MOVING THE NEEDLE WITH PASSIVE HOUSE IN PUBLIC PROJECTS: MOUNT VERNON LIBRARY COMMONS

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MVLC A/E Team

HKP Architects (Architecture)

Kriegh Architectural Studio (Sustainability Lead)

WSP (WUFI, WBLCA, and Envelope)

Wil Srubar III, PhD (Materials Scientist, Univ. of Colorado Boulder)

Pacific Survey & Engineering (Survey)

GeoEngineers (Geotechnical)

Swift Company (Landscape)

KPFF (Civil and Structural)

FSi (Mechanical)

TFWB (Electrical)

Dark Light Design (Lighting Design)

The Greenbusch Group (Acoustics, AV, and Vertical Transportation)

Studio Pacifica (Accessibility)

Clevenger Associates (Food Service)

BrandQuery (Wayfinding and Graphics)

DCW (Cost Engineering)

Sazan (Commissioning Agent)

Balderston Associates (PHIUS Rater)

Julie Blazek
AIA, LEED AP, CPHC
HKP Architects
Partner-in-Charge /
Design-Lead

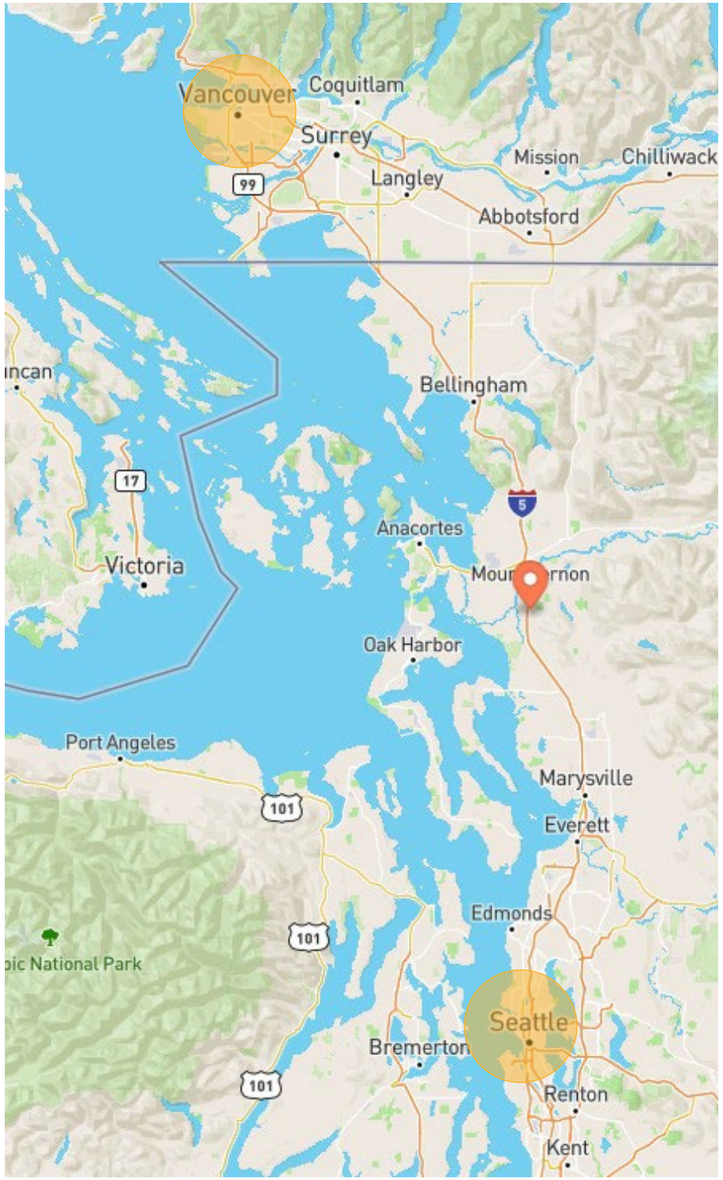
Julie Kriegh
Phd, AIA, LEED AP
Passive House Designer
Kriegh Architectural Studio
Sustainability Consultant - Lead

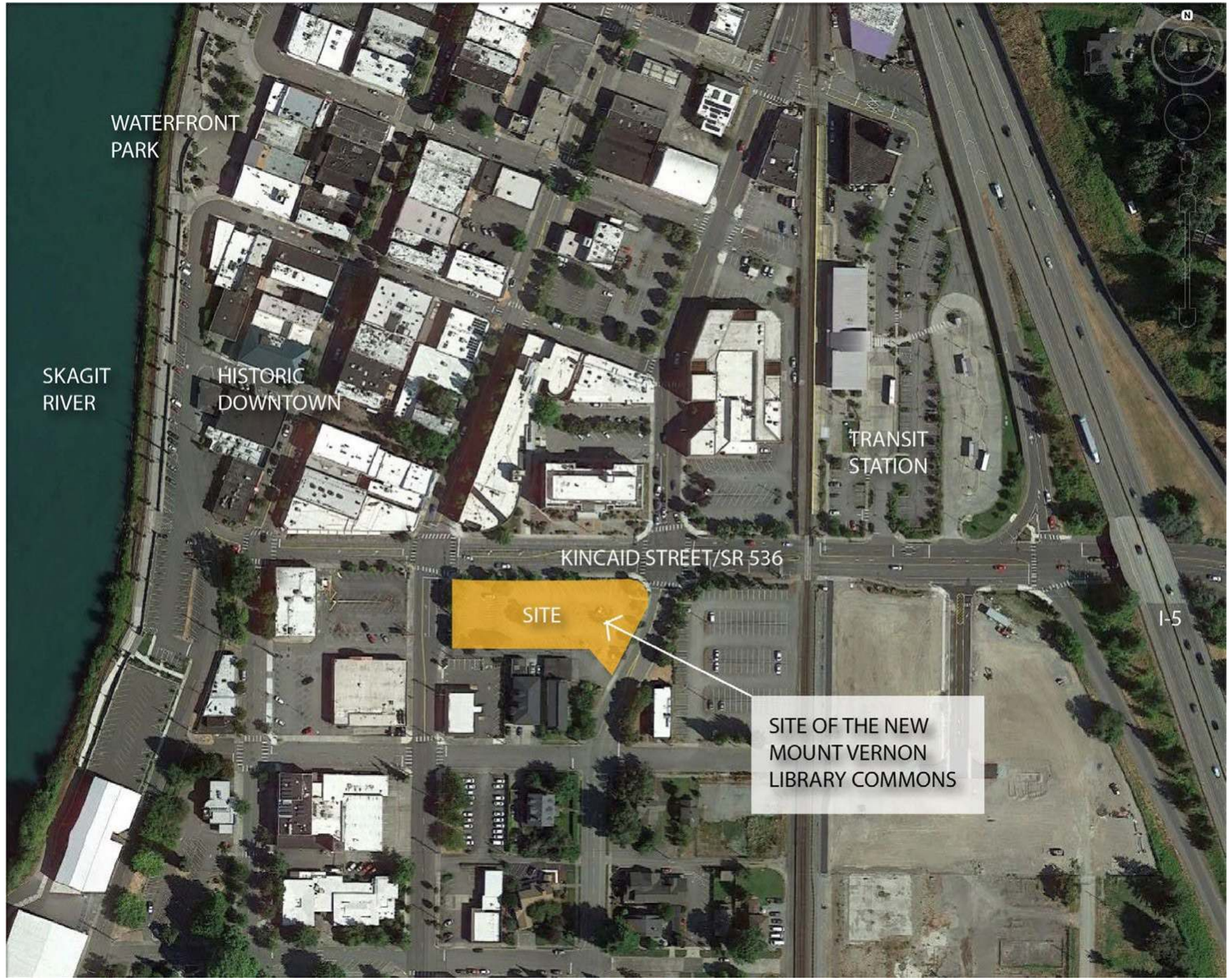
Sarah Buffaloe
AIA, LEED BD+C
WSP
Built Ecology
WBLCA Analysis

It Takes a Dedicated Village

Presentation Focus

- **Building the Foundation for Decision Making**
- **Managing Passive House Targets and Compliance**
- **Managing Carbon Reduction Targets - focus on Concrete**
- **Strategies for Success Building Passive House into Public Bid Projects**





Catalyst and Gateway Project

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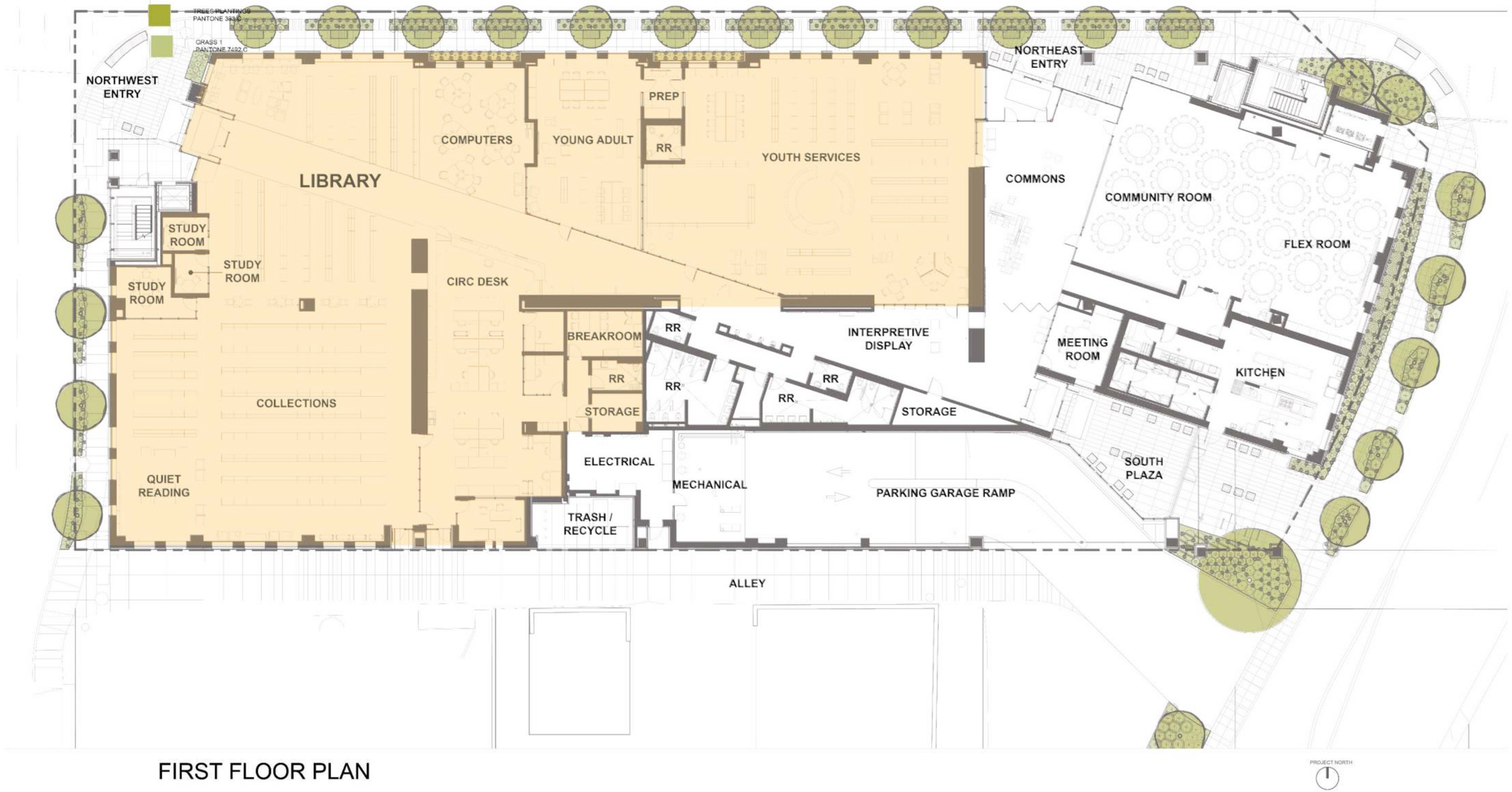
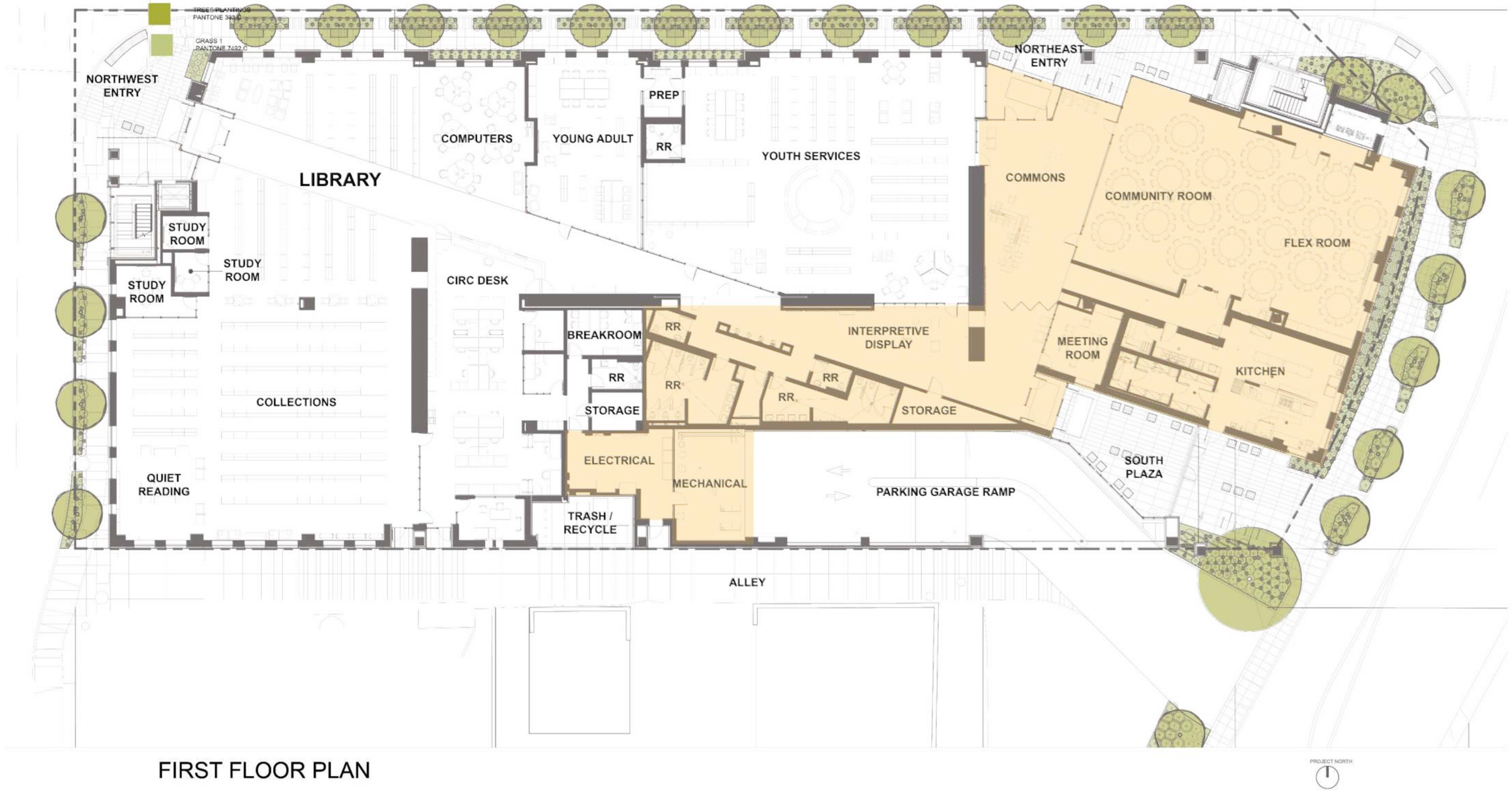


FIRST FLOOR PLAN

Multi-Use Project



FIRST FLOOR PLAN

Multi-Use Project

FIRST FLOOR PLAN

Multi-Use Project

Foundation and Support Building

Overarching Goals

- **Library as HUB of community gathering- three uses library, commons, parking/ EV charging**
- **Climate resilient building:**
  - » **Built to last 75 to 100 years**
  - » **60% lower operational energy**
  - » **35% to 40% lower embodied energy**

Project Goals and Targets

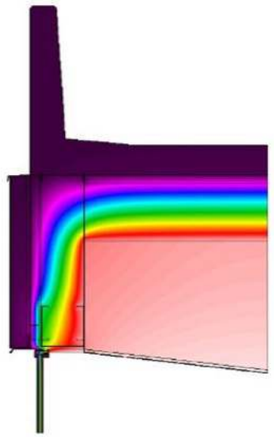


Figure 2 Model 1 (Infrared Image)

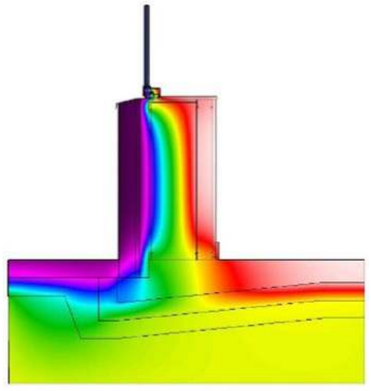
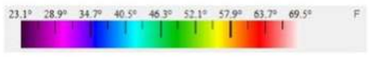
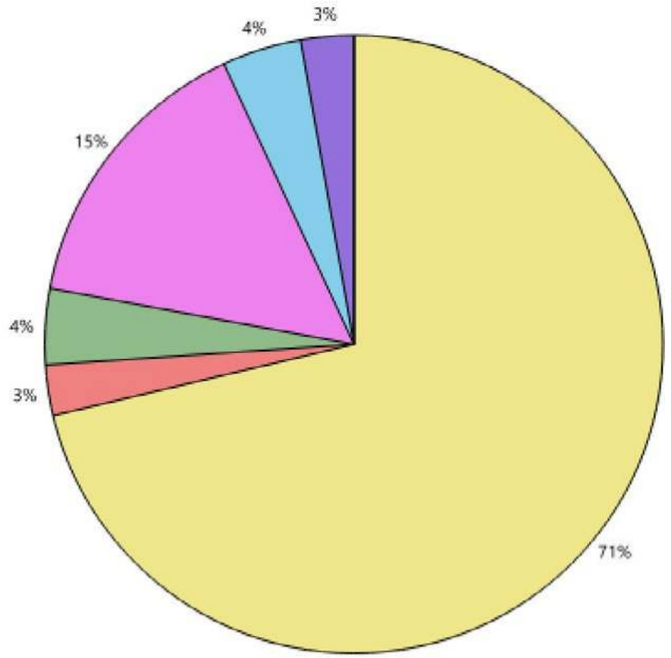


Figure 8 Model 4 (Infrared Image)



WUFI Passive, Therm, and Hygro Modeling



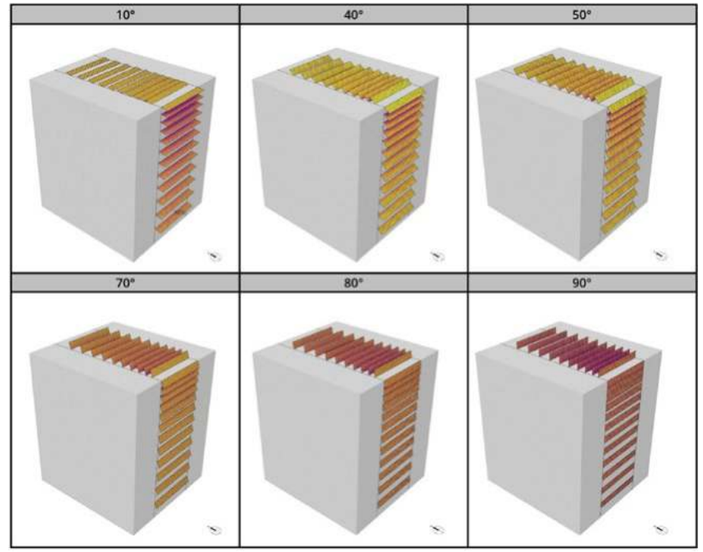
Global Warming Potential

Divisions

- 03 - Concrete
- 04 - Masonry
- 05 - Metals
- 06 - Wood/Plastics/Composites
- 07 - Thermal and Moisture Protection
- 08 - Openings and Glazing
- 09 - Finishes

WBLCA for "Hot Spot" Material Analysis

Overview of Solar Radiation results at various tilt angles and on-center spacings

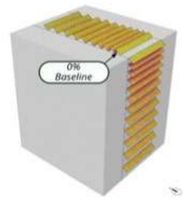


Analysis 2 | Solar Panel Spacing Analysis - 40° tilt

Annual Solar Radiance (kWh/ft²-yr)

0 140

*Solar radiation results @ 40° tilt and % reduction from "baseline"**



PV Tilt Angle	Roof or South Façade	Spacing of Rows O.C. (ft)	Solar Radiation per Row (kWh/ft²-yr)	% Reduction from "Baseline"	# of Rows Achievable Based on Spacing
40°	South Façade	top	133.3	-1%	/ 26' tall
		3	80.0	-41%	8
		3.5	88.6	-34%	7
		4	95.8	-29%	6
		4.5	101.6	-25%	5
		5	106.6	-21%	5
		5.5	110.5	-18%	4
		6	113.6	-16%	4
		6.5	116.2	-14%	4
		7	118.3	-12%	3
		7.5	120.0	-11%	3
		8	121.0	-10%	3
0% Baseline	Roof	front	134.6	0%	/ 20.5' wide
		3	94.5	-30%	6
		3.5	105.2	-22%	5
		4	112.6	-16%	5
		4.5	117.2	-13%	4
		5	120.6	-10%	4
		5.5	122.9	-9%	3
		6	125.0	-7%	3
		6.5	126.4	-6%	3
		7	127.5	-5%	2

*the baseline case is the panel at the most effective tilt angle (40° on roof) with no obstructions.

Solar PV Production Analysis

Energy Reduction Target: Early Modeling

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MOUNT VERNON
Schematic / Design Development

PHIUS+ 2018 and PHIUS 2021

Climate Location: Mount Vernon, Washington

Envelope Area: 72,468 sf

iCFA: 27,910 sf

Total Occupancy: 113

	PHIUS+ 2018	PHIUS 2021
Annual Heating Demand (kBtu/sf)	8.5	7.6
Annual Cooling Demand (kBtu/sf)	5.5	3.6
Peak Heating Load (Btu/hr-sf)	6.6	4.2
Peak Cooling Load (Btu/hr-sf)	2.7	1.4
Source Energy (kBtu/sf)	34.8	24.5
Other		- Updated energy emission factors - All-electric or electric-ready - EV charging

WUFI Passive Results

Heating demand is at least 83% above PHIUS criteria

Cooling demand is at least meets PHIUS criteria

Source energy is at least 146% above PHIUS criteria

Category	EUI
Annual Heating Demand (kBtu/sf)	15.55
Annual Cooling Demand (kBtu/sf)	1.65
Peak Heating Load (kBtu/hr-sf)	4.76
Peak Cooling Load (kBtu/hr-sf)	1.7
Source Energy (kBtu/sf)	85.49
Site Energy (kBtu/sf)	30.53

Meeting Criteria- initial recommendations and refinements

- Recommend providing a high efficiency ERV (90% sensible recovery)
- Adding insulation can help reduce heading demand
- Incorporate natural ventilation in the summer to reduce the cooling demand
- Revise ventilation rates to minimize heating and ensure compliance with - ASHRAE 62.1
- Revise equipment using Energy Saving mode operation
- Ensure that the Commercial Kitchen is not considered within the Passive Envelope
- Include PV solar panel renewable energy

Passive House Preliminary WUFI Modeling

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MOUNT VERNON

100% Construction Documents

WUFI Passive Results

Air tightness CFM50 per envelope area 0.05
Renewable generation 114,000 kWh/yr

Category	EUI
Annual Heating Demand (kBtu/sfyr)	1.41
Annual Cooling Demand (kBtu/sfyr)	4.66
Peak Heating Load (kBtu/hr-sf)	4.66
Peak Cooling Load (kBtu/hr-sf)	1.7
Source Energy (kBtu/sf)	41.61
Site Energy (kBtu/sf)	14.86

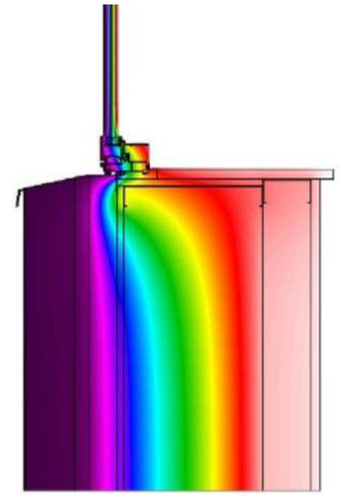


Figure 10 Model 5 (Infrared Image)

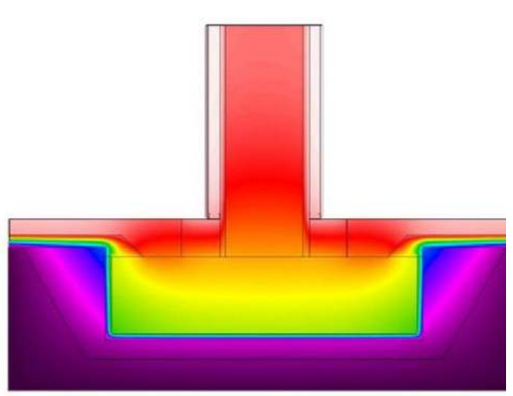
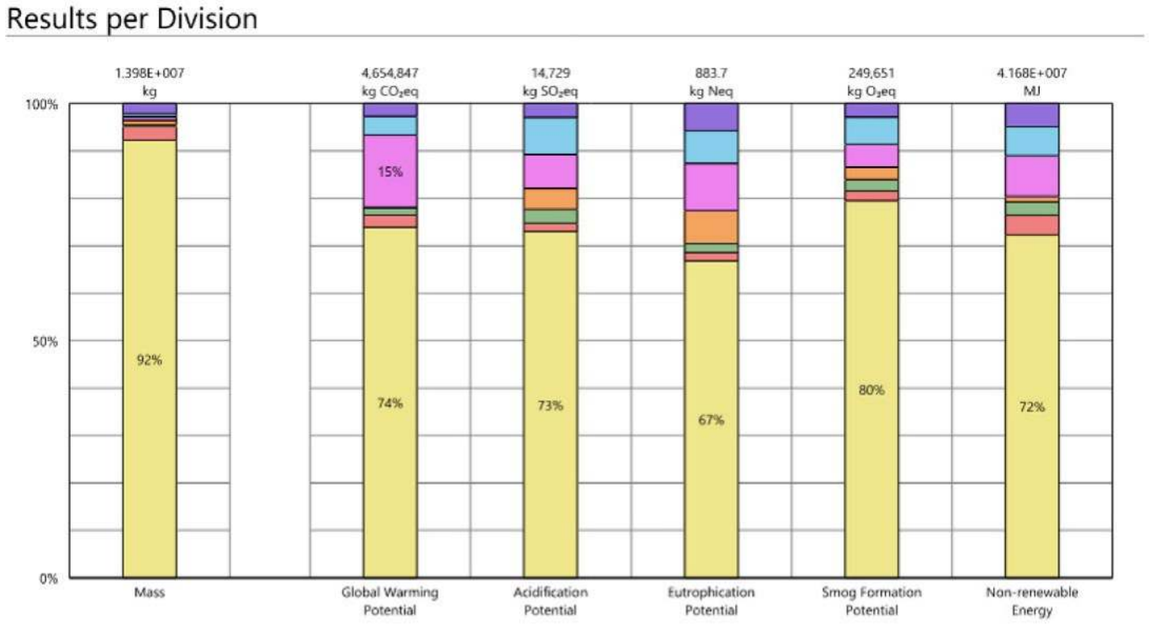
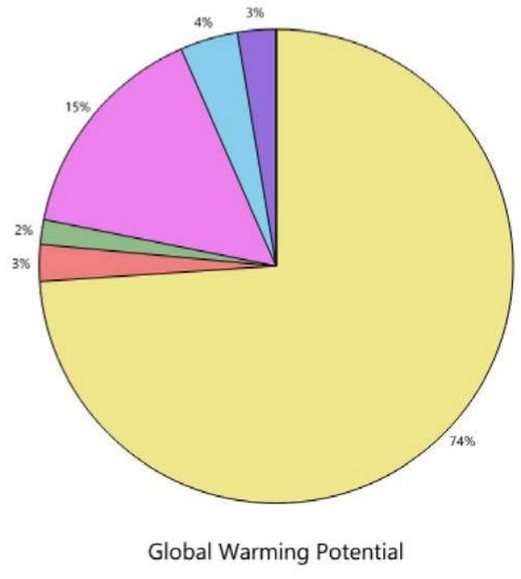


Figure 13 Model 6 (Infrared Image)



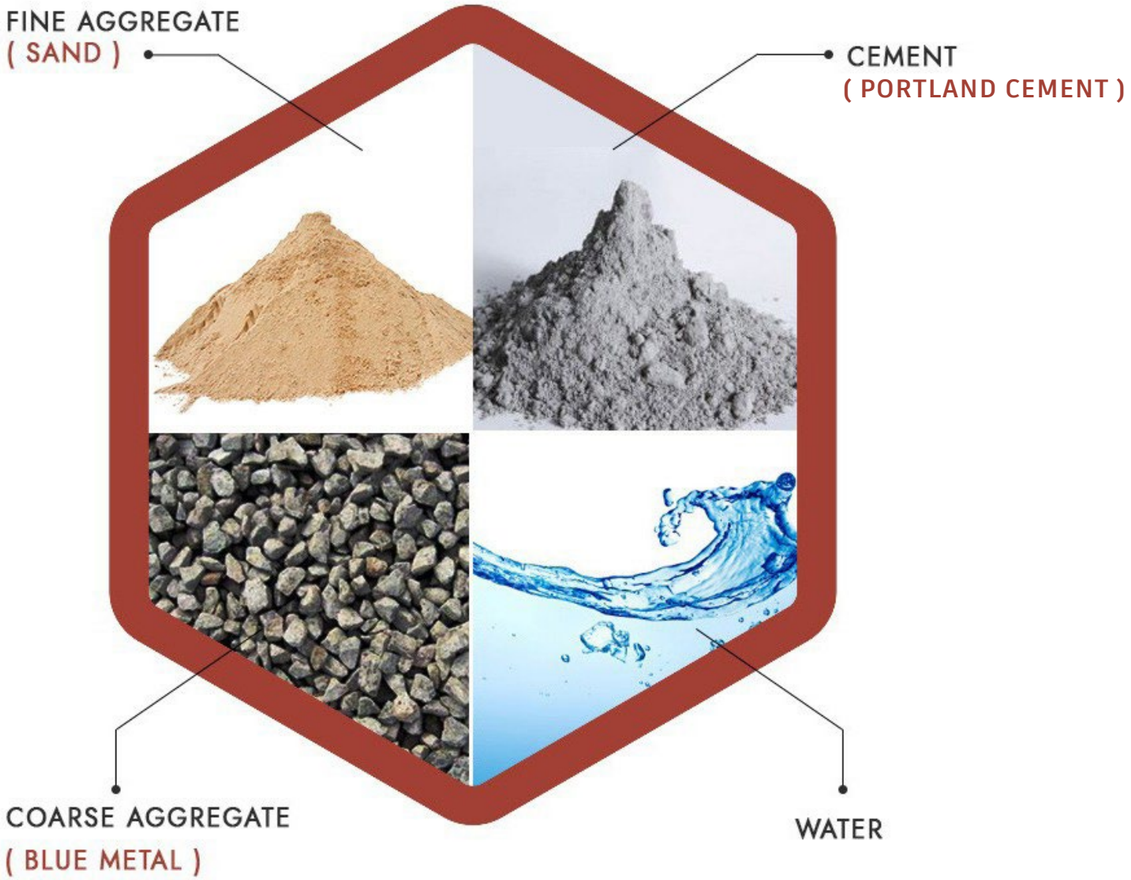


Hot spot analysis reveals concrete to be the major contributor in this building by volume and by GWP.

Design team recommended and the structural engineering team agreed to craft specifications that would allow the concrete supplier to use mix designs according to function (PT slab, columns, footings, etc…)
with the goal of a 35 to 40% reduction in overall GWP:

- Type 1L cement (15% limestone vs Portland cement)
- SCM (Supplementary Cementitious Materials) (fly ash and/or slag)
- 56-day strength vs 28-day

WBLCA “Hot Spot” Analysis



Decarbonizing Concrete

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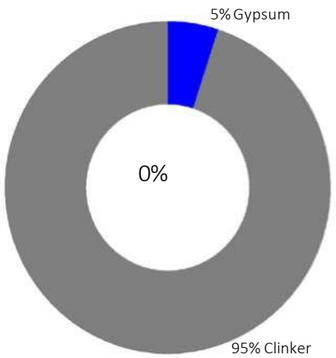
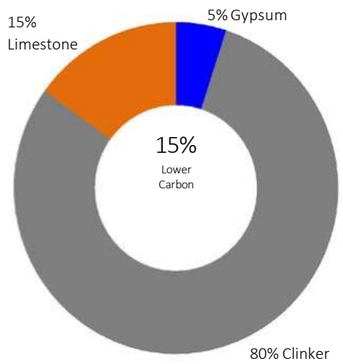
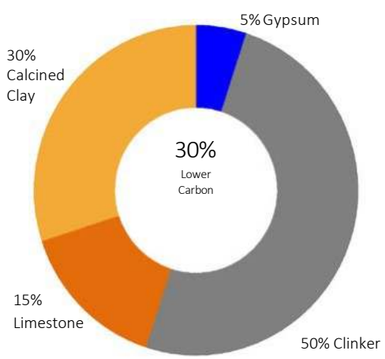
Strategy	Potential GWP reduction of Cement	Limitations
Increase Supplemental Cementitious Materials (SCM) such as fly ash and slag	20-40% depending on amount of SCMs	Above 20% SCMs will elongate cure time and impact color. Supply of fly ash and slag varies seasonally and may be a local concern
Increasing cure time from standard 28 day to 56 day	16-18%	May have schedule implications
Utilizing Type 1 L Cement	15%	Replaces 15% of Portland cement with limestone







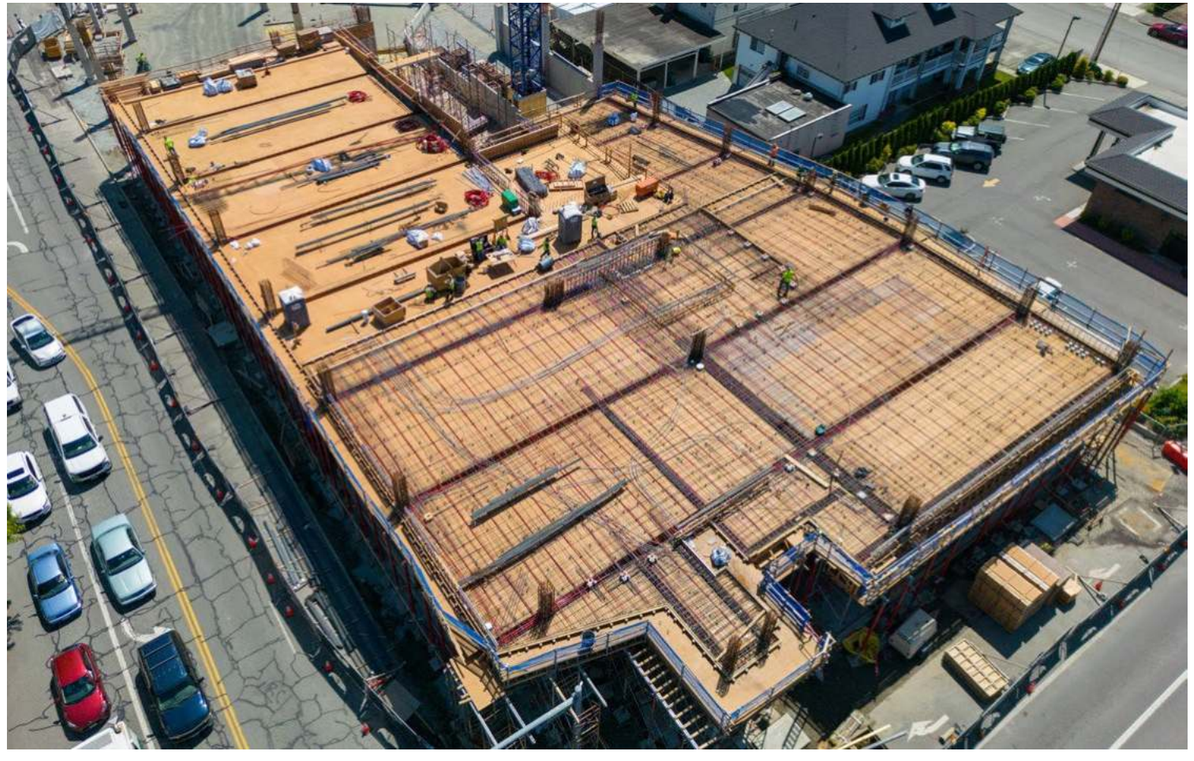
*Calportland produces Type IL cement (EPD); should theoretically be cheaper but demand is low (dominated by Caltrans).

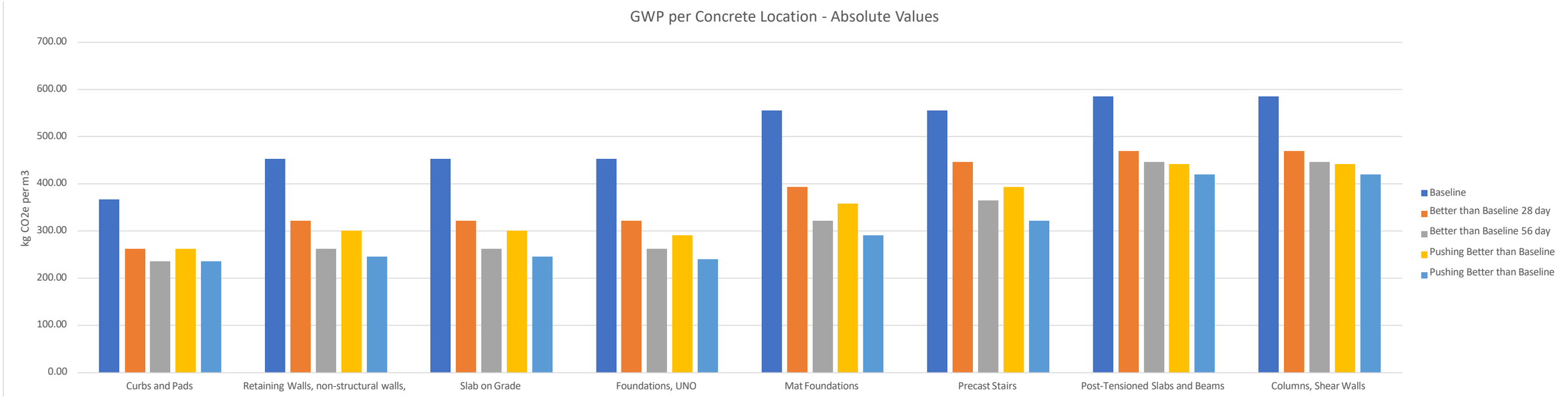
Kriegh, J., Magwood, C., Srubar, W. (2021). Carbon-Storing Materials: Summary Report

Kriegh, J., Magwood, C., Srubar, W., Lewis, M., Simonen, K. (2021). Transformative Carbon-Storing Materials: Accelerating an Ecosystem Report.

What are the “levers” we can pull?

			Baseline	Pushing Better than Baseline			
			Type I/II Cement	Type 1L Cement			
Location	Strength (psi)	Project Volume (m3)	28 day GWP (kg CO2e per m3)	28 day GWP lowest of range (kg CO2e per m3)	28 day %Reduction from Baseline lowest of range	56 day GWP lowest of range (kg CO2e per m3)	56 day %Reduction from Baseline lowest of range
Curbs and Pads (plus roof slab)	3,000	37.18	13,609.37	9,714.00	-29%	8,727.84	-36%
Retaining Walls, non-structural walls, vehicle barriers	4,000	59.55	26,948.06	17,891.53	-34%	14,569.41	-46%
Slab on Grade	4,000	20.56	9,303.93	6,177.13	-34%	5,030.15	-46%
Foundations, UNO	4,000	338.00	152,950.98	98,162.37	-36%	80,803.60	-47%
Mat Foundations	5,000	1,019.08	565,115.55	364,520.23	-35%	295,959.38	-48%
Precast Stairs	5,000	15.17	8,412.44	5,956.88	-29%	4,877.02	-42%
Post-Tensioned Slabs and Beams	6,000	2,037.51	1,190,111.84	898,676.05	-24%	853,512.77	-28%
Columns, Shear Walls	6,000	758.72	443,169.93	334,646.03	-24%	317,828.28	-28%
					-31%		**-40%**





Can We Meet Our Targets?

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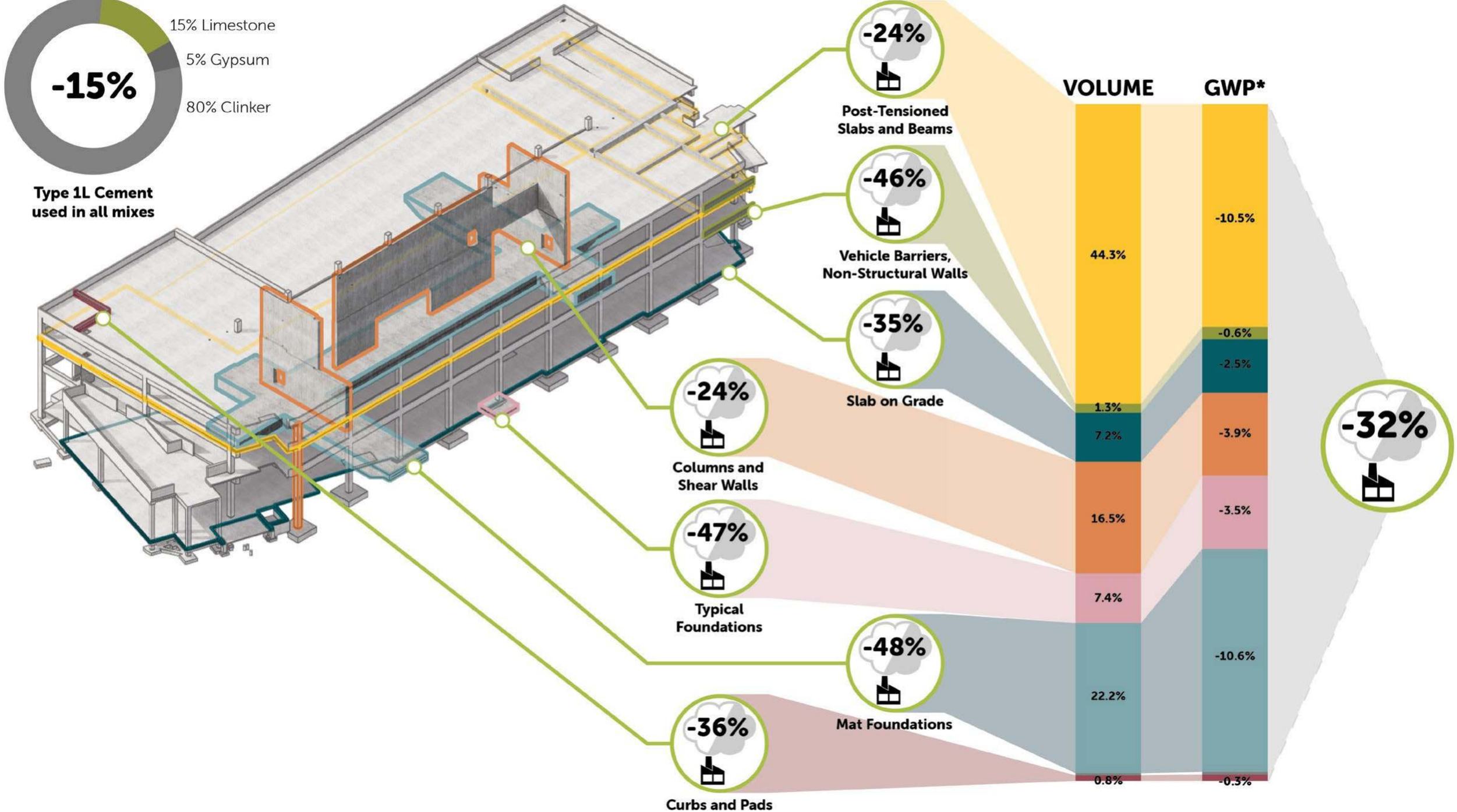
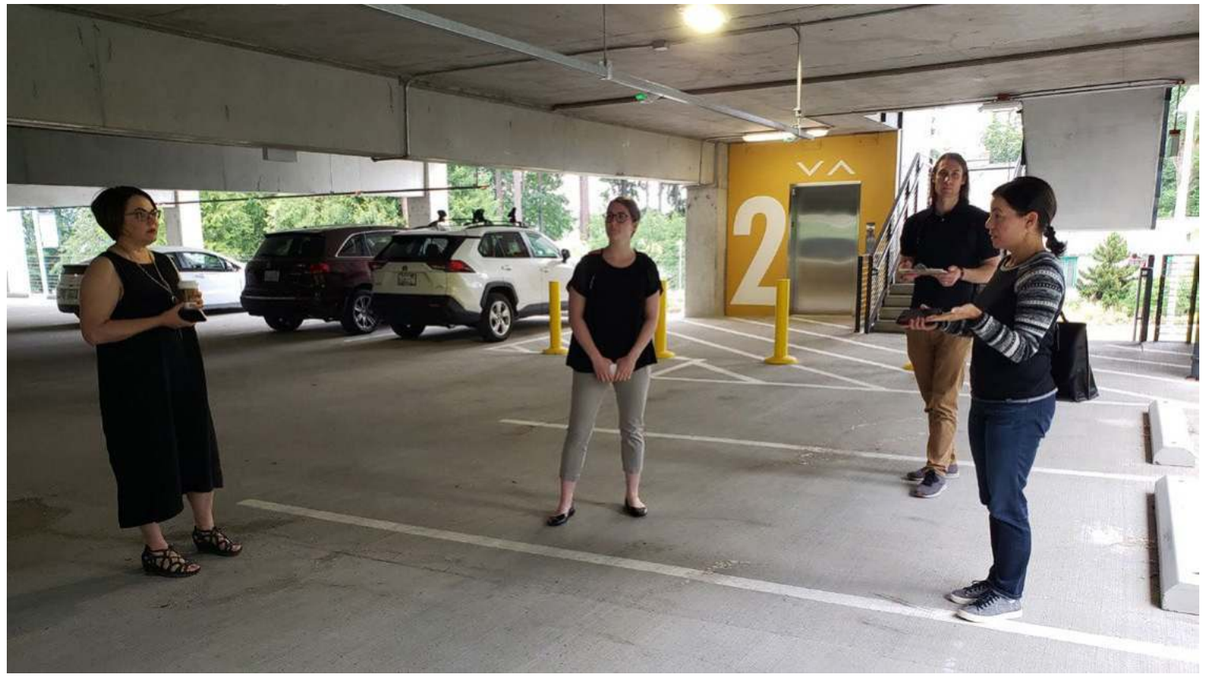


Communicating the Goals



=1,088.4 metric tons

122,476
GALLONS OF
GASOLINE BURNED

2,721,045
miles driven

237 typical
passenger cars
driven for 1 year

41%

REDUCTION IN GWP

Owner Risk-Reward

Future of Concrete

SCM'S / AGGREGATES / CURE TIMES

- CALCINATED CLAYS
- VOLCANIC GLASS
- SILICA-RICH AGRICULTURAL ASH
- RECYCLED GLASS

FROM CARBON REDUCTION TO **CARBON STORING**

Where Can This Be Done?

TYPICAL FOUNDATIONS
MAT FOUNDATIONS
SLAB ON GRADE
POST TENSIONED SLABS AND BEAMS
NON-STRUCTURAL CONCRETE WALLS
COLUMNS AND SHEAR WALLS
CURBS AND PADS

CONCRETE

CONCRETE WORK SHALL CONFORM TO ALL REQUIREMENTS OF IBC CHAPTER 19.

CONCRETE MIXTURES
CONCRETE MIXTURES SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:

CONCRETE MIXTURES

f'_c (PSI)	TEST AGE (DAYS)	EXPOSURE CLASS				MAX W/C RATIO	USE	NOTES
		F	S	W	C			
3,500	56	F1	S0	W0	C1	-	CURBS AND PADS	3
4,000	56	F0	S1	W0	C1	-	FOUNDATIONS, UNO	5
4,000	56	F0	S1	W0	C1	0.45	WALLS (UNO), VEHICLE BARRIERS	4
4,000	56	F0	S1	W1	C1	0.45	INTERIOR SLAB-ON-GRADE, ELEVATOR PIT WALLS	2
4,000	56	F1	S1	W1	C1	0.45	EXTERIOR SLAB-ON-GRADE	4
5,000	56	F0	S1	W0	C1	-	MAT FOUNDATIONS	5
5,000	56	F0	S1	W0	C1	-	PRECAST STAIRS	-
6,000	56	F1	S0	W0	C1	0.40	ELEVATED SLABS AND BEAMS, UNO	1, 2
6,000	56	F2	S0	W1	C1	0.45	ELEVATED SLABS AND BEAMS AT TOP LEVEL, TOP RAMP	1, 2
6,000	56	F0	S0	W0	C1	-	COLUMNS, SHEAR WALLS	2

1. FOR POST-TENSIONED SLABS AND BEAMS, CONCRETE SHRINKAGE SHALL BE A MAXIMUM OF 0.035 PERCENT, OR A MAXIMUM ALLOWABLE WATER CONTENT OF 255 Lb/CY.
2. PROVIDE A MINIMUM OF 10% SUPPLEMENTARY CEMENITIOUS MATERIALS (SCM).
3. PROVIDE A MINIMUM OF 20% SUPPLEMENTARY CEMENITIOUS MATERIALS.
4. PROVIDE A MINIMUM OF 25% SUPPLEMENTARY CEMENITIOUS MATERIALS.
5. PROVIDE A MINIMUM OF 30% SUPPLEMENTARY CEMENITIOUS MATERIALS.

Demonstration and Replication

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Public Bid Process and Strategies

1.4 PASSIVE HOUSE CERTIFICATION REQUIREMENTS

A. Project shall meet all of the requirements for Passive House Certification. Contractor shall endeavor to install the construction materials as shown to achieve certification.

B. Contractor Training: Contractor is required to assign a single Passive House lead coordinator for the project. Lead Coordinator shall either have Passive House for Builder training or certifications or shall complete a training course equivalent to the Passive House Network's On-Demand "Introduction to Passive House Trades".

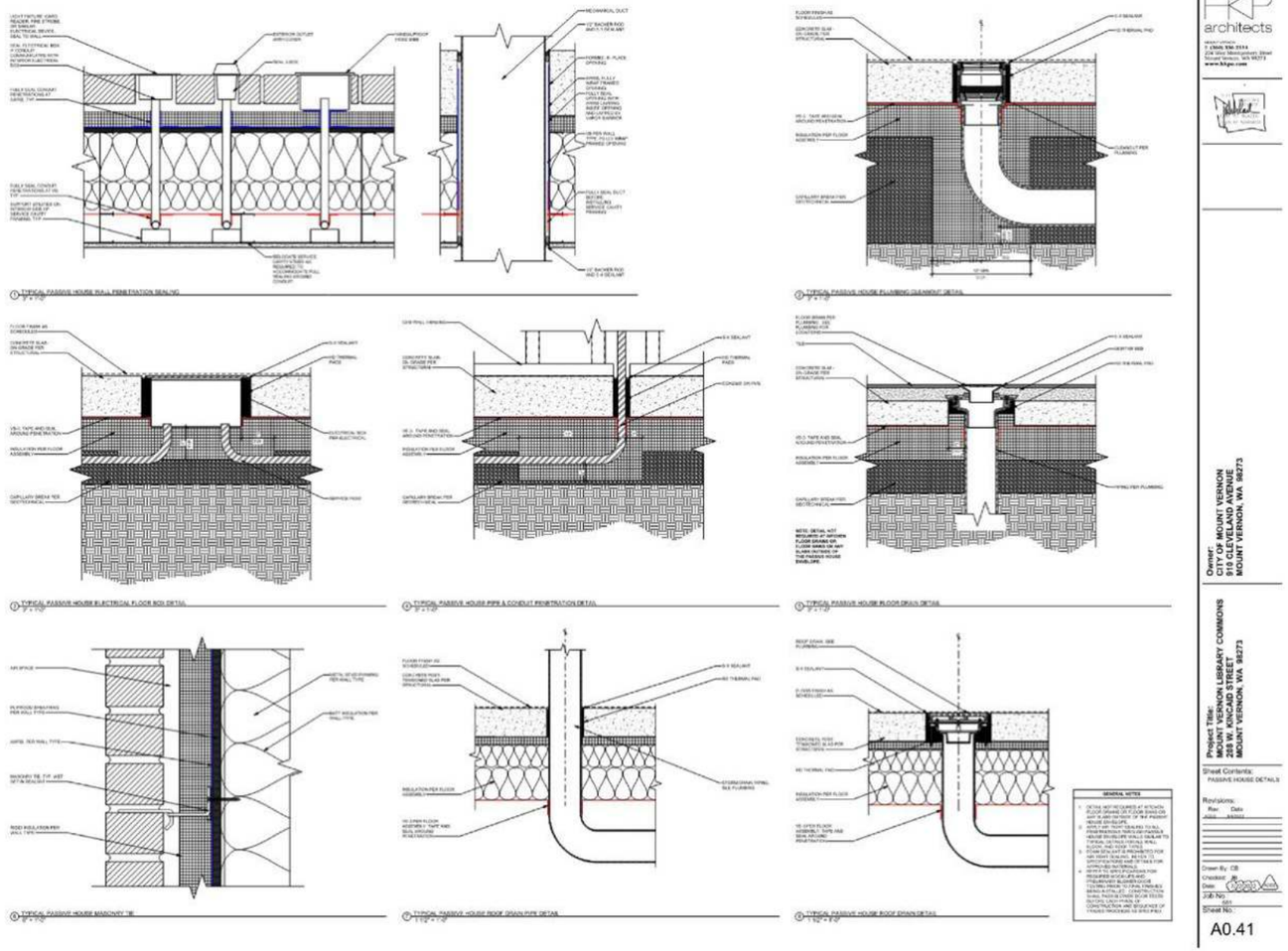
C. Pre-Installation Conferences: Refer to Section 01 31 19 Project Meetings.

D. PHIUS Review: The project Documents have been reviewed by PHIUS for compliance with Passive House requirements. Details shall not be changed and installations shall not be modified without consent of the Architect and approval from PHIUS.

E. PHIUS Rater: A Third-Party PHIUS Rater has reviewed the project Documents and is required to inspect installations throughout construction. Contractor shall coordinate with the Third-Party PHIUS Rater to provide mock-ups, testing, Pre-Installation Conferences, and detail review in an effort to successfully pass inspections and testing.

F. Air-Tightness Quality Control: Contractor shall install Passive House envelope to meet the air-tightness criteria.

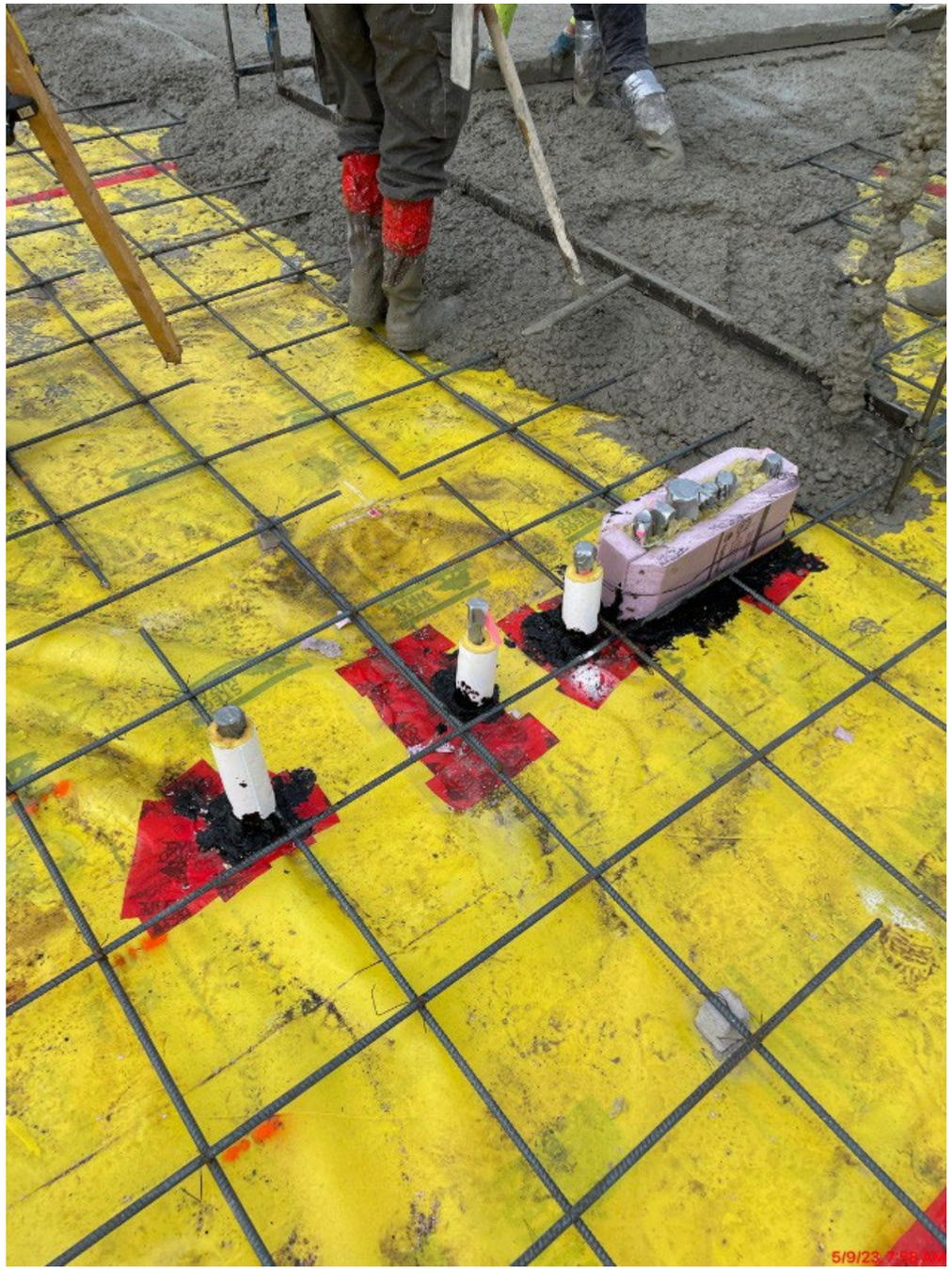
Contractor Requirements Including Training



PASSIVE HOUSE PENETRATION SCHEDULE

Description	Location/Grid Line	Size of Opening-Material	DETAIL TYPE	DETAIL TAG	Notes
PHMFO #1	Mech Room L2	22" x 48" Mechanical Duct Up	Cased Opening	1/A0.41 SIM	Thru Ceiling
PHMFO #2	Mech Room L2	22" x 48" Mechanical Duct Up	Cased Opening	1/A0.41 SIM	Thru Ceiling
PHMFO #3	Mech Room L2	12" x 36" Mechanical Duct Up	Cased Opening	1/A0.41 SIM	Thru Ceiling
PHMFO #4	Mech Room L2	12" x 36" Mechanical Duct Up	Cased Opening	1/A0.41 SIM	Thru Ceiling
PHMFO #5	Kitchen Hood	28" x 28" Mechanical Duct Up	Cased Opening	1/A0.41 SIM	Not Passive- Thru Ceiling
PHMFO #6	Quiet Reading	3" Dia Pipe	DTSW	7/A0.41 SIM	Thru Ceiling
PHMFO #7	Quiet Reading	3" Dia Pipe	DTSW	7/A0.41 SIM	Thru Ceiling
PHMFO #8	Staff Workroom	2" Dia Pipe	DTSW	7/A0.41 SIM	Thru Ceiling
PHMFO #9	Staff Workroom	2" Dia Pipe	DTSW	7/A0.41 SIM	Thru Ceiling
PHPFP#1	Col in Collections	6" Dia Pipe SD	Storm Drain	2/A0.41 SIM	Thru Floor
PHPFP#2	Shear Wall at Circulation	4" Dia Pipe SD	Storm Drain	1/A0.41 SIM	Thru Floor

Penetration Schedule and Details



PRE-BID WALK-THROUGH AGENDA

Date: August 3, 2022
Project: Mount Vernon Library Commons
Held By: Christine Baldwin, HKP Architects

Project Sustainability Goals (Julie)

i. EV Charging
ii. Passive House
iii. Carbon Reduction
iv. LEED Silver Targets

Bid Period

MILES
SAND & GRAVEL

OFFICE: 253.833.3705
FAX: 253.833.3746

400 Valley Ave NE
Puyallup, WA 98372-2516

MIX SUBMITTAL

Date Issued : 03.10.2023

Customer: Lydig Construction

Project: MV Library Commons **Slump:** 5" max

Mix I.D.: 1240AF **Design f'c:** 3500 psi

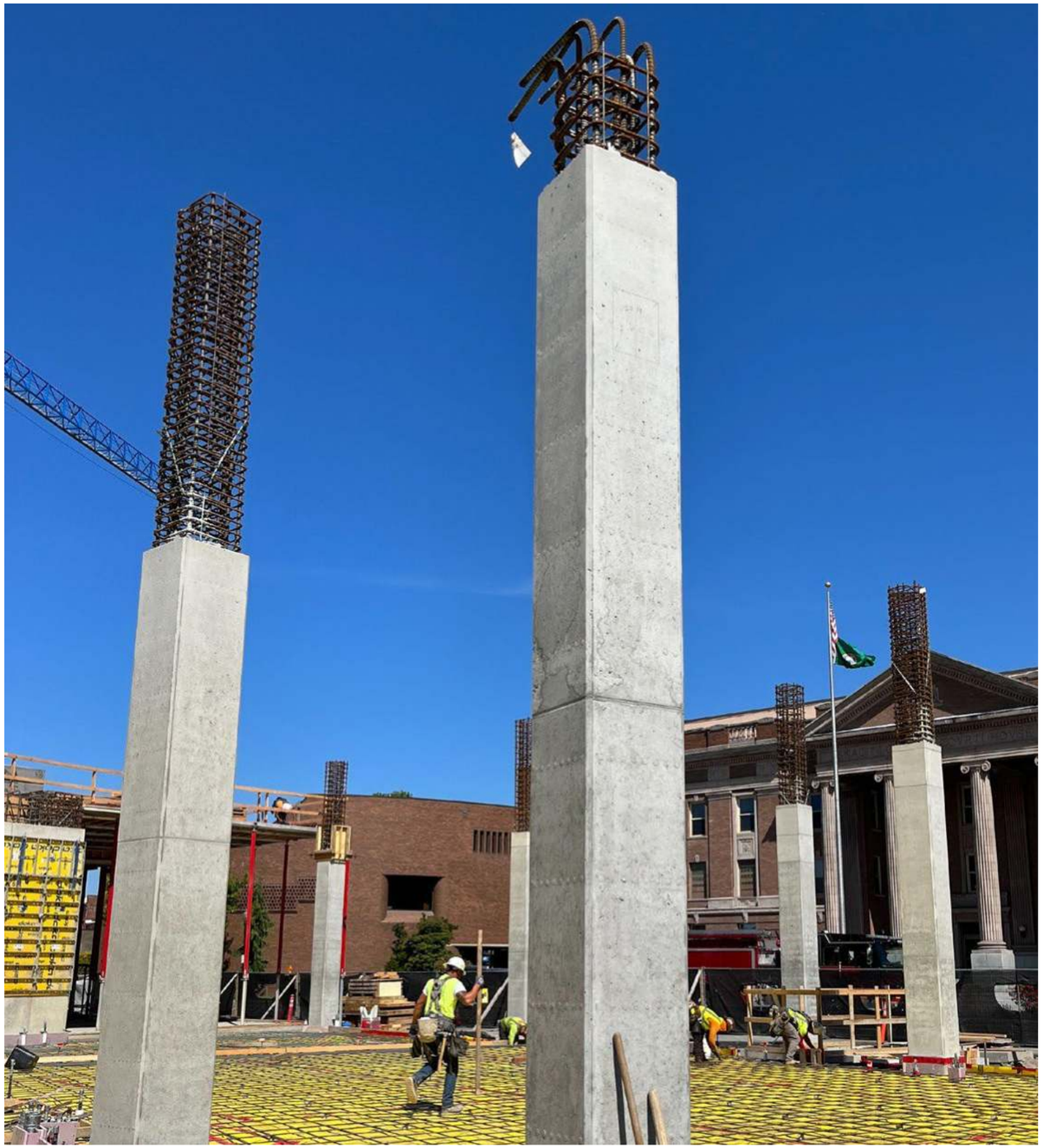
Absorption	Specific Gravity	Material	Batch weight SSD (lbs)		Material Volume
-	-		-	-	-
1.15	2.69	ASTM C-33 #57	1,550	lbs.	9.23
1.25	2.68	ASTM C-33 #8	350	lbs.	2.09
2.14	2.65	ASTM C-33 Sand	1,280	lbs.	7.74
	3.15	ASTM C-595 Type IL (Cement)	451	lbs.	2.29
	2.75	ASTM C-1697 SCM	113	lbs.	0.66
	-		-	-	-
	1.00	ASTM C-1602 Water	237.0	lbs.	3.80
		%Air (design)	5.00%		1.35
		MasterAir AE-90 (Air Ent.)	1 - 20	oz.	
		MasterGlenium 7500 (High Range WRA)	11 - 80	oz.	

W/C Ratio: 0.42 Density: 146.5 Design Volume: 27.17

Notes:
* ASTM C 94 (5.6) "The purchaser shall ensure that the manufacturer is provided copies of all reports of tests performed on concrete samples taken to determine compliance with specification requirements. Reports shall be provided on a timely basis."
* Miles S&G does not acknowledge test lab data that does not conform completely to ASTM standards.
* Point of placement, for mix conformance, is at the end of the discharge chute of the mixer.
* Miles S&G is not responsible for changes in the mix due to placement methods.
* Concrete placed that exceeds the maximum design slump, is placed at the risk of the contractor and owner.
*When NOT delivered MILES, MILES agrees to batch concrete based on Customer's order. The performance of the concrete becomes the sole responsibility of the Customer at the time of batching. Customer understands that MILES provides no representations or warranties, either express or implied, of merchantability, fitness for a specific purpose, or otherwise with regards to any concrete provided hereunder. Customer hereby knowingly and intentionally releases, indemnifies, and holds MILES harmless from and against any and all claims, actions, liabilities, and costs for performance, personal injury or property damage resulting from concrete provided hereunder.

Remarks: **3500 PSI 20%SCM Replacement Air Entrained**

Applicaton: Curbs and Pads



BLOWER DOOR TEST POOL

Enter to win a special prize for your efforts. Anyone can enter; different prizes will be given for those trades working directly on air sealing related to their scope of work.

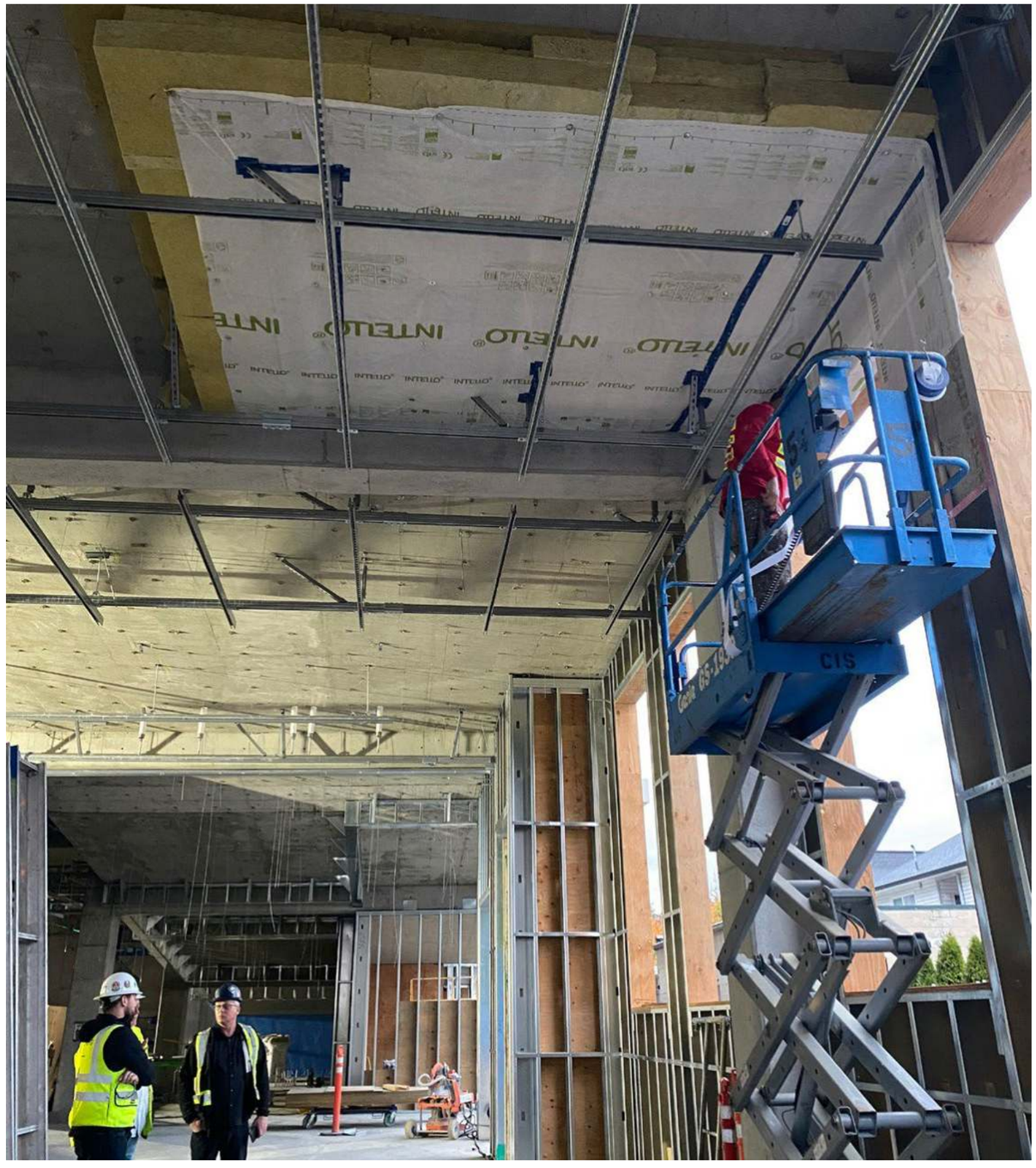
Name: _____

Company/Firm/Agency: _____ Phone: _____

Responsibility on Project: _____

Fill in your guesses for both Blower Door Tests below.
See back side for more information on typical testing.

	Air Infiltration Rate
Passive House Requirement	**≤0.060**
Blower Door Test 2 (after air and weather barrier and windows are installed, but before interior finishes and exterior veneer masonry is installed)	
Blower Door Test 4 - Final (after exterior veneer masonry and interior wall and ceiling finishes are complete)	



PASSIVE HOUSE ENVELOPE
SEAL PENETRATIONS FOR AIR-TIGHTNESS

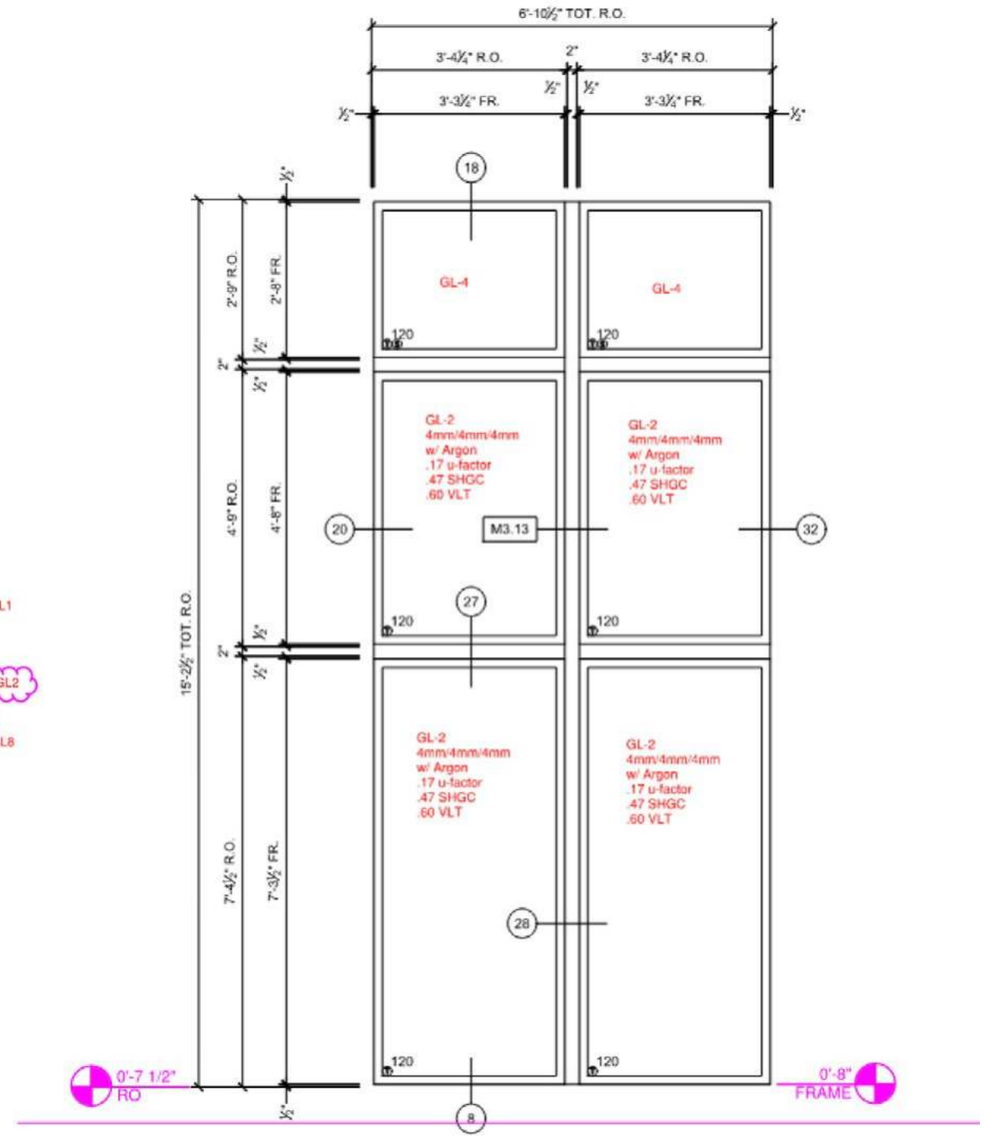
Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm) Ext.	Mid.	Int.	Gap Fill	U-Factor	SHGC	VLT	CR	Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown U. S. Zone N	NC	SC	S	Canada ER	Zone
Fixed - with Triple-Pane Glazing																CA
1-1/4"	Advanced Low-E IG	PEL-N-257-00137-00001	3	3	3	argon	0.16	0.29	0.54	73	N	NC			37	CA
	with grilles-between-the-glass	PEL-N-257-00137-00002					0.16	0.26	0.48	73	N	NC			35	CA
	with applied grilles	PEL-N-257-00137-00005					0.16	0.24	0.43	73	N	NC	SC	S	34	CA
1-1/4"	Advanced Low-E IG	PEL-N-257-00141-00001	4	4	4	argon	0.17	0.28	0.53	71	N	NC			35	CA
	with grilles-between-the-glass	PEL-N-257-00142-00001					0.17	0.26	0.47	71	N	NC			34	CA
	with applied grilles	PEL-N-257-00141-00002					0.17	0.23	0.42	71	N	NC	SC	S	32	CA
1-1/4"	Advanced Low-E IG	PEL-N-257-00147-00001	5	5	5	argon	0.19	0.28	0.52	69	N	NC			32	CA
	with grilles-between-the-glass	PEL-N-257-00148-00001					0.19	0.26	0.47	69	N	NC			31	CA
	with applied grilles	PEL-N-257-00147-00002					0.19	0.23	0.42	69	N	NC	SC	S	29	CA
1-1/4"	Advanced Low-E IG	PEL-N-257-00153-00001	6	6	6	argon	0.21	0.28	0.51	66	N	NC			30	CA
	with grilles-between-the-glass	PEL-N-257-00154-00001					0.22	0.25	0.46	66	N	NC	SC	S	27	
	with applied grilles	PEL-N-257-00153-00002					0.21	0.23	0.41	66	N	NC	SC	S	27	CA
1-1/4"	SunDefense™ IG	PEL-N-257-00158-00001	3	3	3	argon	0.16	0.22	0.50	73	N	NC	SC	S	33	CA
	with grilles-between-the-glass	PEL-N-257-00158-00002					0.16	0.20	0.45	73	N	NC	SC	S	31	CA
	with applied grilles	PEL-N-257-00158-00005					0.16	0.18	0.40	73	N	NC	SC	S	30	CA
1-1/4"	SunDefense™ IG	PEL-N-257-00162-00001	4	4	4	argon	0.17	0.22	0.49	71	N	NC	SC	S	31	CA
	with grilles-between-the-glass	PEL-N-257-00163-00001					0.17	0.20	0.44	71	N	NC	SC	S	30	CA
	with applied grilles	PEL-N-257-00162-00002					0.17	0.18	0.39	71	N	NC	SC	S	29	CA
1-1/4"	SunDefense™ IG	PEL-N-257-00168-00001	5	5	5	argon	0.19	0.22	0.48	69	N	NC	SC	S	29	CA
	with grilles-between-the-glass	PEL-N-257-00169-00001					0.19	0.20	0.43	69	N	NC	SC	S	28	CA
	with applied grilles	PEL-N-257-00168-00002					0.19	0.18	0.39	69	N	NC	SC	S	27	CA
1-1/4"	SunDefense™ IG	PEL-N-257-00174-00001	6	6	6	argon	0.21	0.22	0.47	66	N	NC	SC	S	26	CA
	with grilles-between-the-glass	PEL-N-257-00175-00001					0.22	0.20	0.42	66	N	NC	SC	S	24	
	with applied grilles	PEL-N-257-00174-00002					0.21	0.18	0.38	66	N	NC	SC	S	24	CA
1-1/4"	NaturalSun Low-E IG	PEL-N-257-00116-00001	3	3	3	argon	0.16	0.49	0.61	73	N				48	CA
	with grilles-between-the-glass	PEL-N-257-00116-00002					0.16	0.44	0.58	73	N				45	CA
	with applied grilles	PEL-N-257-00116-00005					0.16	0.40	0.49	73	N	NC			43	CA
1-1/4"	NaturalSun Low-E IG	PEL-N-257-00120-00001	4	4	4	argon	0.17	0.47	0.60	70	N				46	CA
	with grilles-between-the-glass	PEL-N-257-00121-00001					0.18	0.43	0.54	70	N				42	CA
	with applied grilles	PEL-N-257-00120-00002					0.17	0.39	0.48	70	N	NC			41	CA
1-1/4"	NaturalSun Low-E IG	PEL-N-257-00126-00001	5	5	5	argon	0.19	0.47	0.59	68	N				43	CA
	with grilles-between-the-glass	PEL-N-257-00127-00001					0.20	0.42	0.53	68	N				38	CA
	with applied grilles	PEL-N-257-00126-00002					0.19	0.38	0.47	68	N	NC			38	CA
1-1/4"	NaturalSun Low-E IG	PEL-N-257-00132-00001	6	6	6	argon	0.21	0.45	0.58	65	N				40	CA
	with grilles-between-the-glass	PEL-N-257-00133-00001					0.22	0.41	0.52	65	N				36	CA
	with applied grilles	PEL-N-257-00132-00002					0.21	0.37	0.46	65	N	NC			35	CA

GL1

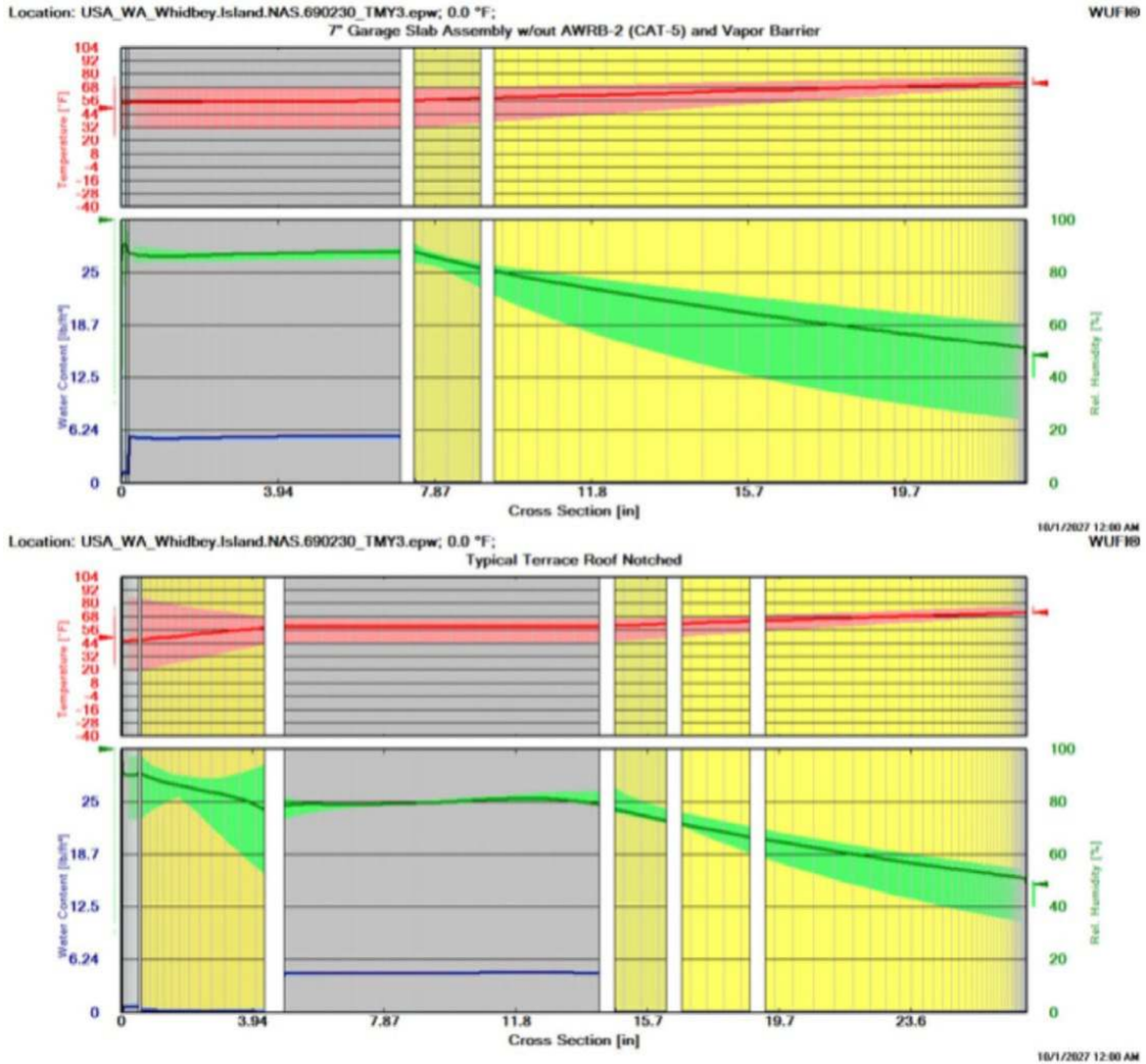
GL2

GL8

Continued on next page (Krypton gas)



Krypton Gas Window Unit Substitution - War in Ukraine



Insulation decrease in localized areas due to mechanical conflicts

Construction: Modifications and Support

HKP architects

MVLC

072100 INSUL-2

Comfortbatt®

Thermal Batt Insulation

Easy Fit

Easily cut to achieve an optimal fit around pipes, electrical wiring boxes, ductwork and between studs and joists that are less than standard width.

ROCKWOOL Comfortbatt® is a semi-rigid stone wool batt insulation for exterior wood and steel stud applications in both new construction and renovations.

It features a unique flexible edge designed to compress as the batt is inserted then spring back, expanding the batt against the frame studs to give a complete fit. This flexibility ensures the expected R-value is achieved and maintained.

Non-combustible and fire resistant, Comfortbatt® will not develop toxic smoke or promote flame spread, even when exposed directly to a fire. It also offers water and moisture resistance and excellent sound absorbency.

Comfortbatt® is an effective way to improve a home's energy efficiency. It is GREENGUARD Gold Certified and contributes to a healthier indoor environment.

Learn more at rockwool.com

ROCKWOOL

Specified, Approved

OWENS CORNING

INTRODUCING OWENS CORNING®

THERMAFIBER®
FIRE & SOUND GUARD® PLUS
SOUND AND THERMAL BATT

Thermafiber® Fire & Sound Guard® Plus is a hybrid light-density mineral wool batt that is designed to use in both interior and exterior wall cavities. This product combines the attributes of Thermafiber® UltraBatt™ and Thermafiber® Fire & Sound Guard® into one product, saving time for the installer.

Thermal Comfort
Contributes to energy efficiency with R-values that won't decrease as the insulation ages.

Fire Resistant
Mineral wool is naturally fire resistant

Non-Combustible
Mineral wool is non-combustible per ASTM E136.

Mold Resistant
Resists mold, fungi and is vermin-resistant due to its being an incrganic material - tested per ASTM C1338.

Sound Control
Helps control noise between floors, through walls, and from outdoors.

Ease of Installation
Batt product that is easy to cut and install, flexibility and durability allow it to conform and friction fit.

Recycled Content
70% recycled content.

Availability

Available in a wide range of R-values for common wood stud assemblies as well as steel framing in both narrow and wide widths.

- **Wood Stud R-Values**
  R-13, R-15, R-21, R-23, R-30
- **Steel Stud R-Values**
  R-10, R-13, R-15, R-21, R-24

Learn more by visiting owenscorning.com/thermafiber.

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ONE OWENS CORNING PARKWAY
TOLEDO, OH 43659 USA
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Substitution 1, Approved

Johns Manville

Formaldehyde-Free™ Fiber Glass Insulation Enhanced with Bio-Based Binder

UNFACED
KRAFT FACED
FOIL FACED

PRODUCT DATA SHEET

COMPANY
Johns Manville is committed to creating more comfortable, healthier and energy efficient indoor environments. We revolutionized the building insulation industry by pioneering the development of Formaldehyde-free™ fiber glass building insulation over a decade ago. We continue to build on our legacy of innovation with a new Formaldehyde-free™ fiber glass insulation solution that utilizes an innovative bio-based binder, made mostly from rapidly renewable plant-based materials, that continues to offer excellent thermal and acoustical performance as well as improved handling, easier cutting and less dust than our previous product. At JM, we believe that in every detail, materials matter.

DESCRIPTION
JM Formaldehyde-free™ thermal and acoustical insulation is made of long, resilient glass fibers bonded with our bio-based binder. A wide range of thermal resistance R-values is available to provide thermal control for both vertical and horizontal applications. JM insulation is available unfaced or with a variety of facings, including kraft or foil vapor retarder.

USE
JM Formaldehyde-free™ thermal and acoustical insulation can be used in a wide variety of wood frame, engineered wood and steel frame construction applications, including:

New Construction: residential homes and commercial buildings interior and exterior walls, floors and ceilings for thermal and sound control, as well as basement wall insulation.

Retrofit: adding insulation to attics, crawl spaces and above suspended ceilings.

INSTALLATION
JM insulation cuts easily with an ordinary utility knife, and unfaced or tabless versions install easily by simply pressing in place between studs or joists in standard framing. Standard facings have stapling tabs for attachment to framing if additional securement is required.

PACKAGING
JM insulation is compression-packaged for savings in storage and freight costs.

DESIGN CONSIDERATIONS
Kraft and standard foil facings on this product will burn and must not be left exposed. It must be covered with gypsum board or another approved interior finish. Where an exposed application is required, use FSK-25 flame-resistant faced insulation.

In colder climate areas, vapor retarders (whether attached to the insulation or applied separately) are often placed toward the heated or conditioned side of the wall. This is done to reduce water vapor penetration into the wall from the building interior. Check your local building codes for vapor retarder requirements.

Refer to JM guide specifications for further design considerations and required installation instructions.

LIMITATIONS OF USE
Check applicable building codes.

PERFORMANCE ADVANTAGES
Formaldehyde-free: will not off-gas formaldehyde in the indoor environment.

Thermal Efficiency: provides effective resistance to heat transfer with R-values up to R-49 (RSI-8.6).

Sound Control: reduces transmission of sound through exterior and interior walls and floor or ceiling assemblies.

Fire Resistant and Noncombustible: see Physical Properties.

Durable Inorganic Glass: will not rot, mildew or deteriorate and is noncorrosive to pipes, wiring and metal studs.

Superior Performance: bonded glass fibers are dimensionally stable and will not slump within the wall cavity, settle or break down during normal applications.

ENERGY AND ENVIRONMENT

ENERGY STAR PARTNER

GREENGUARD

Substitution 2, Approved

Insulation Substitutions Related to Strike

70% Complete; Opening in Spring 2024

HKP architects

MVLC

Questions?