

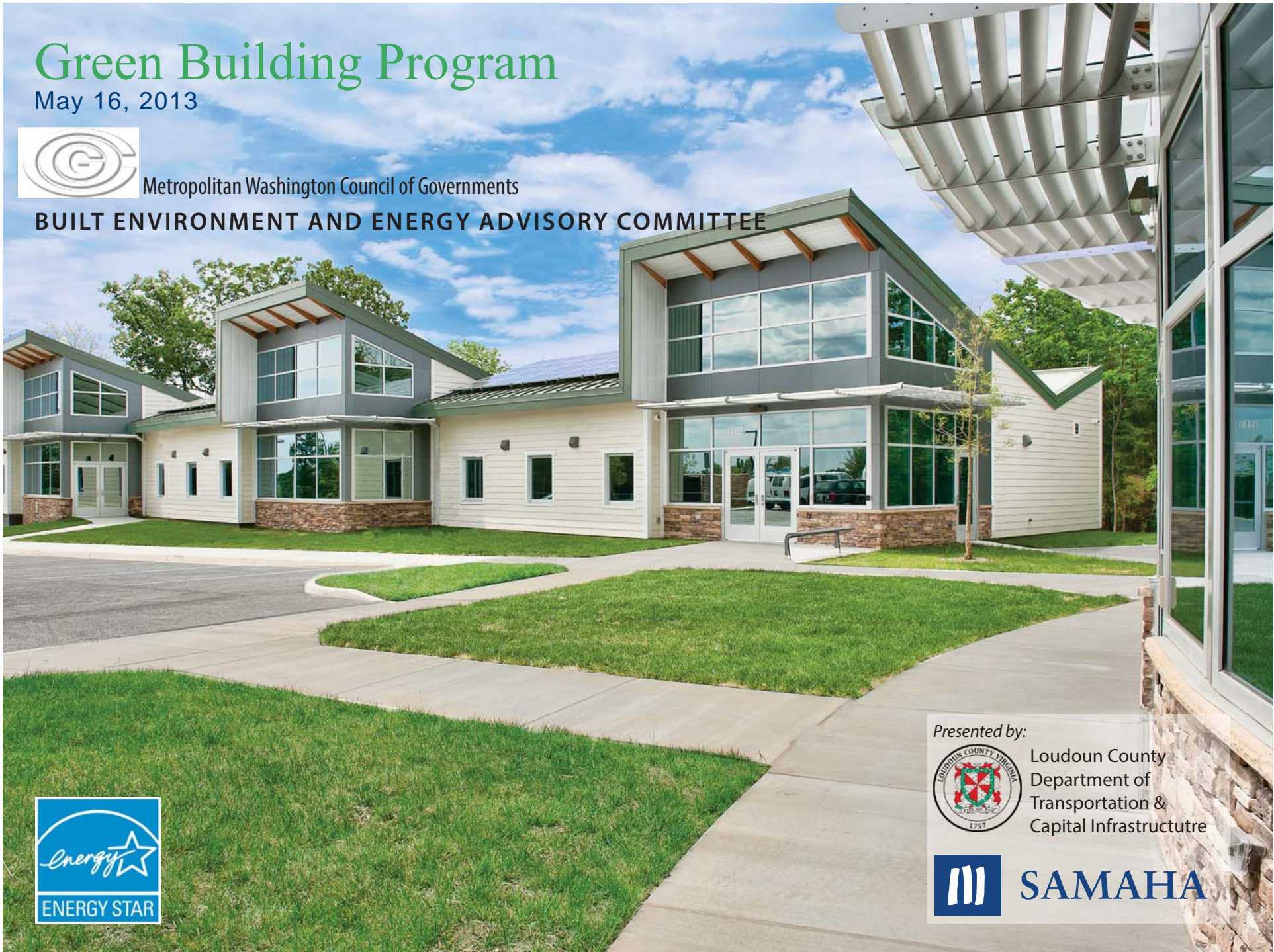
Green Building Program

May 16, 2013



Metropolitan Washington Council of Governments

BUILT ENVIRONMENT AND ENERGY ADVISORY COMMITTEE



Presented by:



Loudoun County
Department of
Transportation &
Capital Infrastructure



SAMAHA

Green Building Guideline

- Green Building Policy & Guideline was established in November 2007
- The Goal is to attain a minimum Silver Certification
- Evaluate & review each projects based on reasonable cost



LEED Buildings

- Bluemont Community Center LEED (Gold)
- Brambleton Public Safety Center LEED (Gold)
- Eastern Loudoun Respite Center LEED (Silver)
- Emergency Homeless Shelter LEED (Gold)
- Juvenile Detention Center LEED (Gold)
- Youth Shelter LEED (Gold)✱
- Lucketts Community Center LEED (Gold)
- Middleburg Volunteer Fire Department LEED (Silver)
- Fire Station No 16 Design Final Application LEED (Gold)✱



Lessons Learned

- Not as expensive as people think
(less than 2% of the overall cost)
- Energy savings in 20% range
- Geothermal has the most payback 7.3 years
- Each project is unique



Owner's Project & Sustainable Design Goals:

- Energy Reduction per the AIA 2030 Challenge
- LEED Silver
- Utilize Geothermal Heating and Cooling System
- Accommodate a DOE Grant for Photovoltaic On-site Power Generation



Family Services Programmatic Goals:

- Passive security through line of sight
- Flexibility for multi-purpose spaces
- Separation of Youth
- Facility licensing requirements
- Utilize existing facility to remain



A/E Team Goals and Vision:

- Dynamic living environment for the youth and professional workplace for staff
- Natural daylight and views to every occupied space
- Exceed the County's goals for LEED Silver and deliver LEED Gold
- Outstanding service from programming through the completion of construction



Programming

New Loudoun County Youth Shelter 12 bed		
Program Space	Sq. Ft.	Comments
Support		
Janitor Closet	25	
Mechanical/electrical/telephone	140	In basement
ADA Accessible Toilet	50	Centrally located
Storage for outdoor sports	500	In basement
Kitchen	240	Full kitchen to feed 16 people daily. Oversized double ovens, ranges, 2 dishwashers, industrial sized refrigerator and separate freezer, adequate work surface for 4-6 cooks
Pantry	100	Adjacent to loading dock
General Storage	320	In basement with shelving
Administration		
Reception/Lobby	145	
Nurse Station	120	
File Room	80	
Social Worker's Office	100	
Supervisor's Office	320	Includes desks for 4-5 personnel
Director's Office	120	
Conference room	240	To seat 12 staff members
Shelter living spaces		
Single bunk rooms	960	12@80 verify w/DJJ standards
Girl's bath	200	Can be grouped in one bath or not, 3 showers, 3 toilets, 3 sinks
Boy's bath	200	Can be grouped in one bath or not, 3 showers, 2 toilets, 1 waterless urinals, 3 sinks
Computer room	240	Also to serve as classroom for 4-5 students
Dining	400	Large enough to seat 16 people
Small conference rooms	200	2@100 with sound attenuation
Multipurpose room	500	
Laundry	120	Adequate for 2 sets industrial W/D and sink
Patio		For picnics adjacent to vegetable garden
Outdoor recreation area		Large yard for volleyball, basketball, etc

Loudoun Youth Shelter
Programming Summary - Design Development Submission

4/15/2009

Program based on: Attachment II: Youth Shelter Approximate Program Standards for Interdepartmental Regulation of Children's Residential Facilities Loudoun County Cabling Standards, Updated October 25, 2004

The Loudoun Youth Shelter shall be designed in compliance with the following applicable codes:
The current VA Uniform Statewide Building Code which has adopted the 2006 International Building Code (IBC).
The 2006 IBC references the current ICC ANSI A117.1 edition for Americans with Disabilities Act compliance.

Space Name	Original Program Square Footage	Recommended Sqft. (bold where revised)	Remarks	Provided in Conceptual Design	Percent of Program Space Provided
Support					
Janitor's Closet	50	50	Enlarged to include cleaning supply storage	81	162.00%
Janitor's Closet - Dining Bldg.	0	45	Added to program to accommodate campus plan	40	88.89%
Mechanical - Basement		200	Space requirements depend on selected system (Basement)	263	131.50%
Electrical - Basement	200	150	Will require main electric room in one bldg. & satellite electrical closet in other bldg. (Basement)	151	100.67%
Telephone/Telecom - Basement		150	Required per 12/1/05 Mig and Cabling Standards (to include security) (Basement)	101	67.33%
Mechanical/Electrical - Main Level	0	50	Added for effective distribution	30	60.00%
Mechanical/Electrical - Dining Bldg.	0	75	Added to program to accommodate campus plan	66	88.00%
ADA Accessible Toilet	80	45	45sf min. required to meet ADA/ANSI (Will be labeled "Womens" to permit submission)	51	113.33%
Storage for Outdoor Sports	500	500	In Basement	735	147.00%
Dining	500		To seat 16 - Shared w/ exist. facility.		
Kitchen	350	850	Full kitchen for 16. Oversized dbl. ovens, ranges, (2) DWs, oversized refrig., freezer, & work surface for 4-6 cooks.	962	113.18%
Pantry	200	200	Adj. to loading space	153	76.50%
General Storage	500	500	In Basement w/ Shelving	393	78.60%
Recycling	0	125	Prerequisite required by LEED program	127	101.60%
TOTAL ADMINISTRATION	2,380 sf	2,940 sf		3,153	107.24%

Laundry	160	160	Linen & towel storage from use of residential Washers and Dryer in lieu of Commercial Equip.	113	70.63%
Living Room/Indoor Recreation Space	0	350	Required if Multipurpose & Computer Room occur in exist. bldg. north wing (large area shown includes circulation)	554	158.29%

Total - Base Bid minus Deduct Alternates \$2,116,275

	316	105.33%			
	162	98.18%			
	140	70.00%			
	120	100.00%			
	184	92.00%		2,962	75.37%
	130	100.00%			
					7,233
	0	#DIV/0!			2,532
	16	80.00%			
	50	100.00%			
					9,765
	1,118	94.35%			
	1440	100.00%			
	267	98.89%			
	208	77.04%			\$2,165,000
	53	53.00%			SE cost/sf
	0	0.00%			\$ 20,000
	0	0.00%			\$ 50,000
	327	136.25%			\$233
					125 \$ 240,375
					250 \$1,436,250
					275 \$ 419,650
					\$2,266,275
					\$ 246.49
					\$ 35,000
					\$ 50,000
					\$ 65,000
					\$ 150,000



Programming

Loudoun Youth Shelter

Loudoun County, Virginia
Samaha Associates, PC

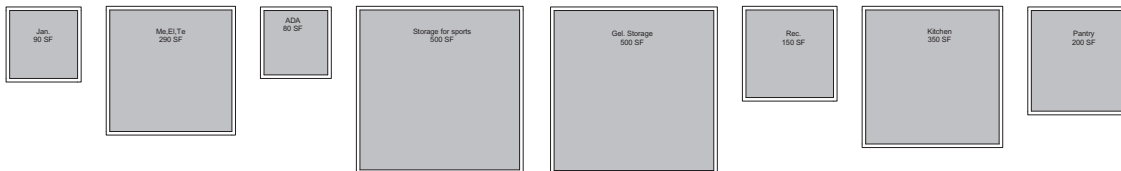
ADMINISTRATION



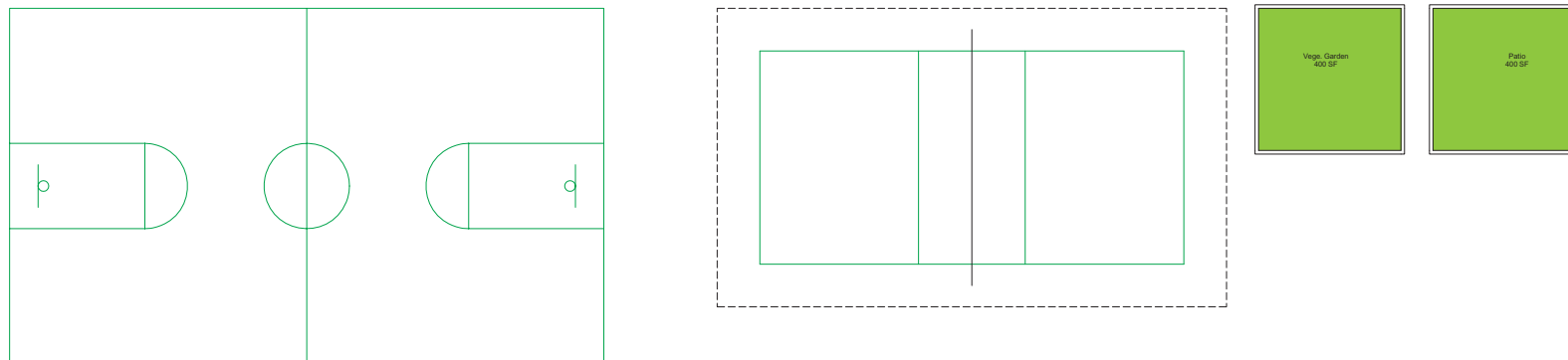
LIVING



SUPPORT



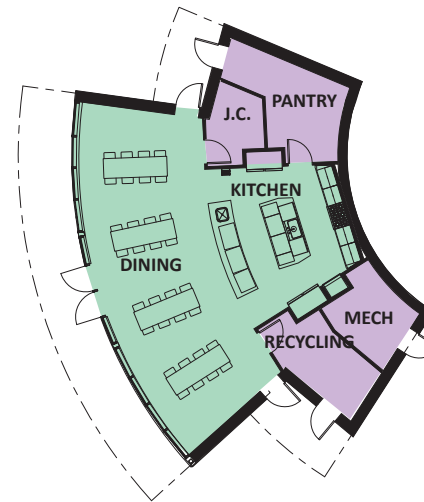
OUTDOOR



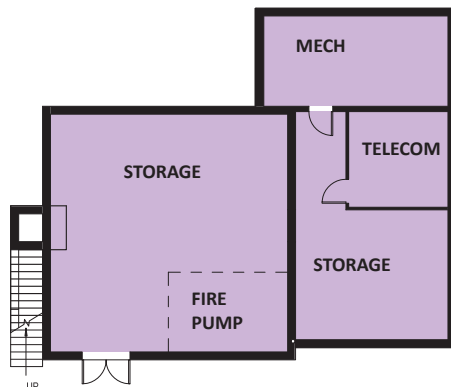
Zoned Separation of Building Uses



BUILDING 1 - MAIN LEVEL PLAN

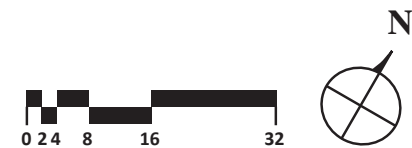


BUILDING 2

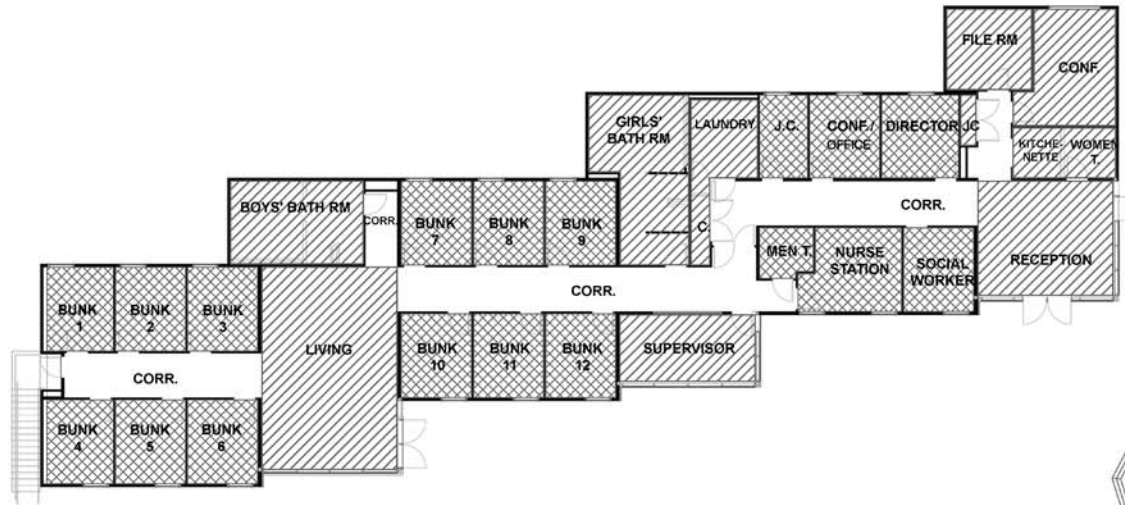


BUILDING 1 - LOWER LEVEL PLAN

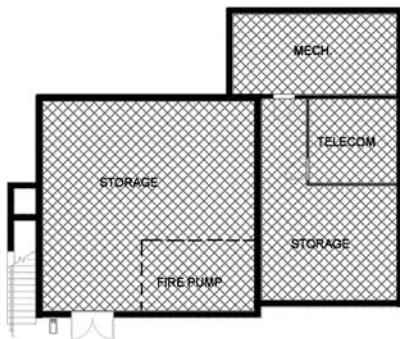
- RESIDENTIAL AREAS
- BUSINESS AREAS
- CIRCULATION
- BUILDING SUPPORT/STORAGE



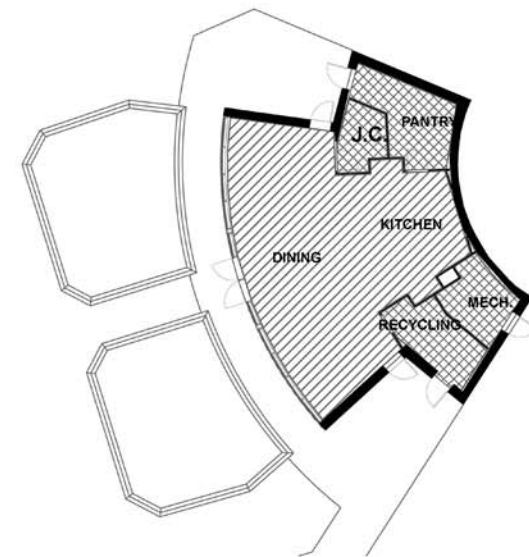
Public & Private Spaces Emphasized by Open & Closed Building Forms






BUILDING 1 - MAIN LEVEL PLAN



BUILDING 1 - LOWER LEVEL PLAN



BUILDING 2

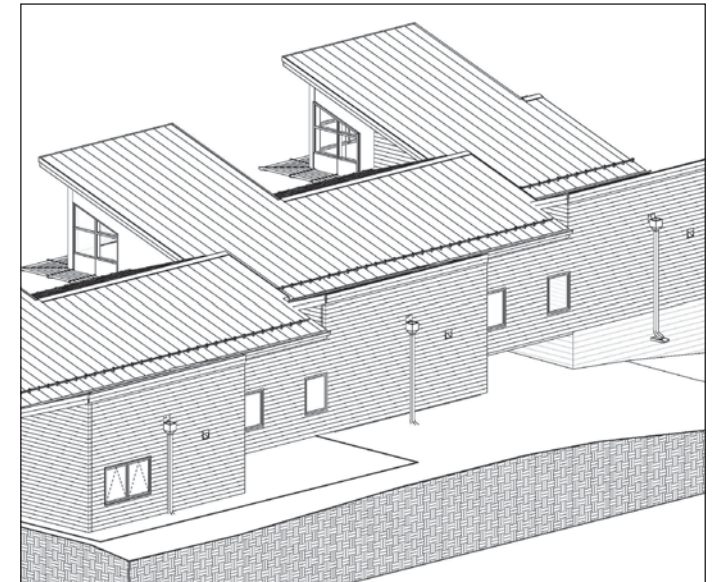
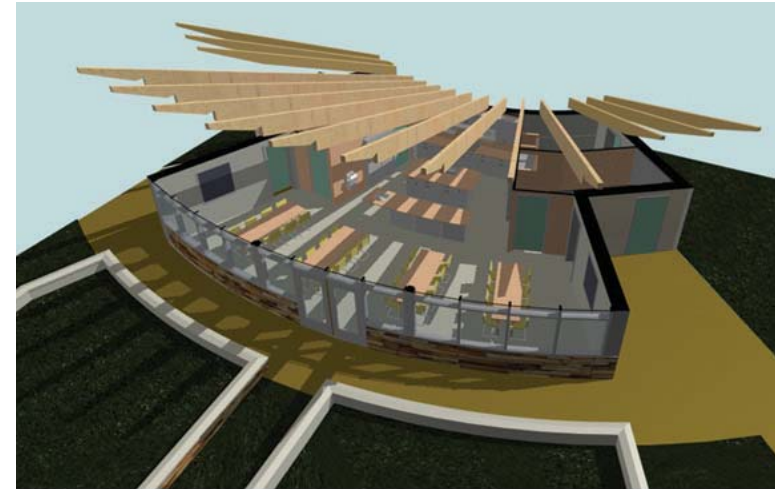
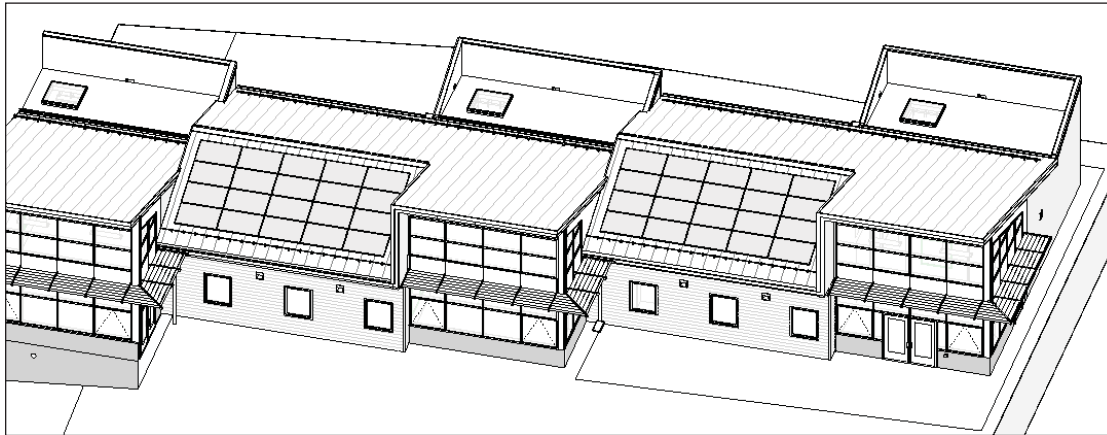
-  PUBLIC / SHARED SPACES
-  PRIVATE / SUPPORT SPACES
-  CIRCULATION



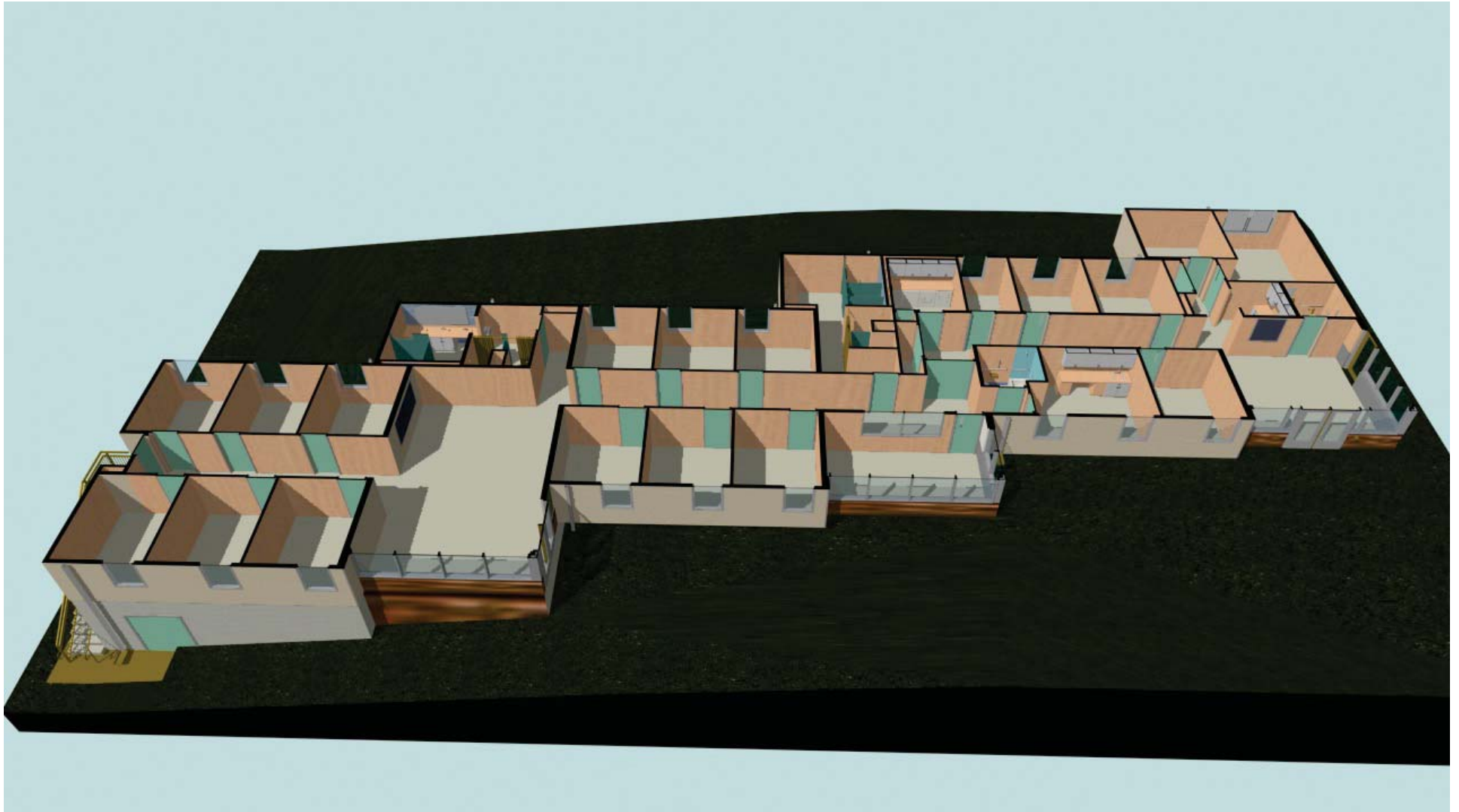
Passive Visual Security



Building Information Modeling (BIM)



Building Information Modeling (BIM)



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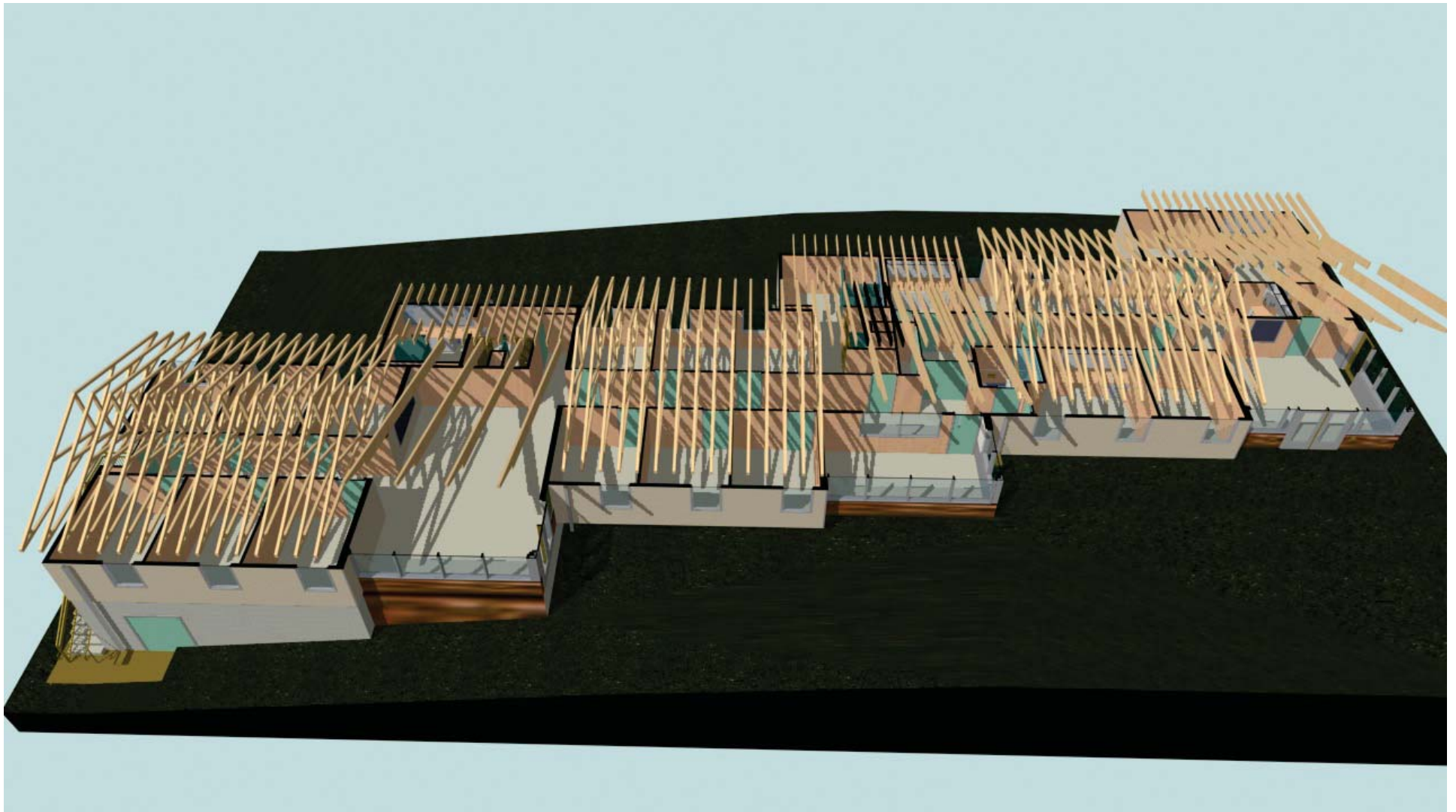


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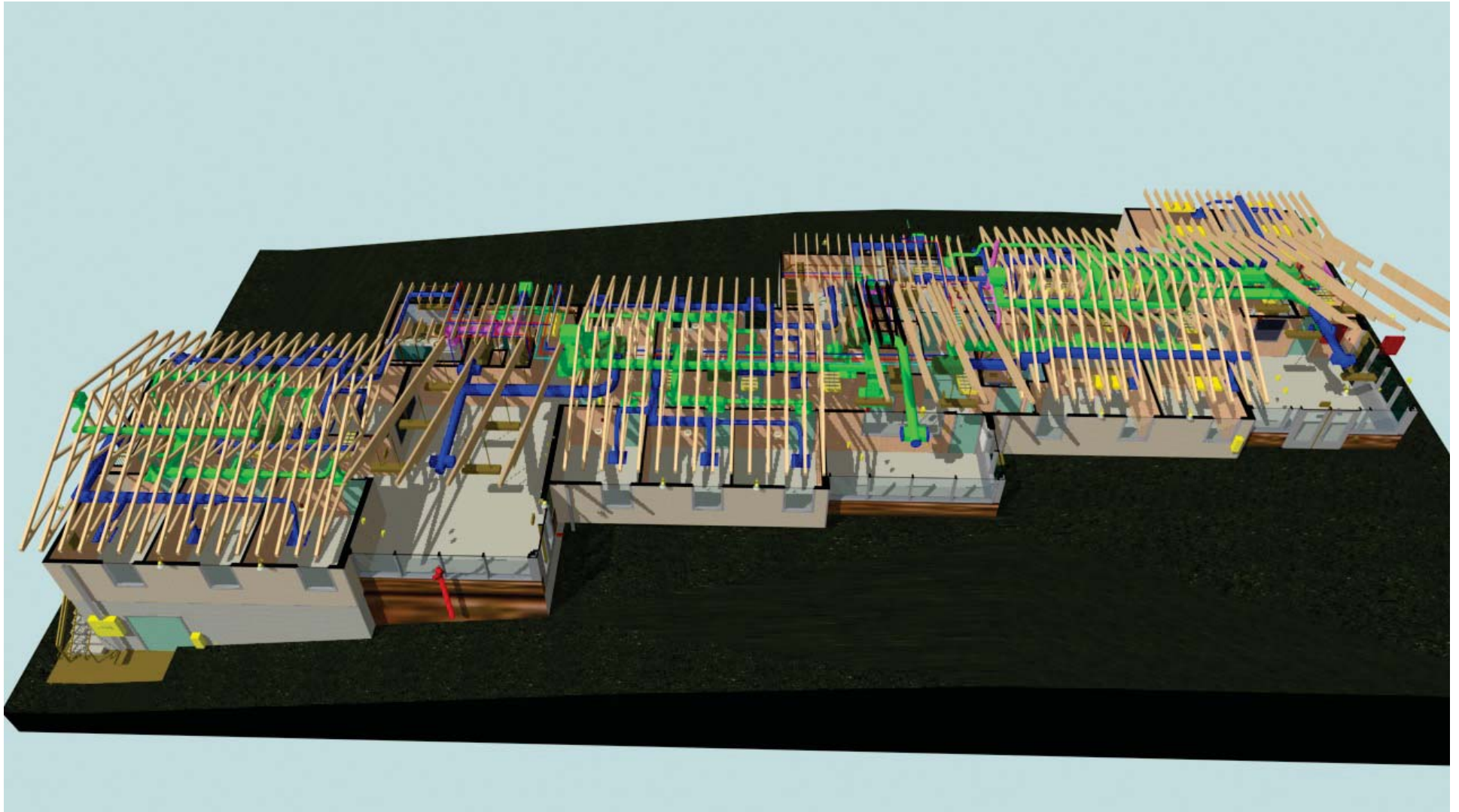


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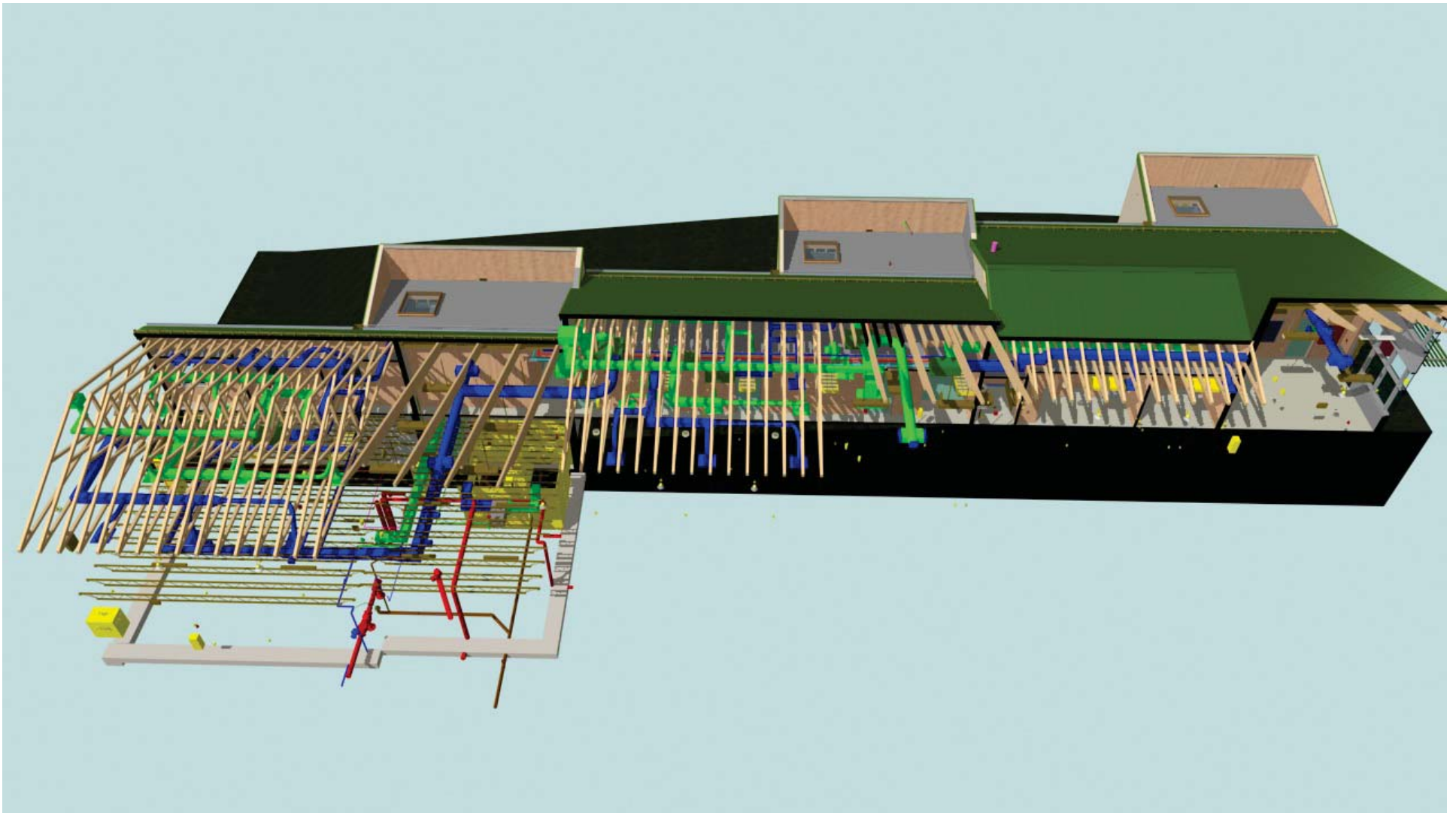
Building Information Modeling (BIM)



Building Information Modeling (BIM)



Building Information Modeling (BIM)



Building Information Modeling (BIM)



Pre-Rendering (REVIT)



Preliminary Rendering (3D Studio Max)



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Rendering (3D Studio Max)



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Photograph



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Sustainable Sites

- Limited area of site development / maximize open space
- Alternative transportation
- Reduce heat island effect



Water Efficiency

- Efficient fixtures
- Cisterns

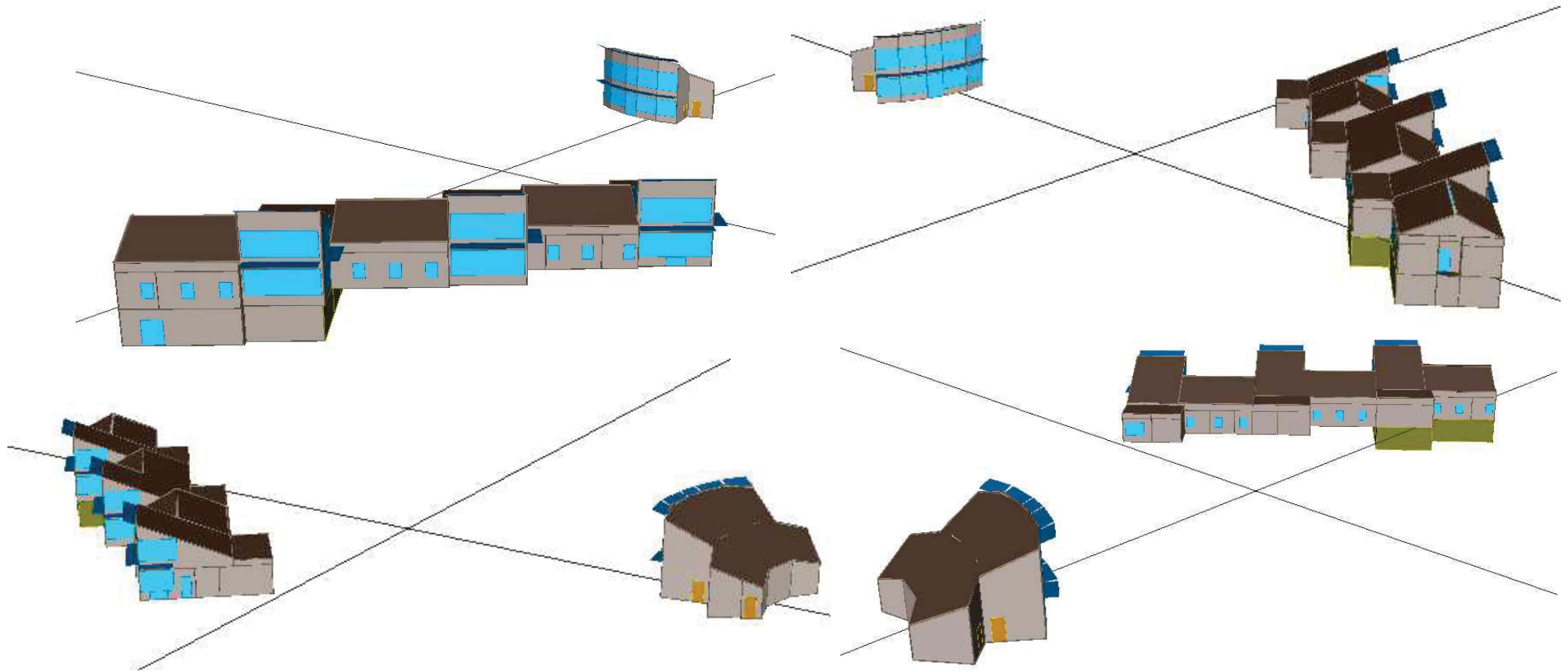


Materials and Resources

- Bamboo
- Cork
- Certified wood



Energy and Atmosphere



Thermal Model (all orientations)



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Solar Site Plan



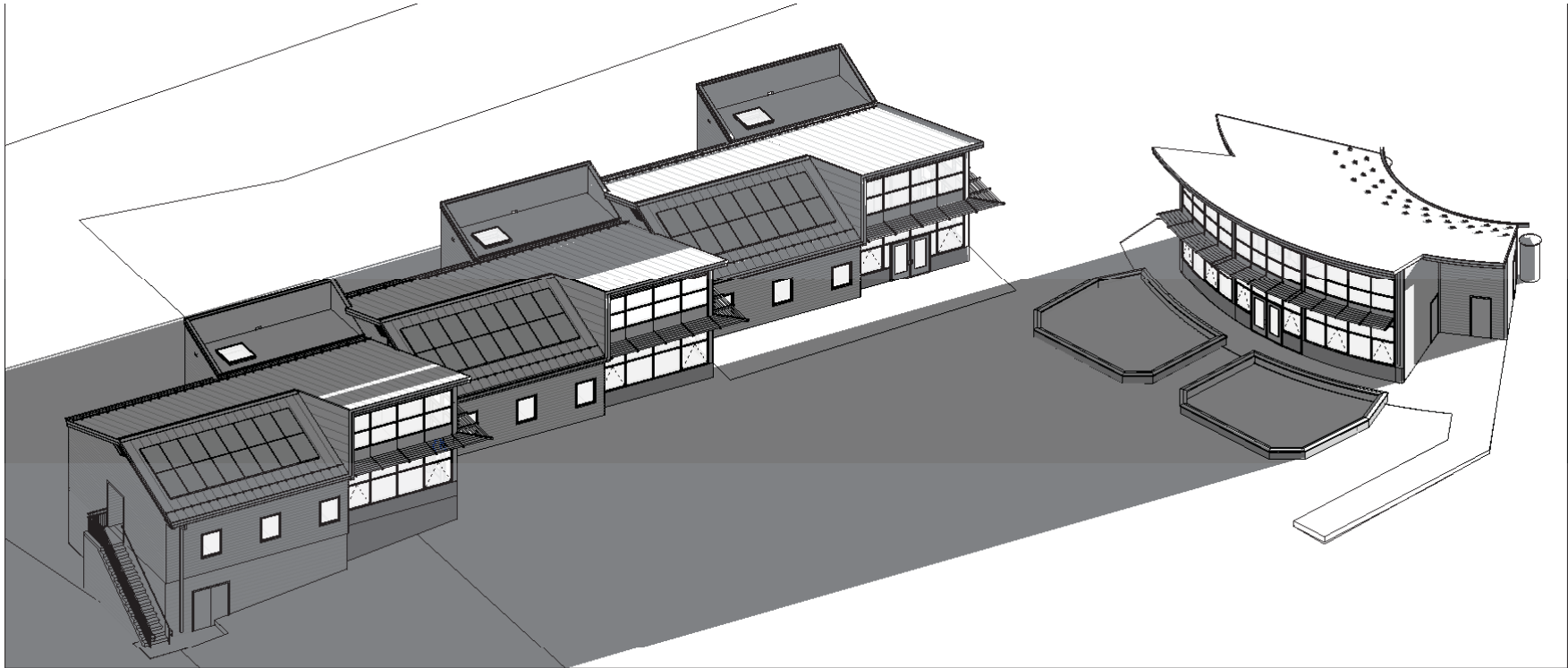
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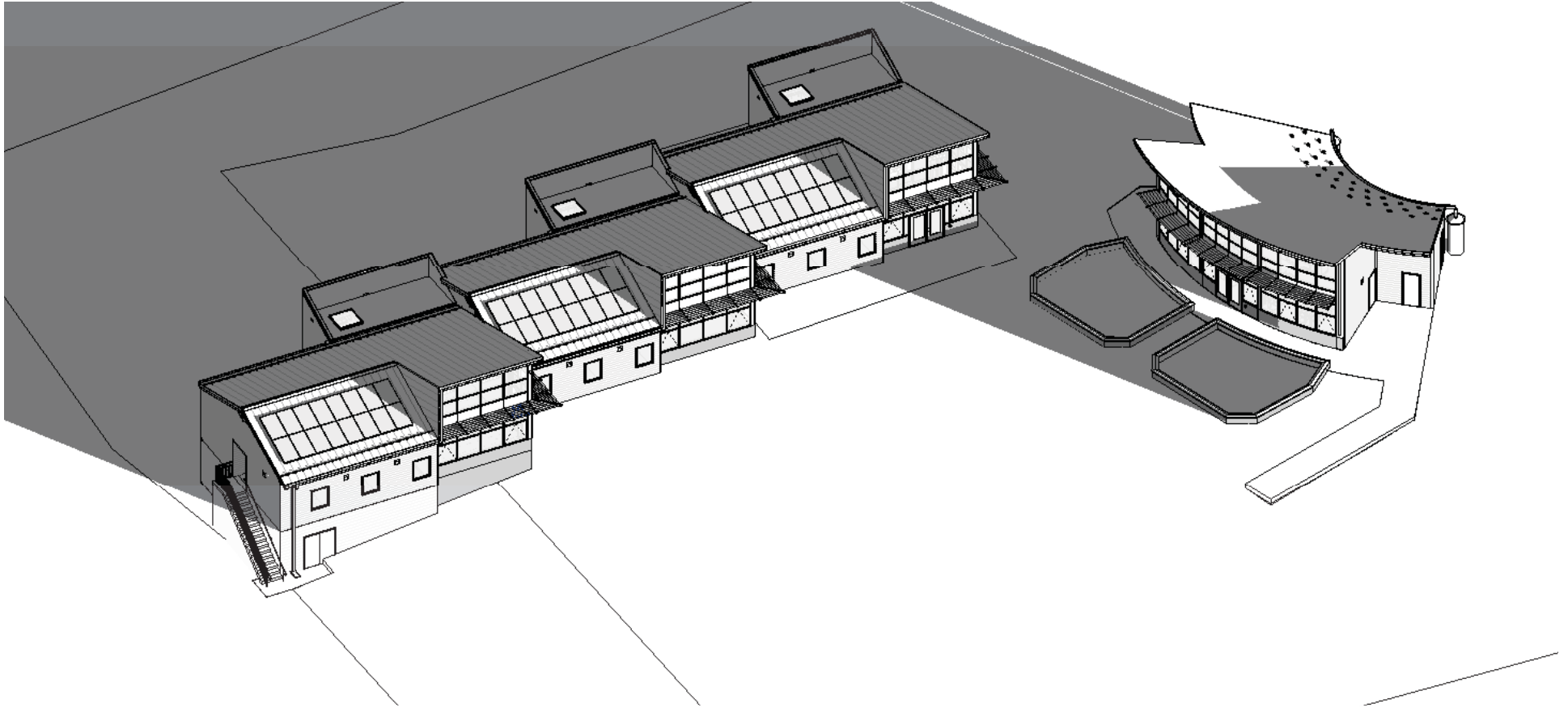
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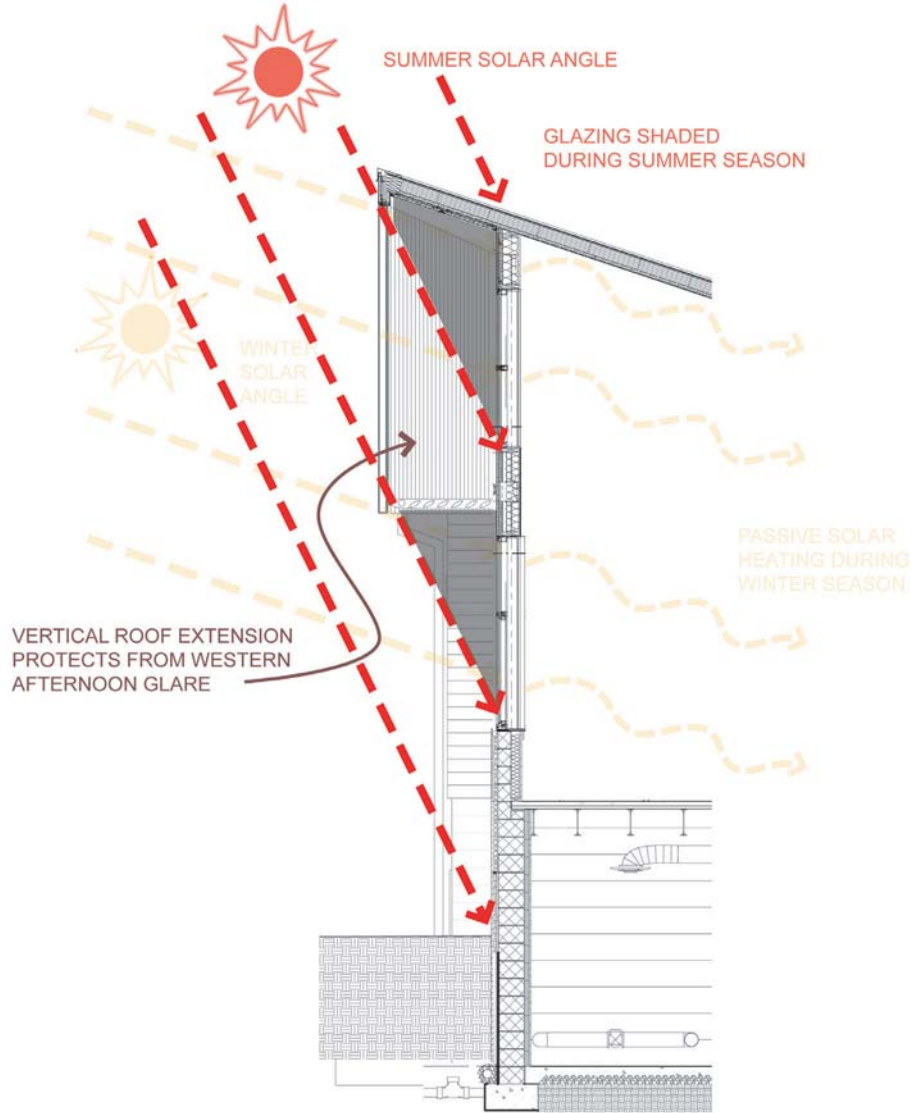
Energy Modeling



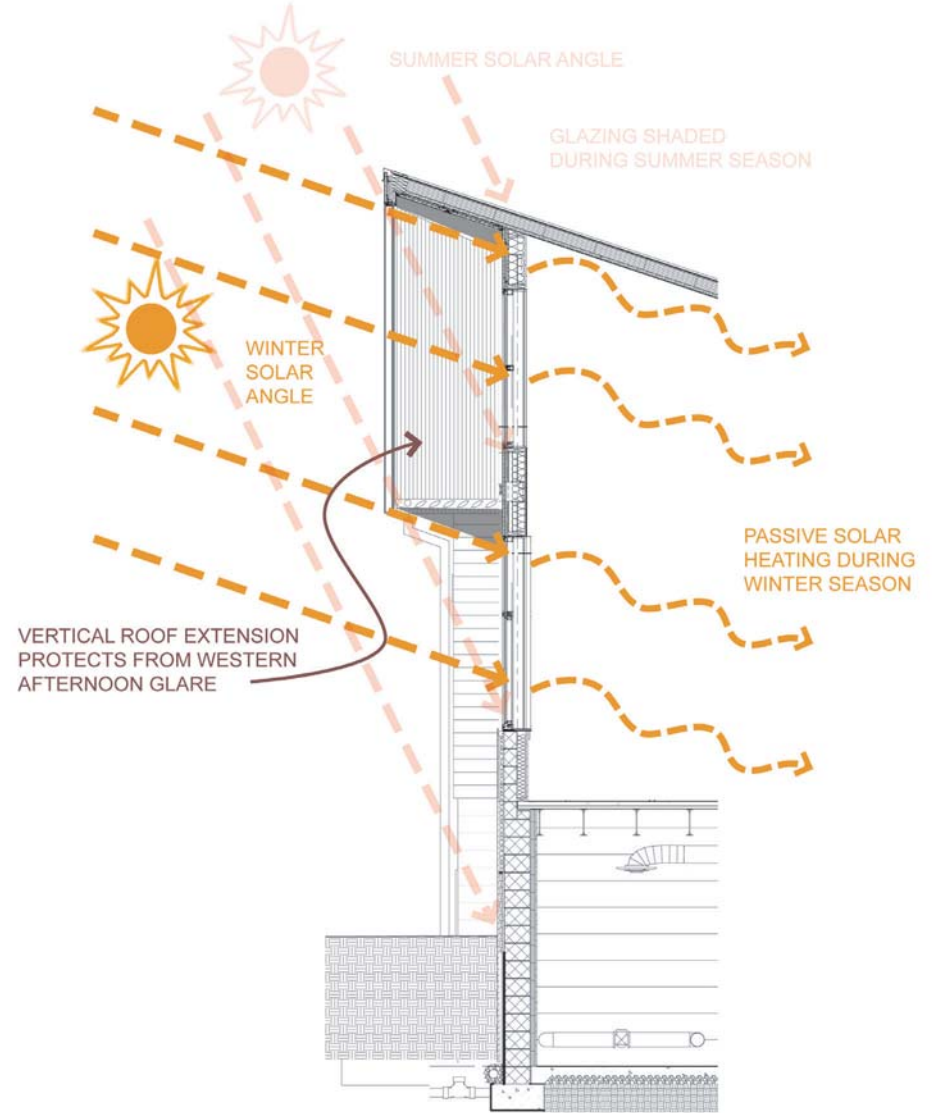
Energy Modeling



Indoor Environmental Quality



Summer Solar Angles



Winter Solar Angles



- Exemplary Performance of SSc 5.2 Open Space equal to 200% Building Footprint
- Exemplary Performance of WEc 3.2 40% Reduction
- Exemplary Performance of EAc1 45.5% Optimize Energy Performance



LEED Goals and Checklist



LEED for New Construction v2.2 Registered Project Checklist

Project Name: Loudoun County Youth Shelter
Project Address: 16450 Meadowview Court, Leesburg VA, 20175

Sustainable Sites 14 Points

Yes	?	No	Points	Description	Required
Y			1	Prereq 1 Construction Activity Pollution Prevention	Required
1			1	Credit 1 Site Selection	1
		1	1	Credit 2 Development Density & Community Connectivity	1
		1	1	Credit 3 Brownfield Redevelopment	1
		1	1	Credit 4.1 Alternative Transportation, Public Transportation Access	1
1			1	Credit 4.2 Alternative Transportation, Bicycle Storage & Changing Rooms	1
1			1	Credit 4.3 Alternative Transportation, Low-Emitting & Fuel-Efficient Vehicles	1
1			1	Credit 4.4 Alternative Transportation, Parking Capacity	1
		1	1	Credit 5.1 Site Development, Protect or Restore Habitat	1
1			1	Credit 5.2 Site Development, Maximize Open Space	1
		1	1	Credit 6.1 Stormwater Design, Quantity Control	1
		1	1	Credit 6.2 Stormwater Design, Quality Control	1
1			1	Credit 7.1 Heat Island Effect, Non-Roof	1
1			1	Credit 7.2 Heat Island Effect, Roof	1
		1	1	Credit 8 Light Pollution Reduction	1

Water Efficiency 5 Points

Yes	?	No	Points	Description	Required
1			1	Credit 1.1 Water Efficient Landscaping, Reduce by 50%	1
1			1	Credit 1.2 Water Efficient Landscaping, No Potable Use or No Irrigation	1
		1	1	Credit 2 Innovative Wastewater Technologies	1
1			1	Credit 3.1 Water Use Reduction, 20% Reduction	1
1			1	Credit 3.2 Water Use Reduction, 30% Reduction	1

Energy & Atmosphere 17 Points

Yes	?	No	Points	Description	Required
Y			1	Prereq 1 Fundamental Commissioning of the Building Energy Systems	Required
Y			1	Prereq 2 Minimum Energy Performance	Required
Y			1	Prereq 3 Fundamental Refrigerant Management	Required

*Note for EAc1: All LEED for New Construction projects registered after June 26th, 2007 are required to achieve at least two (2) points under EAc1.

Yes	?	No	Points	Description	Required
10			1 to 10	Credit 1 Optimize Energy Performance	1 to 10
			1	10.5% New Buildings or 3.5% Existing Building Renovations	1
			2	14% New Buildings or 7% Existing Building Renovations	2
			3	17.5% New Buildings or 10.5% Existing Building Renovations	3
			4	21% New Buildings or 14% Existing Building Renovations	4
			5	24.5% New Buildings or 17.5% Existing Building Renovations	5
			6	28% New Buildings or 21% Existing Building Renovations	6
			7	31.5% New Buildings or 24.5% Existing Building Renovations	7
			8	35% New Buildings or 28% Existing Building Renovations	8
			9	38.5% New Buildings or 31.5% Existing Building Renovations	9
			10	42% New Buildings or 35% Existing Building Renovations	10
3			1 to 3	Credit 2 On-Site Renewable Energy	1 to 3
			1	2.5% Renewable Energy	1
			2	7.5% Renewable Energy	2
			3	12.5% Renewable Energy	3
1			1	Credit 3 Enhanced Commissioning	1
1			1	Credit 4 Enhanced Refrigerant Management	1
		1	1	Credit 5 Measurement & Verification	1
		1	1	Credit 6 Green Power	1

continued...

Materials & Resources 13 Points

Yes	?	No	Points	Description	Required
Y			1	Prereq 1 Storage & Collection of Recyclables	Required
		1	1	Credit 1.1 Building Reuse, Maintain 75% of Existing Walls, Floors & Roof	1
		1	1	Credit 1.2 Building Reuse, Maintain 100% of Existing Walls, Floors & Roof	1
		1	1	Credit 1.3 Building Reuse, Maintain 50% of Interior Non-Structural Elements	1
1			1	Credit 2.1 Construction Waste Management, Divert 50% from Disposal	1
1			1	Credit 2.2 Construction Waste Management, Divert 75% from Disposal	1
		1	1	Credit 3.1 Materials Reuse, 5%	1
		1	1	Credit 3.2 Materials Reuse, 10%	1
1			1	Credit 4.1 Recycled Content, 10% (post-consumer + 1/2 pre-consumer)	1
		1	1	Credit 4.2 Recycled Content, 20% (post-consumer + 1/2 pre-consumer)	1
1			1	Credit 5.1 Regional Materials, 10% Extracted, Processed & Manufactured Regio	1
1			1	Credit 5.2 Regional Materials, 20% Extracted, Processed & Manufactured Regio	1
1			1	Credit 6 Rapidly Renewable Materials	1
1			1	Credit 7 Certified Wood	1

Indoor Environmental Quality 15 Points

Yes	?	No	Points	Description	Required
Y			1	Prereq 1 Minimum IAQ Performance	Required
Y			1	Prereq 2 Environmental Tobacco Smoke (ETS) Control	Required
		1	1	Credit 1 Outdoor Air Delivery Monitoring	1
		1	1	Credit 2 Increased Ventilation	1
1			1	Credit 3.1 Construction IAQ Management Plan, During Construction	1
1			1	Credit 3.2 Construction IAQ Management Plan, Before Occupancy	1
1			1	Credit 4.1 Low-Emitting Materials, Adhesives & Sealants	1
1			1	Credit 4.2 Low-Emitting Materials, Paints & Coatings	1
		1	1	Credit 4.3 Low-Emitting Materials, Carpet Systems	1
		1	1	Credit 4.4 Low-Emitting Materials, Composite Wood & Agrifiber Products	1
1			1	Credit 5 Indoor Chemical & Pollutant Source Control	1
1			1	Credit 6.1 Controllability of Systems, Lighting	1
1			1	Credit 6.2 Controllability of Systems, Thermal Comfort	1
1			1	Credit 7.1 Thermal Comfort, Design	1
1			1	Credit 7.2 Thermal Comfort, Verification	1
		1	1	Credit 8.1 Daylight & Views, Daylight 75% of Spaces	1
1			1	Credit 8.2 Daylight & Views, Views for 90% of Spaces	1

Innovation & Design Process 5 Points

Yes	?	No	Points	Description	Required
1			1	Credit 1.1 Innovation in Design: SSc5.2 - Open Space 200% of Bldg Footprint	1
1			1	Credit 1.2 Innovation in Design: Per WEc3.2 - 40% Water Use Reduction	1
1			1	Credit 1.3 Innovation in Design: Per EA1-45.5% Optimize Energy Performance	1
		1	1	Credit 1.4 Innovation in Design:	1
1			1	Credit 2 LEED® Accredited Professional	1

Project Totals (pre-certification estimates) 69 Points

Certified: 26-32 points, Silver: 33-38 points, Gold: 39-51 points, Platinum: 52-69 pc

46 points = LEED Gold



Loudoun County Fire Station #16

Design Alternates

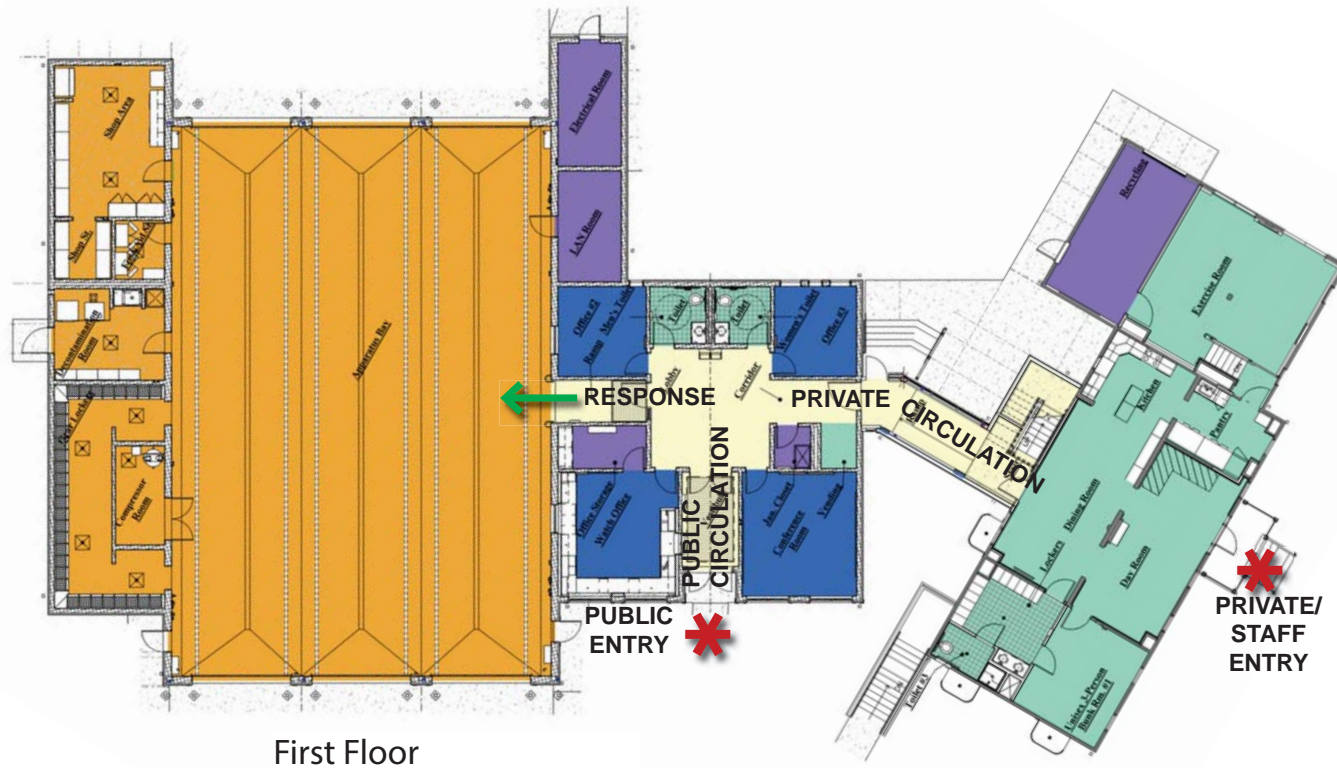
Design with Alternates



Design without Alternates



Floor Plans



- LIVING AREAS
- BUSINESS AREAS
- APPARATUS BAY & SUPP
- BUILDING SUPPORT
- CIRCULATION

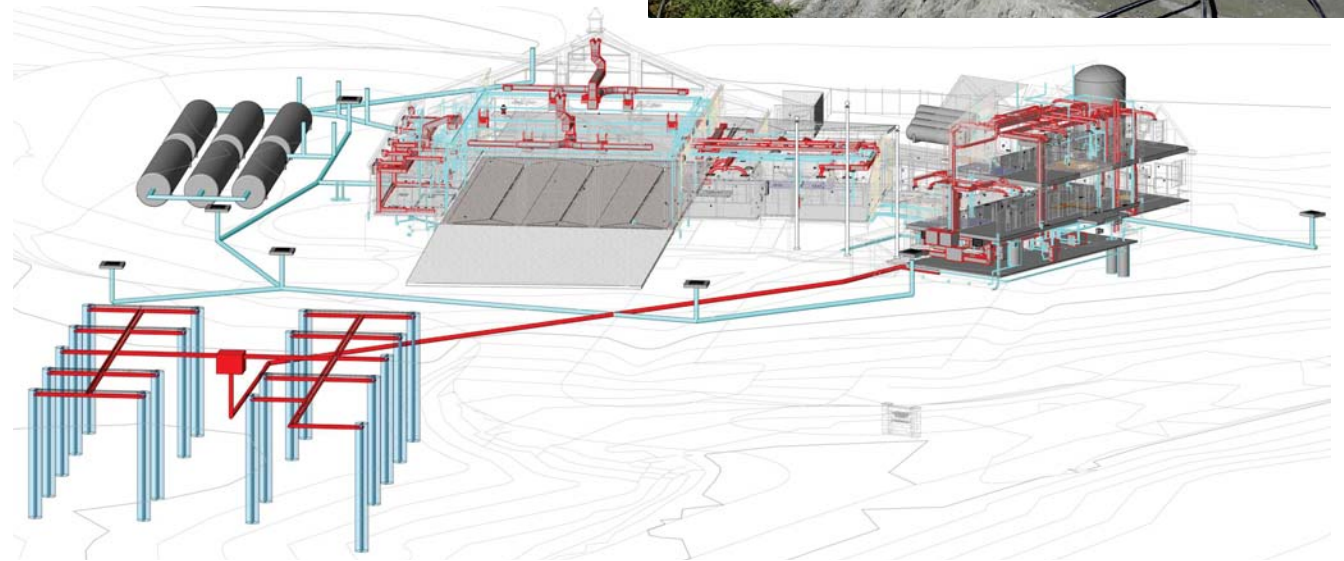


Sustainable Site

- 90,000 gallon storm water harvesting system
- Integration of Storm Water Quantity & Quality Control Best Management Practices BMPs



- Ground source Well system
- Ground source heat pumps
- Radiant floor slab system
- Solar water heater system
- LED site lighting package



Energy and Atmosphere

DOE 2 Model Designation	Energy use in million kWh per year	Change (Savings) Energy Use	Estimated Cost Savings per year
Baseline Model per ASHRAE 90.1	399,443	N/A	N/A
Actual Design	238,342	40.3%	\$16,924/yr.



Total Energy Use Reduction 40.3%

Saved approximately 161,131 KWh per year equaling (14) average U.S. homes total energy consumption



Water Use Reduction

- Grey water system for quick fill connections
- Integration of low flow plumbing fixtures to reduce potable water usage

Interior Environmental Quality

- Integration of low VOC sealants, coatings and adhesives
- Integration of 0 formaldehyde wood products
- Day-lighting strategies



Materials and Resources

- Adaptive re-use of existing residential building
- Incorporation of regionally extracted, harvested and manufactured materials



Loudoun County Fire Station #16
Objective: LEED Silver Certification
Seeking: LEED Gold Certification



Thank You!

Loudoun County
www.loudoun.gov/energy

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