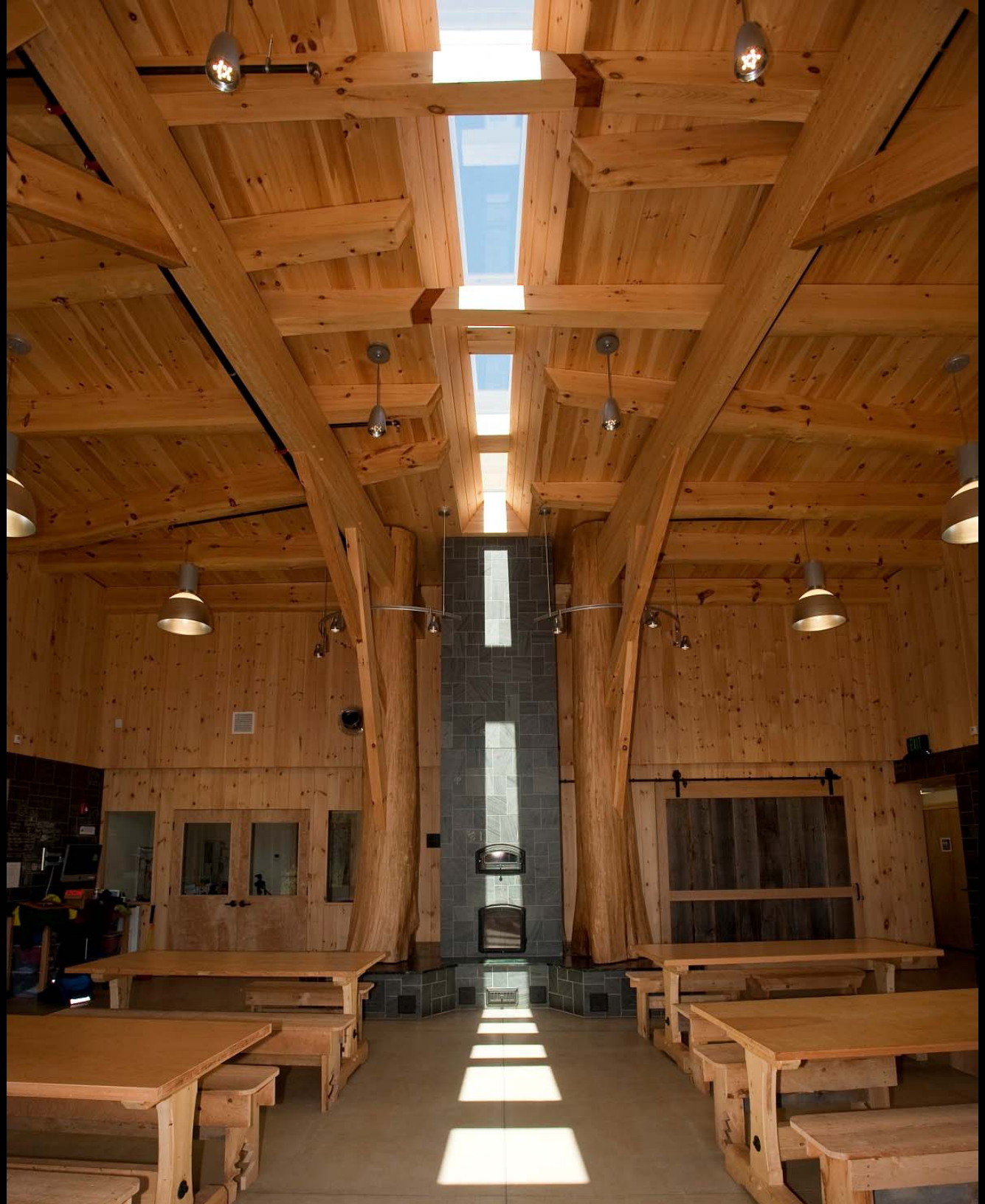


Note: Chiptec is a local company based in Williston, VT (www.chiptec.com)

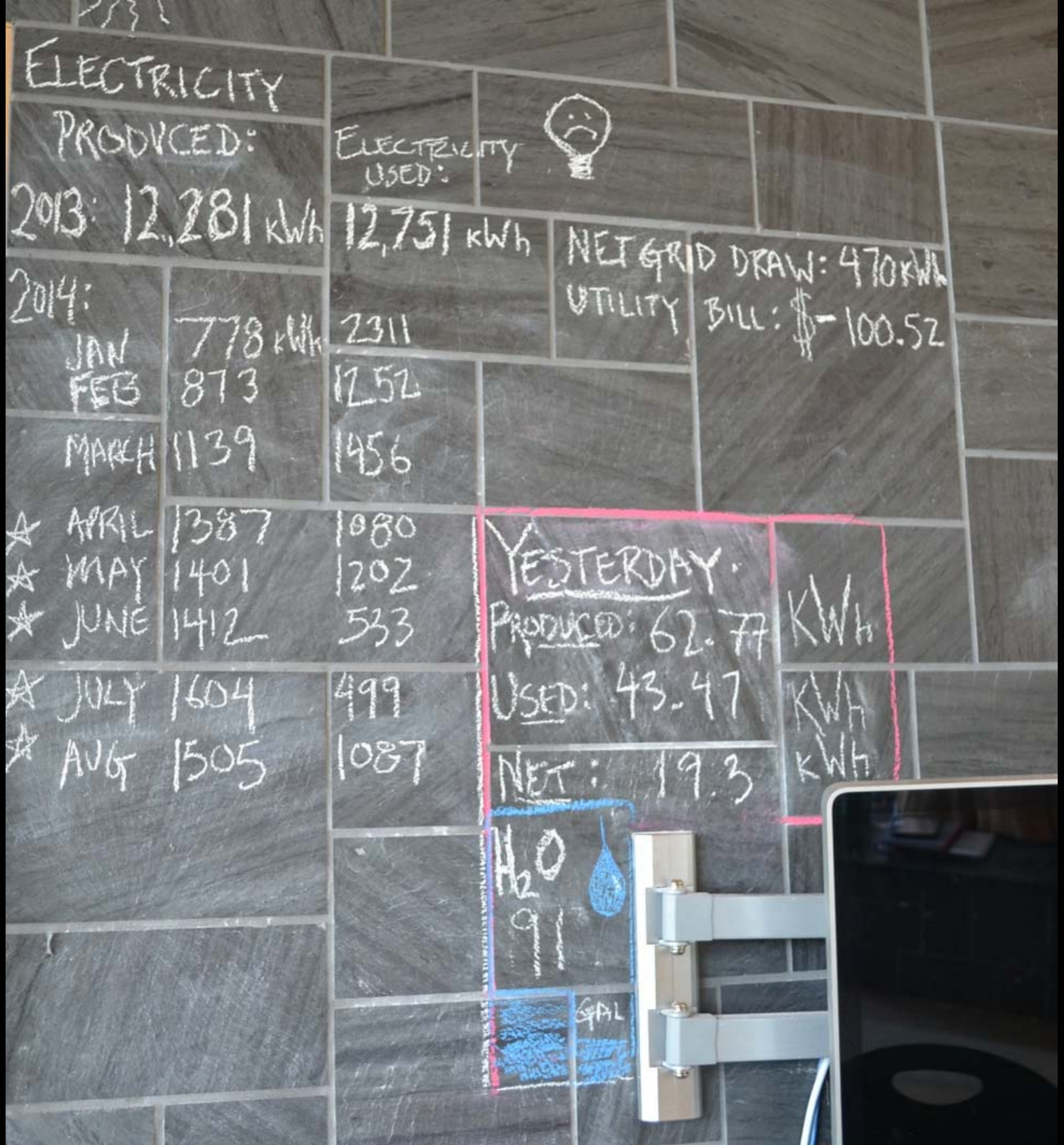

LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN
LEED
PLATINUM
2014
WEATHER
TEMP:
LAST NIGHT LOW: 33.8 °F
8:15 AM: 46.2 °F
PREDICTED HIGH: 59 °F
WITH WIND CHILL:
PRESSURE + TREND:
28.47
SPEED + DIRECTION
0-5 MPH
PRECIPITATION + CLOUD COVER
SUNRISE: 6:31
SUNSET: 7:01
MOON PHASE
WANING
28 DAY
LUNAR CYCLE
NEW
1ST 1/4
FULL
3RD
WAXING CRESCENT
WAXING GIBBOUS
WANING GIBBOUS


EXIT

12:30
12:15
12:20
12:30

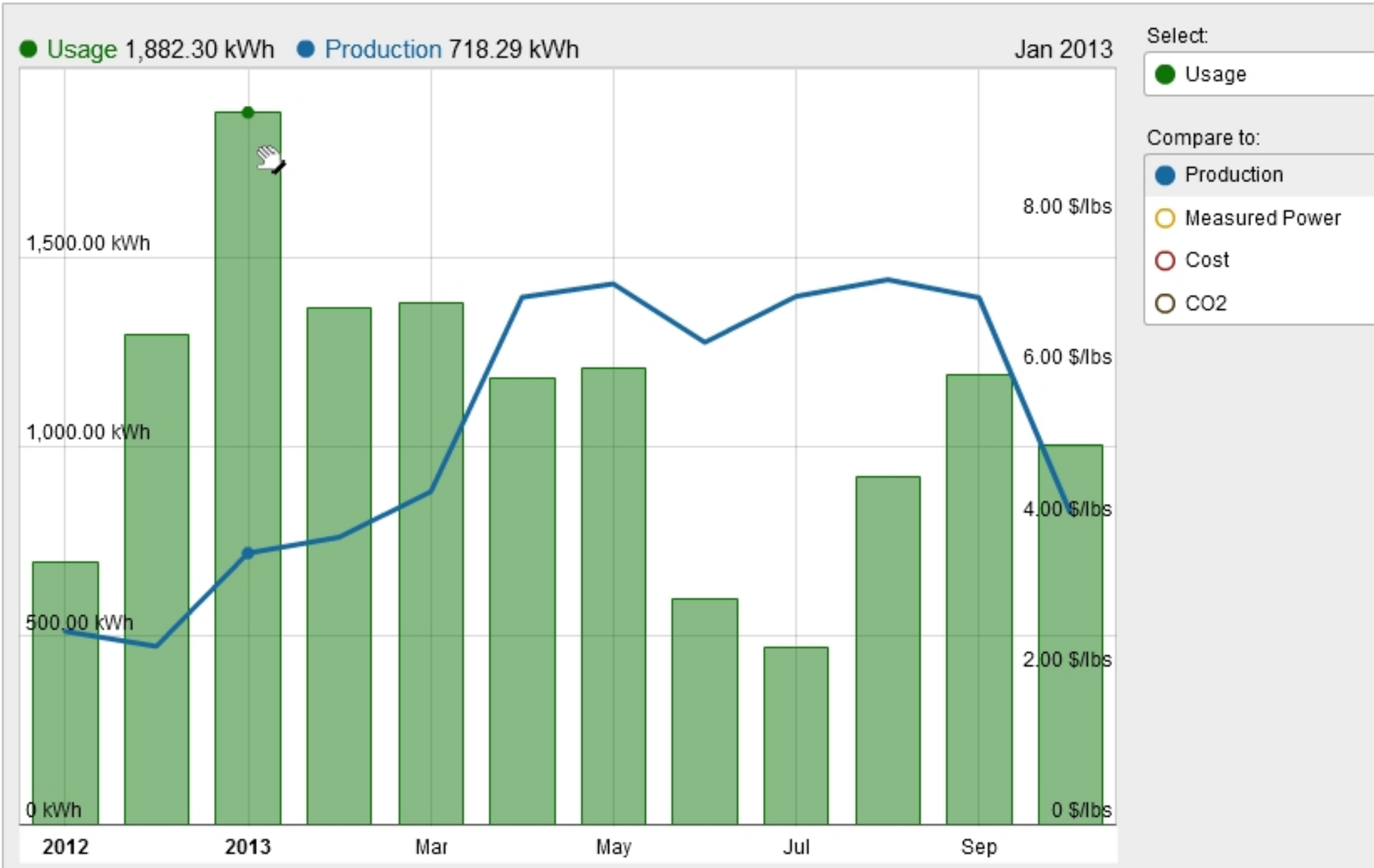



ONE PLACE UNDERSTOOD
HELPS US UNDERSTAND ALL PLACES BETTER

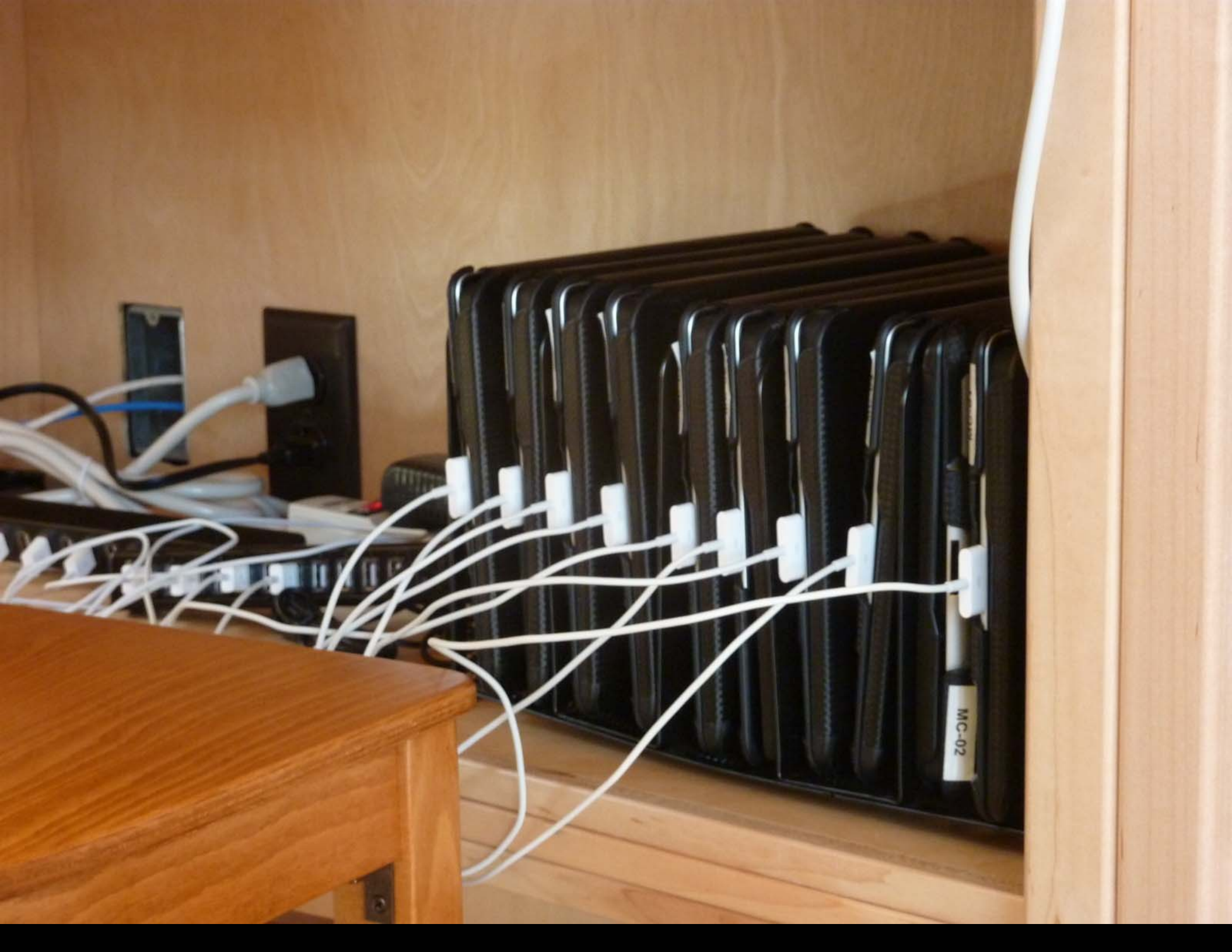

ELECTRICITY
PRODUCED:
ELECTRICITY USED:
2013: 12,281 kWh
12,751 kWh
NET GRID DRAW: 470kWh
UTILITY BILL: $-100.52
2014:
JAN 778 kWh 2311
FEB 873 12.52
MARCH 1139 1456
APRIL 1387 1080
MAY 1401 1202
JUNE 1412 533
JULY 1604 499
AUG 1505 1087
YESTERDAY.
PRODUCED: 62.77 KWh
USED: 43.47 KWh
NET: 19.3 kWh
H2O
91
GAL

Your Energy History

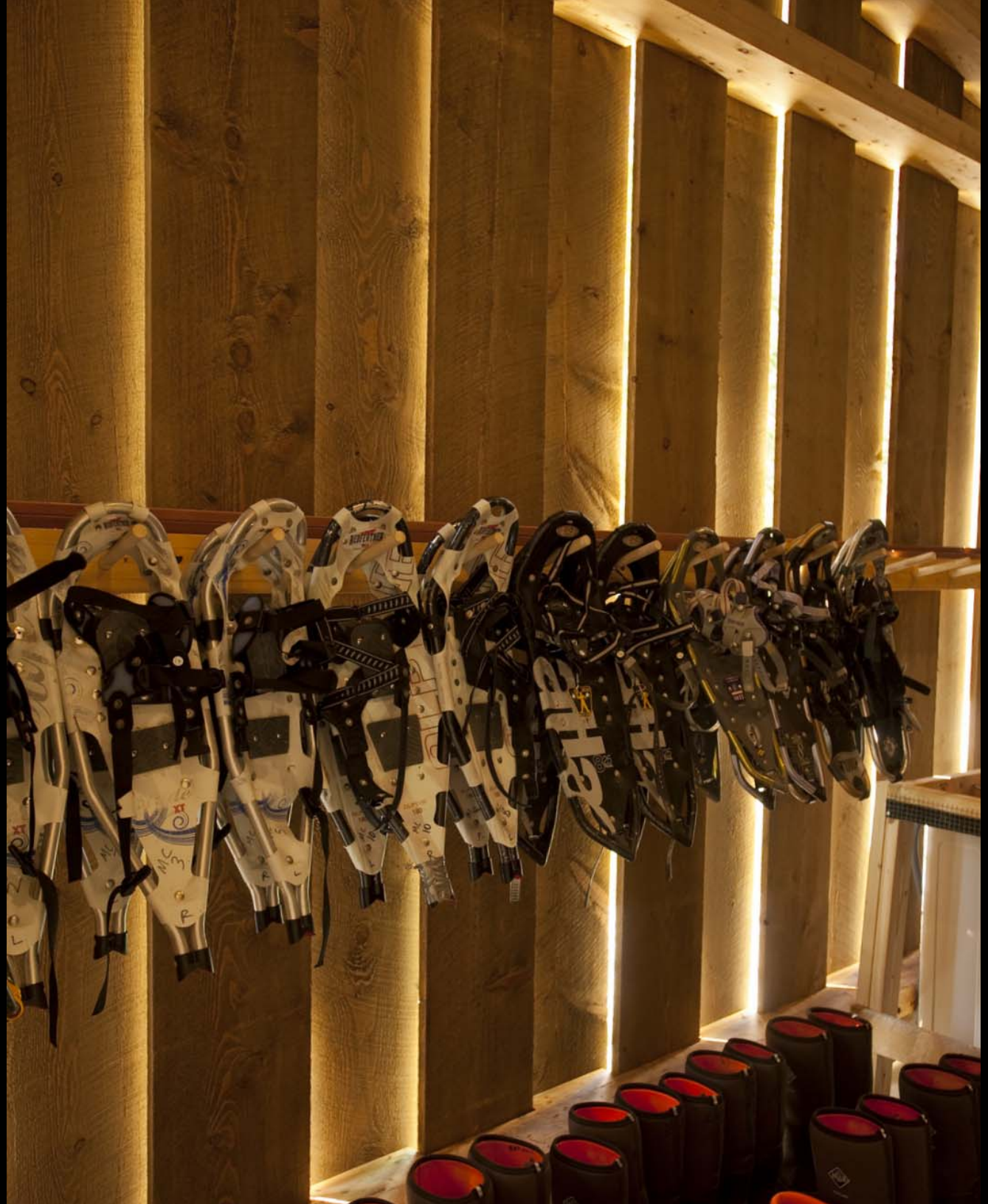
Hint: Click on a month to view that month in days.



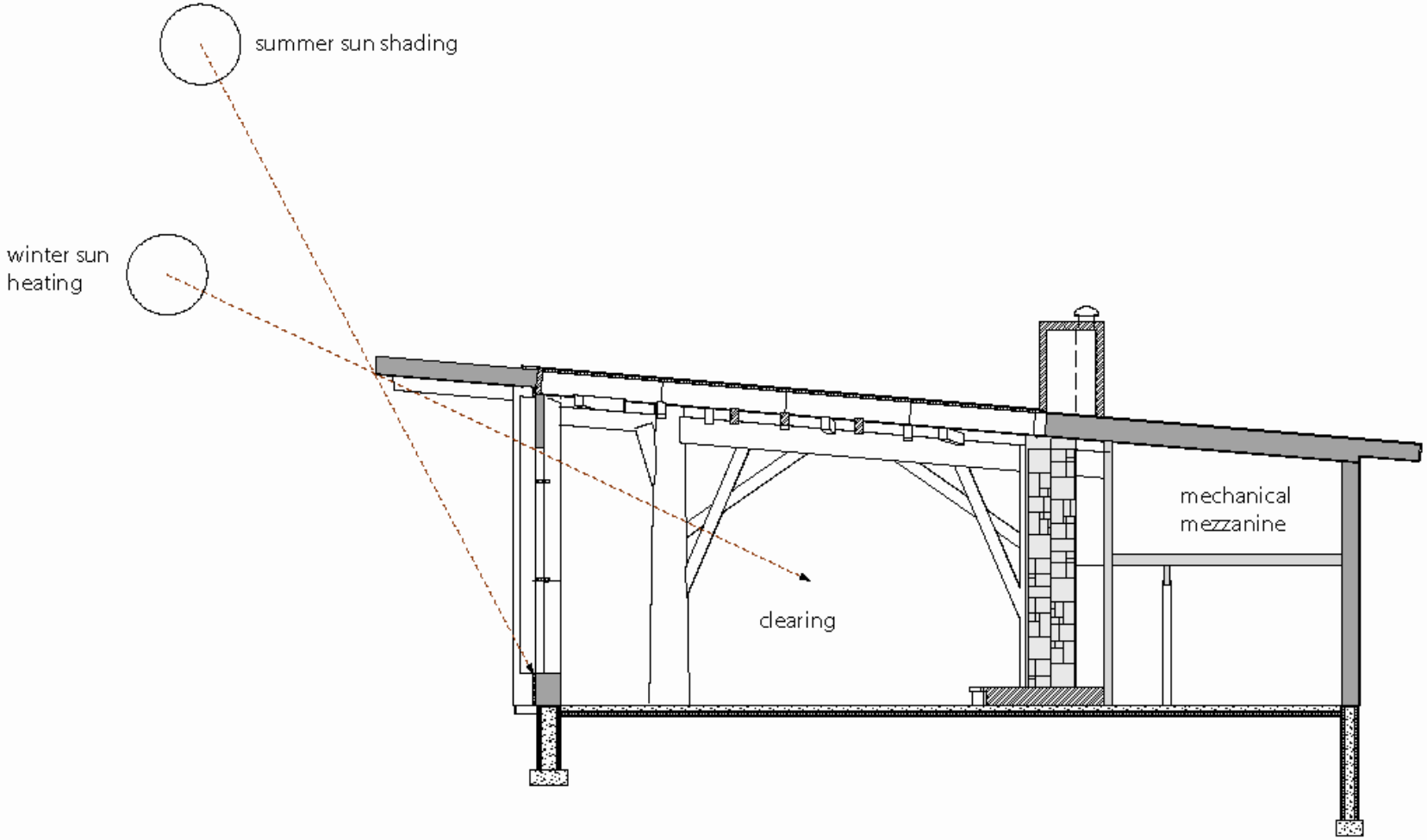

14 FEB
Angel
21
John
Kelleher
T-REX
LEED
PLATINUM
WEATHER
TEMP:
PRESSURE + TREND:
28.21
WIND SPEED + DIRECTION
PRECIPITATION + CLOUD COVER
SUNRISE: 5:47
SUNSET: 8:07
MOON PHASE
63.7
18%

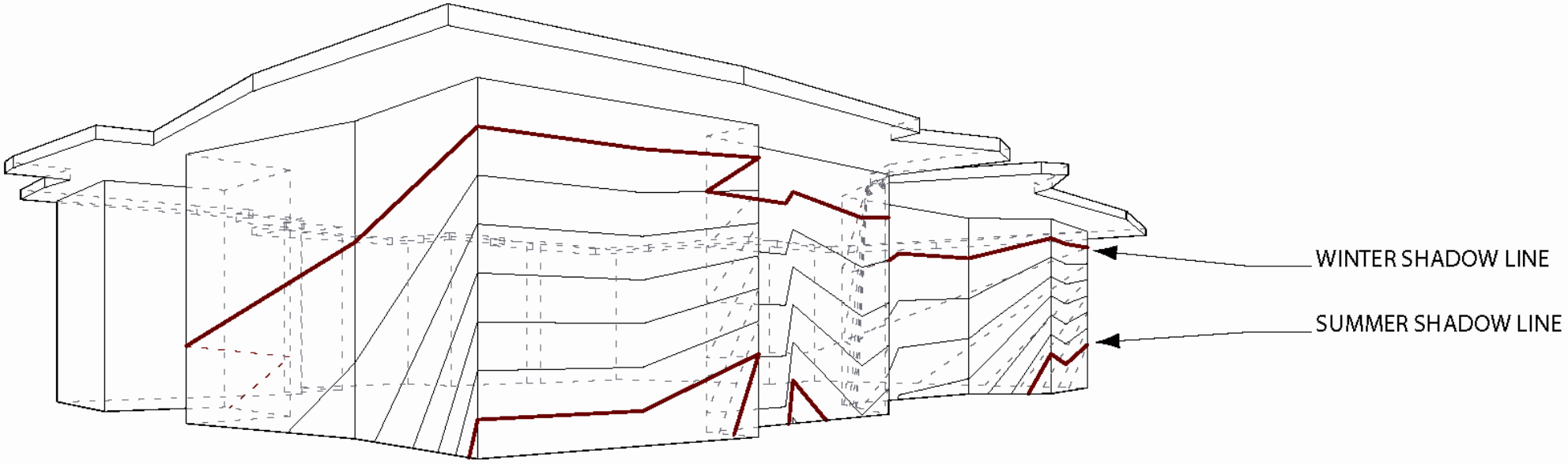

MC-02

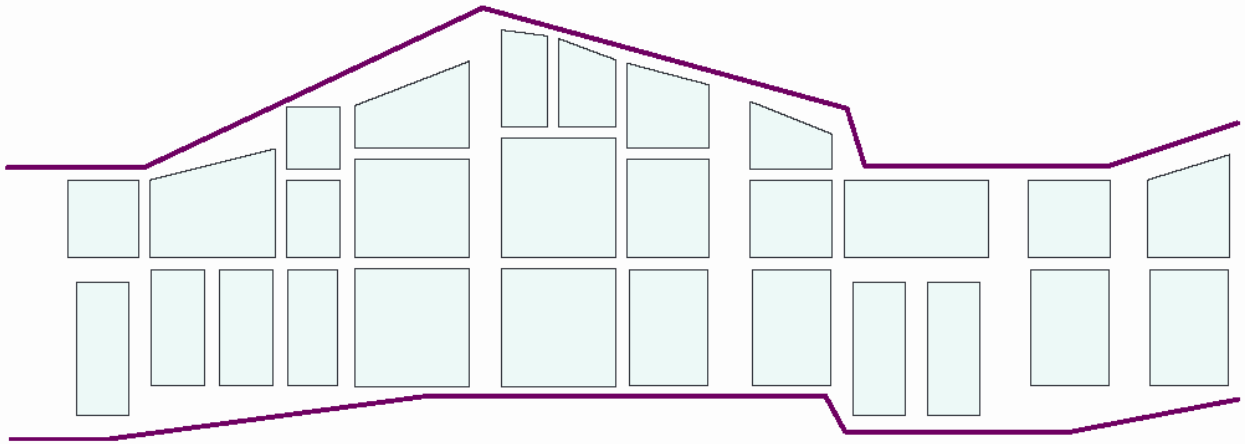

ONE PLACE UNDERSTOOD
HELPS US UNDERSTAND ALL PLACES BETTER



SOUTH FACADE SHADING DIAGRAM




WINTER SHADOW LINE
SUMMER SHADOW LINE

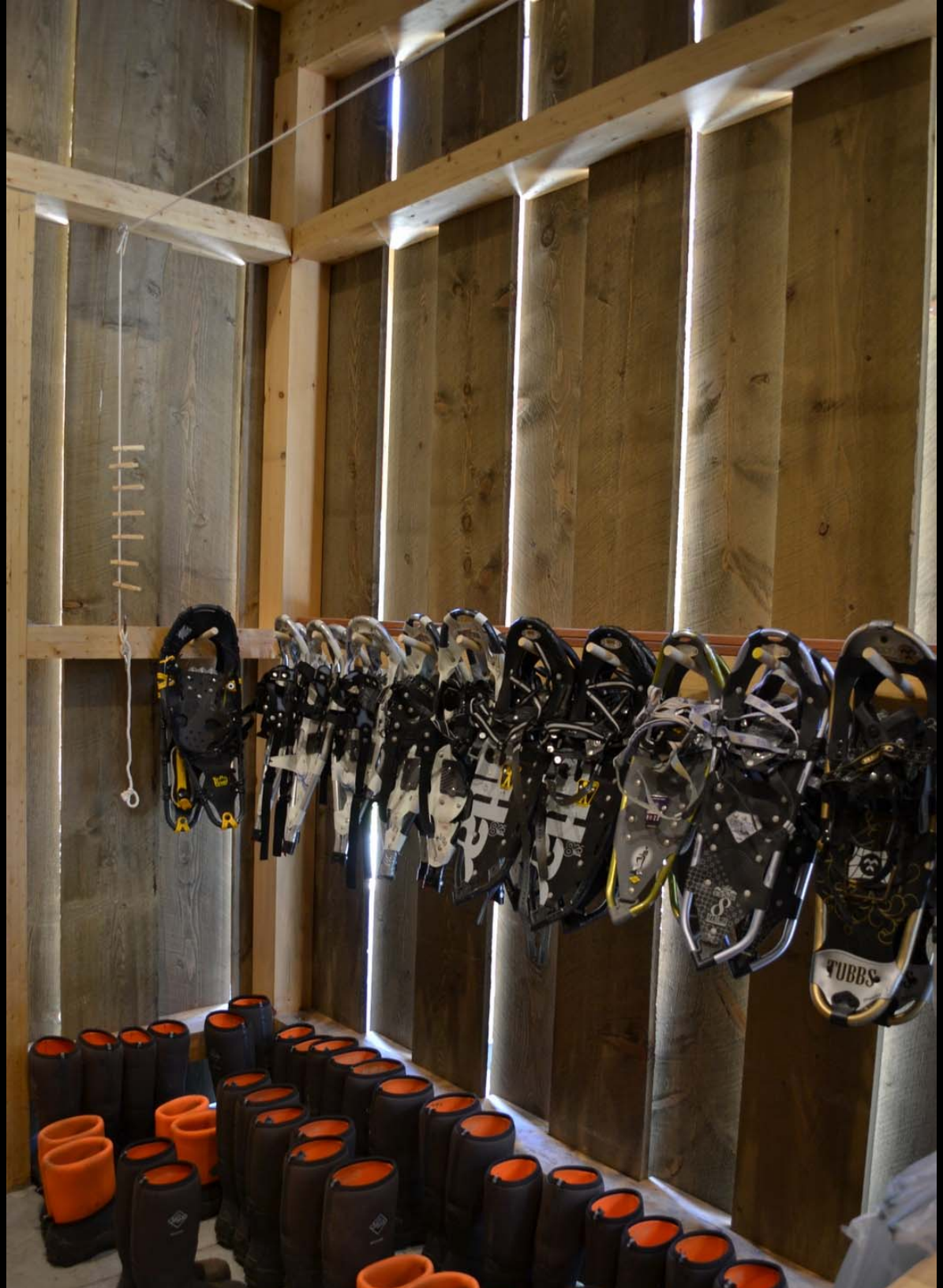


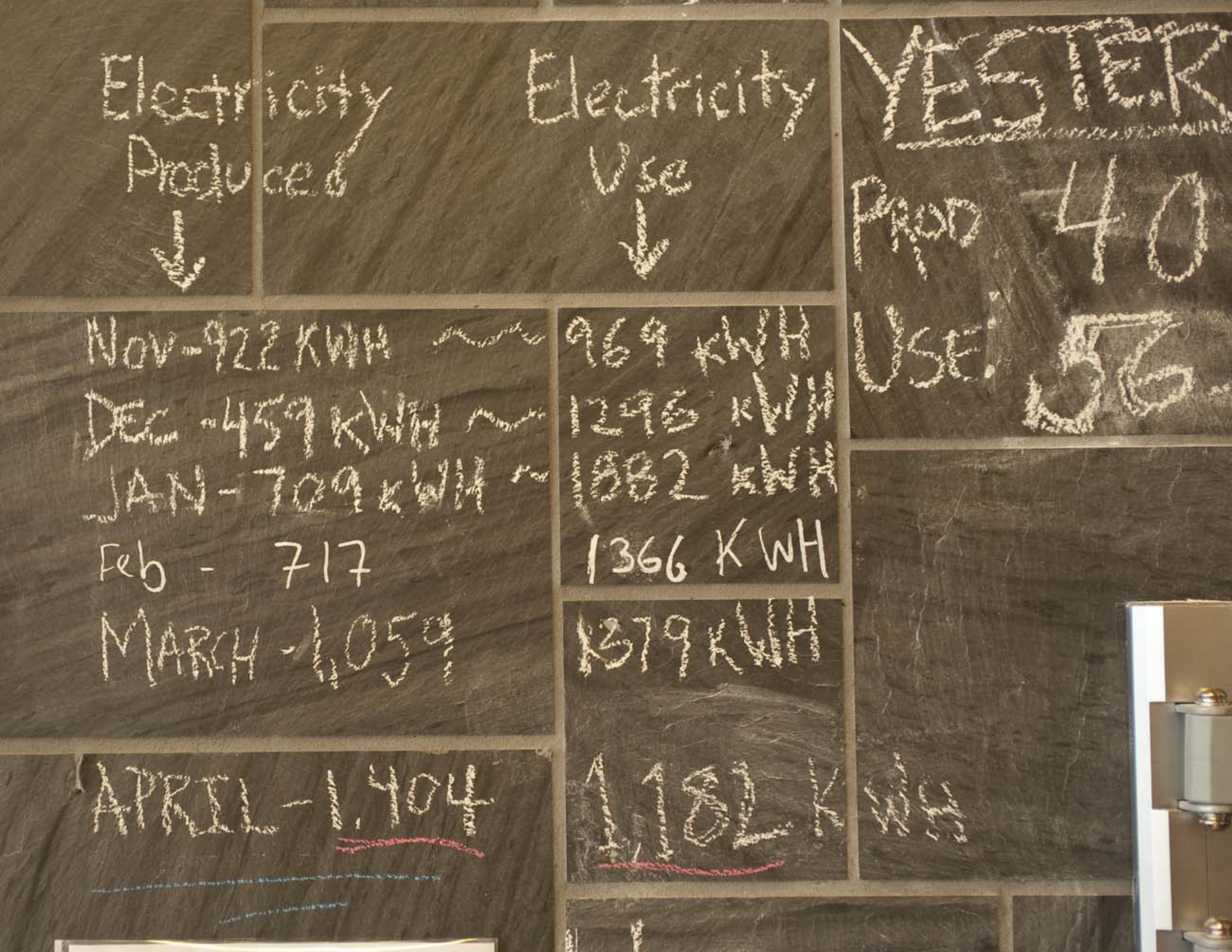

EXIT

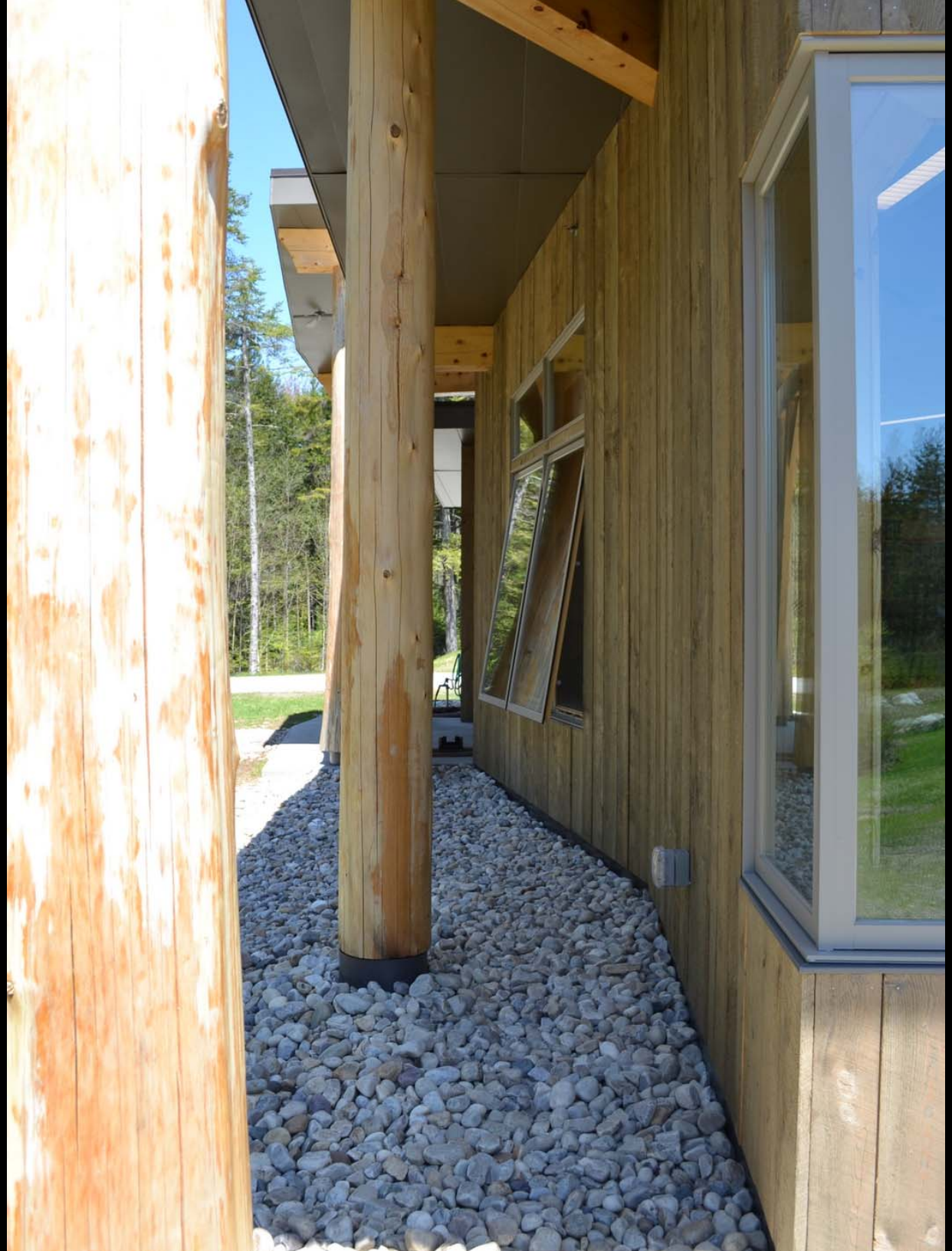

2012

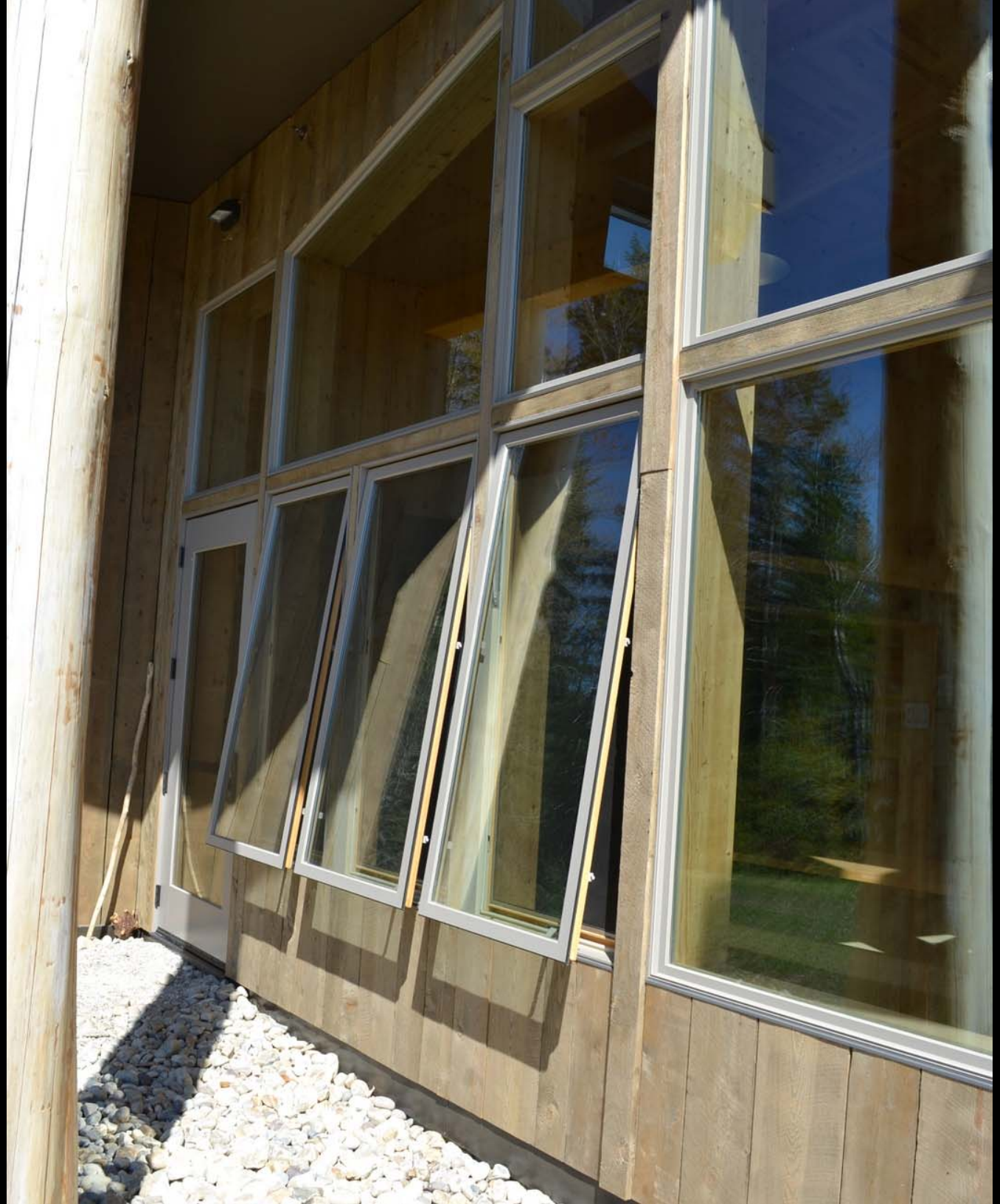

WEIGHTS
LOG

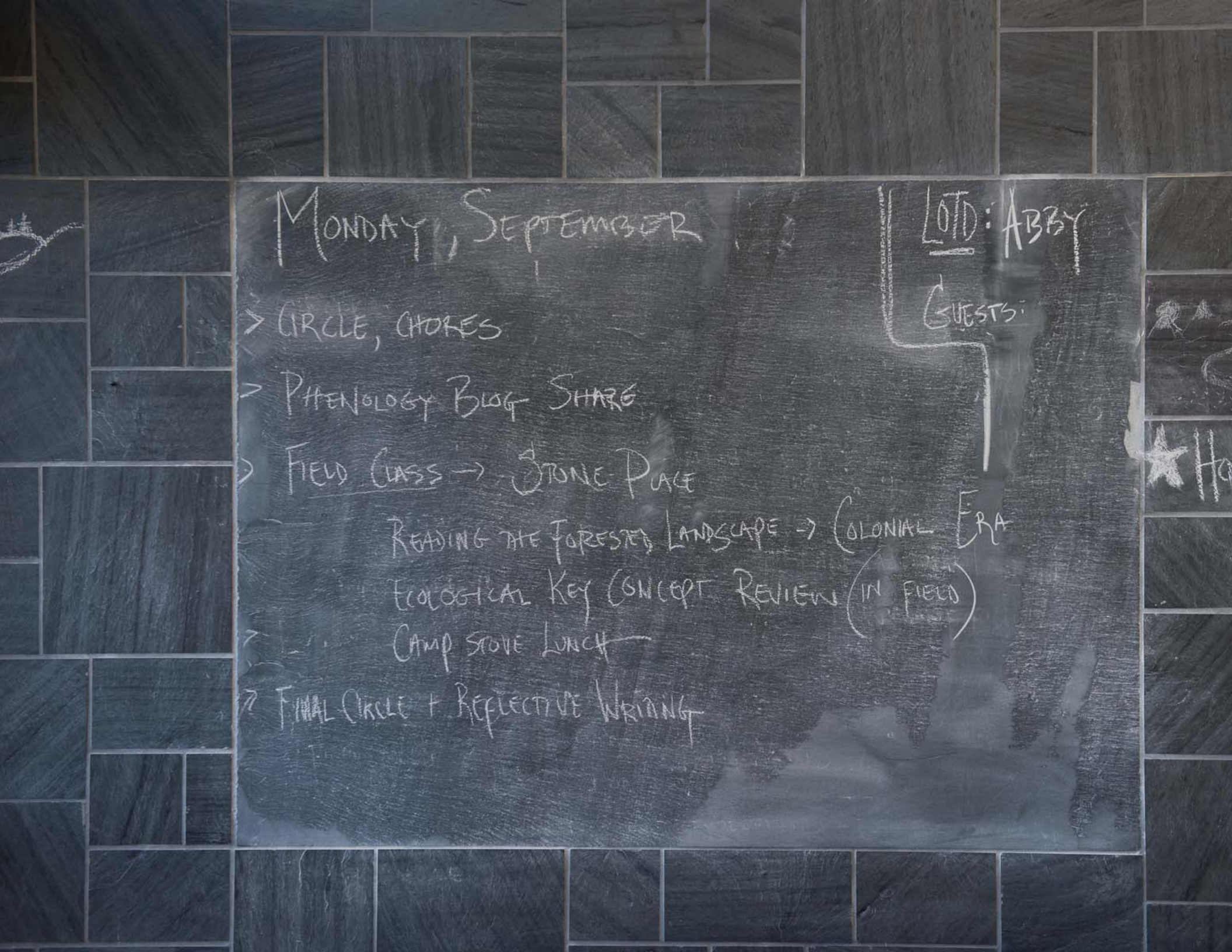

WE ♥ COMPOST


TUBBS


Electricity Produced
Electricity Use
YESTER
PROD 40
USE: 56
Nov-922 KWH
Dec-459 KWH
JAN-709 KWH
Feb - 717
MARCH-1,054
APRIL-1,404
969 KWH
1296 KWH
1882 KWH
1366 KWH
879 KWH
1,182 KWH

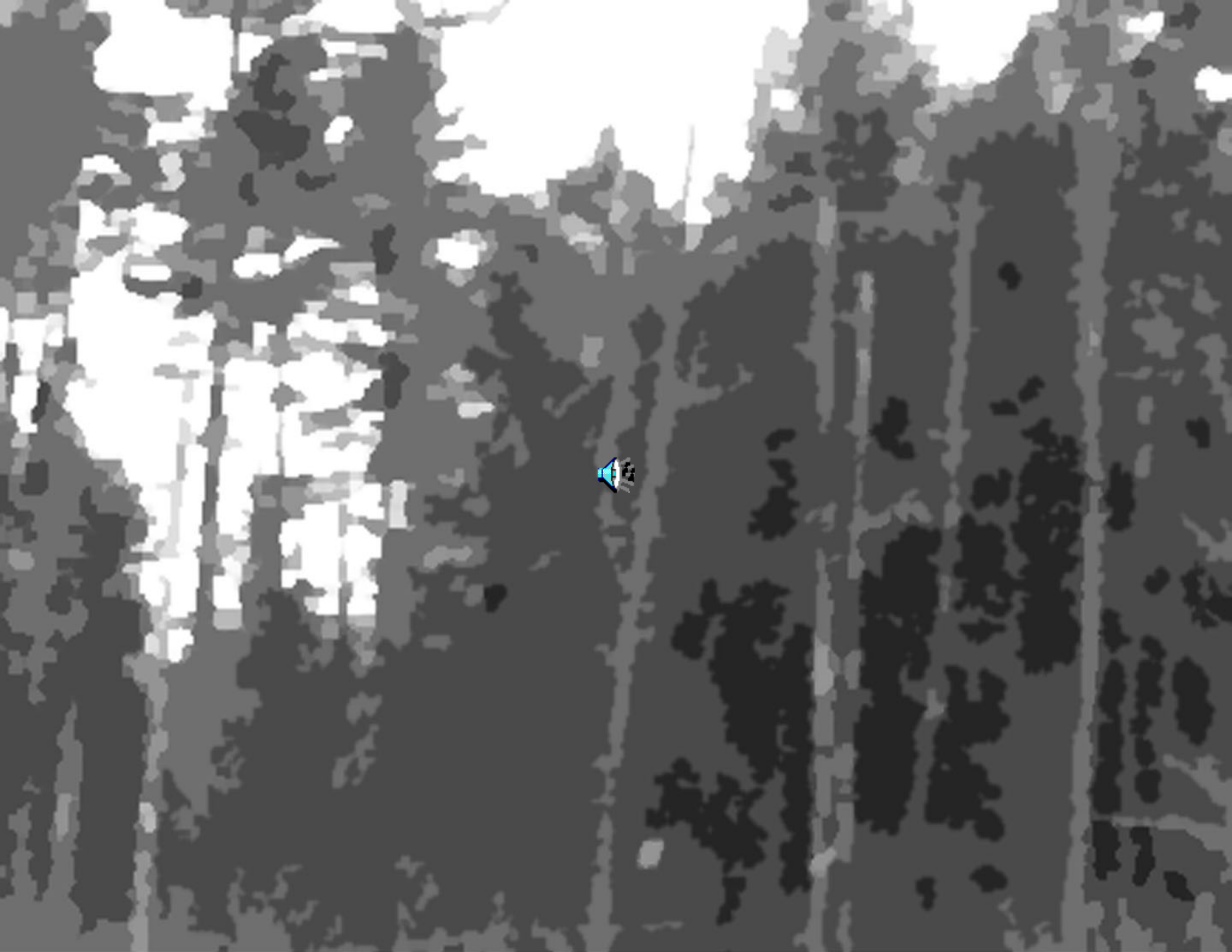





MONDAY, SEPTEMBER
LOTD: ABBY
GUESTS:
> CIRCLE, CHORES
> PHENOLOGY BLOG SHARE
> FIELD CLASS → STONE PLACE
READING THE FORESTED LANDSCAPE → COLONIAL ERA
ECOLOGICAL KEY CONCEPT REVIEW (IN FIELD)
CAMP STOVE LUNCH
> FINAL CIRCLE + REFLECTIVE WRITING


40
60
80
100
140
160
F


VERMONT
YOUTH
CLIMATE
SUMMIT
BURLINGTON
2014



Questions?

This concludes The American Institute of Architects Continuing Education Systems Course

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