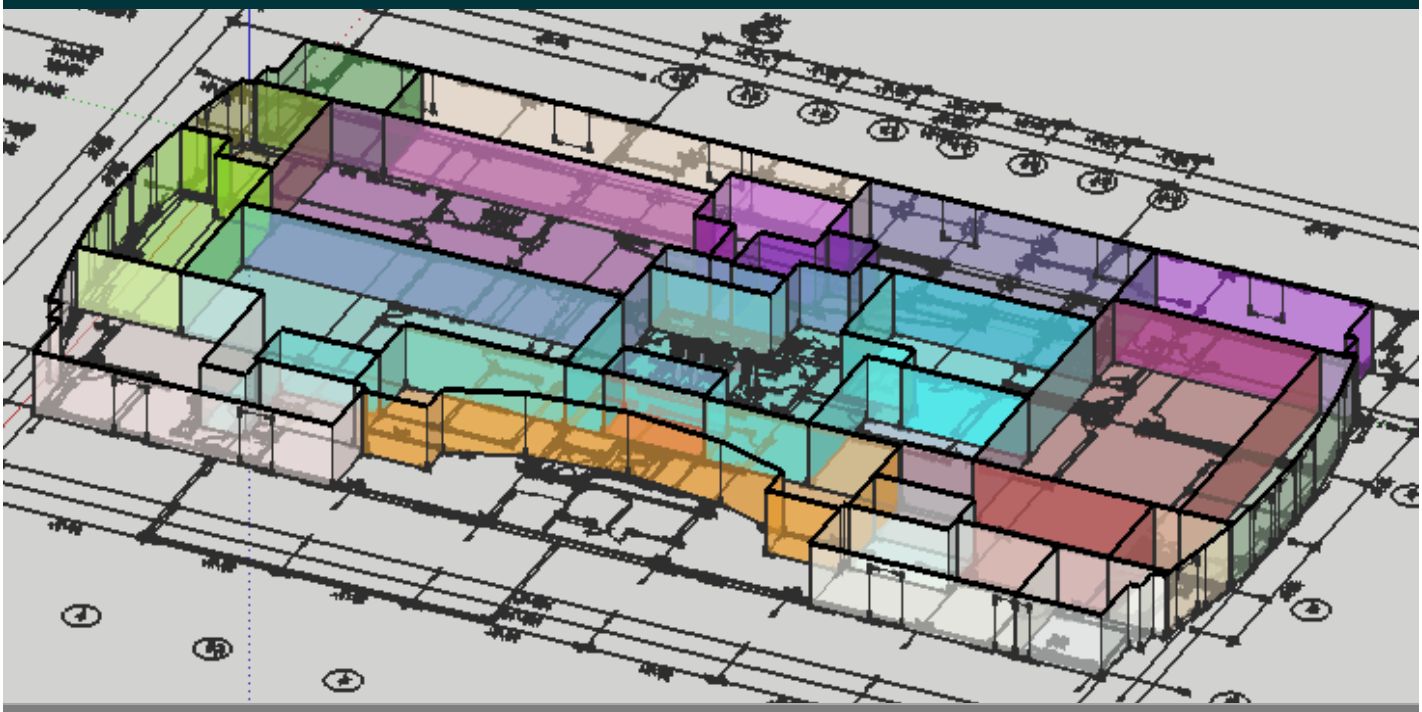


Preliminary Energy Performance Analysis

Arlington County 4.1 Site Plan Submission

4600 Fairfax Drive

Arlington, Virginia

Arlington 4.1 SP Report v2.1

SUSTAINABLE BUILDING PARTNERS

May 12th, 2023

2701 Prosperity Avenue, Suite 100
Fairfax, Virginia 22031

www.sustainbldgs.com

Table of Contents

Disclaimer: This analysis is not intended to predict the absolute energy consumption of the proposed facility but rather it is intended to estimate order of magnitude savings for alternative systems and building options based on refined assumptions, building performance metrics and energy modeling expertise. Change in weather conditions, operational characteristics, end-user, miscellaneous electrical loads, controls alterations and other unpredictable metrics prevent the model from accurately predicting the actual annual energy consumption of any facility.

Design Evaluation

Sustainable Building Partners, LLC (SBP) has developed a whole building energy simulation using Energy Plus v22.1 via the Open Studio v1.4 interface for the proposed 4600 Fairfax Drive apartment building and triplex buildings in Alexandria, VA. SBP's modeling methodology is consistent with LEEDv4 and ASHRAE 90.1-2010 Appendix G modeling protocol and best practices.

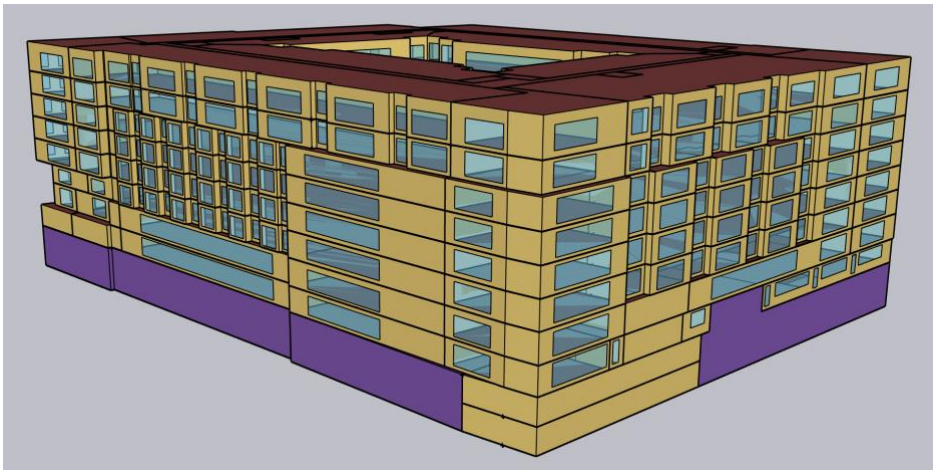


Figure 1: Rendering of 4600 N Fairfax Drive (building 1)

Arlington County 4.1 Site Plan Conditions / GBIP

2020 GBIP Bonus Density: **0.25 FAR**

GBIP Energy Performance Requirements:

- **20% Energy Cost Savings** as compared to a LEED Baseline design (ASHRAE 90.1-2010 Appendix G)
- **EnergyStar score of ≥75**
- **Renewable Energy**
  - On-site Solar @ 2 W/sf
  - On-site Solar @1.5 W/sf + 12% Green Roof
  - Off-site Tier 2 purchase (10% offset for 10-years)

Performance Disclaimer

This analysis is based on an early design information and thus all results and benchmarking should be viewed as relative order-of-magnitude (RoM). This report works to establish high-level performance targets and general design standards but does not guarantee future performance as is noted in ASHRAE 90.1-2010 Section G1.2 Note #2.

This analysis is configured to only demonstrate compliance with the energy performance requirements of the Green Building Incentive Policy and is not intended to demonstrate compliance with the 2018 VECC. A separate VECC energy model analysis will be provided at the permit submission.

Preliminary Energy Estimates

This section of the report summarizes the results and benchmarking of the preliminary whole building hourly energy simulations. Table 1 provides the results of the hourly energy simulations.

Energy Cost Savings: 20 - 22% (ASHRAE 90.1-2010)

GBIP Compliance: YES (≥20%)

Table 1: Annual Energy Consumption & Performance Benchmarking

Design	Description	Energy Cost Savings	Site EUI (kBtu/sf)	Source EUI (kBtu/sf)	Year 1 GHG(2) (Tons CO2e)	Energy Star Score
Baseline	**ASHRAE 90.1-2010 Appendix G**	**--**	**--**	**--**	**--**	**--**
GBIP Target)	**Minimum required performance**	**≥20%**	**--**	**--**	**--**	**≥75**
Building 1	Current design	**20 - 25%**	**35 - 40**	**100 - 105**	**1,600+**	**≥80**
Buildings 2,3	Current design	**20 - 21%**	**25 - 30**	**80 - 90**	**200+**	**≥80**

Primary Design Features

- Split system heat pumps (15-16 SEER)
- Decoupled ventilation with heat pump DOAS (Building 1)
- In-unit electric storage water heaters
- Interior & garage lighting power reductions (Building 1)
- EnergyStar appliances
- High performance enclosure

Throughout the early-design process the project team has worked to optimize overall energy performance and will continue this effort for the remainder of the design. Most design features are not fully developed at this point in design and will continue to evolve over the next few months.

Disclaimer
A majority of the mechanical configuration is setup based on early-design narratives and standard market design assumptions. Variations in performance are possible as the design progresses.

Path to Electrification

The project team is actively evaluating the feasibility of specific electrification initiatives for the facility. The table below summarizes the primary systems that would typically use either gas or electric as the primary fuel.

Table 2: Electrification Strategies & Considerations (Building 1)

System	Current Basis of Design	Primary Heating	All Electric?	Challenges & Limitations	Future-Proofing
Local HVAC	Split System Heat Pump	Heat Pump	**Yes**	N/A (all electric)	N/A (all electric)
Ventilation HVAC (DOAS)	100% OA Rooftop Unit	Heat Pump with electric-backup	**Yes**	• Electric-resistance auxiliary requires significant peak electric loads (kW) • Electric-resistance auxiliary yields HIGHER operating costs, source energy, and GHG emissions as compared to a gas backup.	• A gas-backup would likely yield lower short- and mid-term carbon emissions and would yield a substantial reduction in peak demand as compared to electric-resistance.
Domestic Hot Water	Central Gas-fired Condensing boilers	Natural Gas	No	• In-unit HPWH is not a viable option because of venting requirements & mech. closet area • Central HPWH is limited by first cost & available mechanical space • When compared to gas-fired boilers and HPWHs, electric-resistance heaters: o yield the highest short- and long-term energy cost, source energy, and greenhouse gas emissions o add significant strain on the electric grid due to the high peak demand which could result in additional *stopgap* gas-fired generation sources being added to the regional grid o reduce EnergyStar score by 3-6 points	• Heat pumps would yield reduced site energy, source energy, and greenhouse gas emission both short- and long-term. Feasibility is still being evaluated.
Unit Appliances	All Electric	--	**Yes**	N/A	• The feasibility of heat pump dryers & induction ranges is still being evaluated.

Table 3: Electrification Strategies & Considerations (Building 2 & 3)

System	Current Basis of Design	Primary Heating	All Electric?	Challenges & Limitations	Future-Proofing
Local HVAC	Split System Heat Pump	Heat Pump	**Yes**	N/A (all electric)	N/A (all electric)
Domestic Hot Water	Electric storage water heaters	Electric-resistance	**Yes**	• In-unit HPWH is challenging because of venting requirements & mech. closet area • When compared to gas-fired boilers and HPWHs, electric-resistance heaters: o yield the highest short- and long-term energy cost, source energy, and greenhouse gas emissions o add significant strain on the electric grid due to the high peak demand which could result in additional *stopgap* gas-fired generation sources being added to the regional grid o reduce EnergyStar score by 3-6 points	• Heat pumps would yield reduced site energy, source energy, and greenhouse gas emission both short- and long-term. Feasibility is still being evaluated.
Unit Appliances	Ranges – Gas All Others - Electric	--	No	• N/A	• The feasibility of heat pump dryers is still being evaluated. • Electric ranges are still being evaluated

Performance Considerations & GHG Emissions

SBP has performed a simplified study to help further define specific electrification initiatives.

Table 4: Estimated Performance Projections

System	Description	All Electric?	Annual Cost (avg)	Annual Site Energy (mmbtu/yr)	Source Energy (kBtu/yr)	Year 1 GHG emissions (lbs CO2e/yr)[1]
DHW *(all values normalized per unit)*	In-Unit Electric Storage	Yes	$240	6.9	21.4	1,300
	Gas-fired Condensing	**No**	$95	9.5	10.1	1,100
	Heat Pump	Yes	$85	2.4	7.5	440
Ventilation/ DOAS *(all values normalized per 1k CFM)*	Gas-Fired Furnace	**No**	$2,400	220	240	22,000
	Heat Pump with Gas Auxiliary	**No**	$2,400	84	219	14,000
	Heat Pump with Electric Auxiliary	Yes	$2,800	80	250	16,000
	Electric-Resistance	Yes	$7,000	205	639	38,000

Opportunities for On-Site Solar

The project team is actively evaluating the feasibility of an on-site rooftop solar array. A full study cannot be conducted until the roof structure components and electric infrastructure are finalized but the team has begun assessing potential array sizes, limitations, and other considerations.

Challenges/Limiting Factors

- IFC setbacks & pathways (likely 4') – limits usable roof area
- Maintenance access pathways – limits usable roof area
- Green roof – expanded row spacing is usually necessary to ensure adequate stormwater management
- SSHP Condensers – mounting over CUs is difficult, restricts airflow, and could void equipment warranties
- DOAS maintenance setbacks/access – limits usable roof area
- PH Screenwalls – significant shading on roof surface

Gross Roof Area: **~55,000 sqft** (Building 1)

- IFC Setbacks: ≥6,500 sqft
- Condensing Units: ≥10,000 sqft (est)
- DOAS: ≥500 sqft
- Maintenance pathways: ≥4,000 sqft
- Heavily shaded from screenwalls, MEP equip, etc: 5,000+ sqft (estimated))

Solar Array Estimates (Building 1):

- Usable Roof Area - **~30,000 sqft (estimated)**
- Max Solar Capacity (horizontal-mounted) – **300 – 350 kW**

Table 3: GBIP Solar Requirements (Building 1)

GBIP Solar Schemes	Required Green Roof	Required Solar	Estimated Required Roof Area (2)
2.0 W/sf	N/A	110 kW	8k – 10k sqft
1.5 W/sf	6,600 sqft (1) (12%)	83 kW (1)	6k – 8k sqft

(1) Arlington requires all 1.5 W/sf to be fully integrated with the green roof which will likely require >12% green roof area as its extremely difficult to accommodate 1.5 W/sf of solar on only 12% green roof.
(2) Estimated based on traditional horizontally-mounted PV array configured with 15° tilt and 3' row spacing

SBP will provide a preliminary solar assessment for Buildings 2 & 3 when a complete site plan is available.

Energy Efficiency Opportunities

The following is a list of specific load reduction and energy savings strategies that are currently being evaluated for the project. Many of these items cannot be confirmed or implemented at this phase of design but will be considered as the design progresses.

Table 4: Energy Efficiency Opportunities

Measure	Considerations/Status	Energy Impact (1)	First Cost Impact	General Feasibility (1)
Enclosure Optimization – Increased Insulation	Additional cavity and/or batt insulation as allowed by current enclosure structure. This will be evaluated when more enclosure details become available.	Low	High	Low
Enclosure Optimization – Reduced Thermal Bridging	These systems are cost prohibitive but will be evaluated when additional enclosure details are developed.	Low	Moderate	Low
Enclosure Optimization – Window Performance	High performance vinyl is already in the BOD, but additional improvements will be evaluated with the manufacturer	Low	Moderate	Moderate
Lighting Power Reductions	See 'Design Target in Table 11. Dwelling unit lighting is largely unregulated, but the team will consider high-efficacy fixtures throughout (>60 lm/W)	Moderate	Low	High
Lighting Power Controls	Corridor occupancy sensors are being evaluated	Moderate	Low	High
Heat Pump Dryers	These are cost prohibitive but will be evaluated as part of the appliance package selections	Moderate	Moderate	Moderate
Elevators with VVVF/Regenerative Drives	Elevators have not yet been selection, but a high performance option will be evaluated	Low	Moderate	Moderate
Ventilation Energy Recovery	Vertical exhaust ducting is extremely challenging in a wood-framed building but will be evaluated. Additional energy recovery systems are cost prohibitive.	High	High	Low
Advanced DOAS Controls	Discharge temperature reset controls will be considered as the sequence of operation is developed	Moderate	Low	High
Corridor Ventilation Optimization	This entails limiting corridor ventilation/pressurization to ≤0.20 CFM/sf. This value is entirely driven by building air-balancing and will be evaluated later in design	High	Low	Moderate
Heat Pump DOAS (all electric)	DOAS with heat pump as primary heat source. This is the current BOD.	Moderate	Moderate	High
High Efficiency SSHPs	Unit heat pumps rated at ≥18 SEER/ 10 HSPF and/or equipped with low-ambient operation. This would likely required inverter compressors & ECMs.	Moderate	High	Moderate
Heat Pump Water Heaters (all electric DHW)	In-unit or central air-to-water heat pumps for primary domestic hot water. Likely requires an electric-resistance backup system.	High	High	Low
Premium Low Flow Fixtures	Low flow plumbing fixtures as follows: Showers – 1.5 GPM, Lav Faucets – 0.5 GPM	Low	Low	Moderate

(1) Assessment of general impact on building energy performance. In general, 'Low' impact items yield <1% impact on total building energy, 'high' impact items yield ≥3% impact on total energy.
(2) Qualitative assessment of the likelihood of implementation given design and cost limitations.

Preliminary Basis of Design

Many assumptions and placeholders have been used in this analysis given the early nature of the design. The intent of this type of analysis is relative order of magnitude (RoM), so small adjustments to design inputs or schedules likely won't change overall findings and takeaways from the analysis. SBP asks that the subsequent section be reviewed for general accuracy.

General Design & Operational Parameters

Table 8: General Project Parameters (Buildings 1-3)

Project Types	Apartment Building (Building 1) Triplexes (Buildings 2,3)
Modeling Software	EnergyPlus V9.6 / OpenStudio V1.3.0
Project Location	Arlington, VA
Climate Zone/Weather	4A / TMY3 – Washington, DC
Design Day Conditions	Cooling – 92°F / 77°F, Heating – 15°F
Design Temperatures	75°F – Cooling / 70°F Heating
Quantity of Floors	7 Floors + PH & 2 floors Below-Grade Parking (Building 1) 4 Floors (Buildings 2,3)
Building Area (GSF)	~434,600 GSF (Building 1) ~47,100 GSF (Buildings 2,3)
Dwelling Units	~438 Units (Building 1) ~30 Units (Buildings 2,3)
Electric Utility Rates	EIA, 2021 VA avg – Residential: $0.1196/kWh EIA, 2021 VA avg – Commercial: $0.0779/kWh
Gas Utility Rates	EIA, 2020 VA avg – Commercial: $0.8997/therm

Exterior Opaque Constructions

All assemblies have been estimated in accordance with ASHRAE RP-1365, 2017 DC Energy Code, and ASHRAE 90.1 Appendix A.

Table 9: Opaque Envelope Performance Summary

Assembly Type	Description*	Proposed Performance*
Exterior Walls - Typical Wood Frame (Buildings 1-3)	R-20 Batt Between Wood Framing	U-0.060
Exterior Walls - Typical Metal Frame (G1-F2 Podium Walls, N Bldg)	R-7.5 CI + R-13 Batt Between Metal Framing (Includes Slab Edge)	U-0.116
Exterior Walls – F1 Concrete (S Bldg)	Concrete Wall + R-13 Batt Between Wood Framing	U-0.090
Roof (Buildings 1-3)	R-30 Continuous Insulation	U-0.032
Floor Over Unconditioned (Buildings 1-3)	R-16.7 Continuous Insulation	U-0.051

**All assembly details and performances have been estimated*

Window Assemblies

All performance has been estimated based on typical performance values.

Window Area:
36% Window-to-Wall Ratio

Basis of Design:
1" IGU, Double-pane, low-E
Vinyl frames/Thermally-broken aluminum frame

Table 10: Window Assembly Performance (frame+glass)

Window	U-value	SHGC
Vinyl (Buildings 2,3)	0.30	≤0.35
Aluminum SF (Building 1)	0.38	≤0.40

Lighting Systems

The lighting design was not available for this analysis and has been approximated based on a standard market design

Table 11: Lighting Summary (Buildings 1-3)

Use Type	ASHRAE 90.1-2010	2018 IECC	Design Target	Occupancy / Daylighting Controls
Corridors	0.66	0.66	**0.50**	OS / Bi-Level
Elevator Lobbies	0.66	0.68	**0.50**	OS / Bi-Level
Fitness Center	0.72	0.50	**0.50**	As required by 2018 VECC
Lounge	0.73	0.62	**0.60**	
Main Lobby	0.90	1.00	**0.60**	
MEP	0.95	0.43	**0.40**	
Office	1.10	0.93	**0.70**	
Parking Garage	0.19	0.14	**0.12**	
Restroom	0.98	0.85	**0.70**	
Stairs	0.69	0.58	**0.50**	
Storage	0.63	0.46	**0.45**	
Dwelling Units *(not regulated by 90.1)*	N.R.	N.R.	**≥60 lm/W**	N/A

Equipment & Appliances

Table 12: Process & Equipment Summary (Building 1)

Component	Description
Dwelling Unit Appliances	• Fridge: EnergyStar • Dishwasher: EnergyStar • Clothes Washer: EnergyStar • Dryer: Electric, EnergyStar • Range: Electric, standard
Misc. Plug Loads	Modeled in accordance with LEED Multifamily Midrise Guidelines
Elevators	MRL Gearless Traction
Garage Ventilation	• 0.75 CFM/sf • DCV with VFD Controls

Table 13: Process & Equipment Summary (Buildings 2,3)

Component	Description
Dwelling Unit Appliances	• Fridge: EnergyStar • Dishwasher: EnergyStar • Clothes Washer: EnergyStar • Dryer: Electric, EnergyStar • Range: Gas, standard
Misc. Plug Loads	Modeled in accordance with LEED Multifamily Midrise Guidelines

Domestic Hot Water System

The DHW system was described in the system narrative as follows.

Table 14: DHW Summary

Component	Description
Water Heater Type	Building 1: Central gas-fired condensing boilers Building 2-3: In unit electric storage water heaters
Configuration	Building 1: central Building 2-3: In-unit
Demand	Estimated Low Flow Fixtures • Showers – 1.75 GPM • Kitchen Faucets – 2.00 GPM • Lavatory Faucets – 1.50 GPM
Storage Capacity	Building 1: TBD Building 2-3: 4.5 kW, 50-gallons (per heater)
Efficiency	Building 1: 95% Et Building 2: 0.95 EF

Base Building HVAC Narrative

Table 15: HVAC Basis of Design (BUILDING 1)

Design Component	Description
Primary System	Split System Heat Pumps • 16 SEER/ 8.2 HSPF • Cont. Vol, Cycling, ECM Motors • Local thermostats control system operation.
Ventilation System	100% Dedicated Outside Air Unit • Air-source Heat Pump • Electric Resistance Auxiliary • Hot gas reheat • Fixed discharge air temperature (70°F)
Ventilation Rates	• Dwelling Units – ASHRAE 62.2 • Common – ASHRAE 62.1 • Corridors – 0.30 CFM/sf (*decoupled from space conditioning*)

Table 16: HVAC Basis of Design (Buildings 2,3)

Design Component	Description
Primary System	Split System Heat Pumps • 18 SEER/ 9.5 HSPF • Ventilation Controls (e.g. Aprilaire 8144NC or similar) • 24/7 operation, ECM Motors
Ventilation Rates	• Dwelling Units – ASHRAE 62.2

Appendix - Simulation Output Files

The following screen captures are selected simulation output files for the Design Energy Cost (DEC) or Proposed case as well as those from the Performance Rating Method (PRM) or Baseline case.

Proposed Model Output Reports (Building 1)

	Electricity Energy Use [kWh]	Electricity Demand [W]	Natural Gas Energy Use [therm]	Natural Gas Demand [Btu/h]
Heating -- General	699665.83	934519.71	0.00	0.00
Cooling -- General	463906.06	387285.04	0.00	0.00
Interior Lighting -- General	357039.67	46265.11	0.00	0.00
Interior Lighting -- Residential	268843.78	68304.71	0.00	0.00
Exterior Lighting -- Elevator LTG	1576.80	180.00	0.00	0.00
Exterior Lighting -- Elevator	123127.01	44680.00	0.00	0.00
Exterior Lighting -- Elevator Vent	516.84	59.00	0.00	0.00
Exterior Lighting -- Exterior Lights	21780.02	5000.00	0.00	0.00
Exterior Lighting -- Garage Lighting	178106.27	27109.00	0.00	0.00
Exterior Lighting -- Garage Vent	98427.88	32103.00	0.00	0.00
Exterior Lighting -- RES Fans	6055.11	1382.44	0.00	0.00
Interior Equipment -- General	209672.78	43280.17	0.00	0.00
Interior Equipment -- Residential	1030235.18	243324.13	0.00	0.00
Fans -- General	226549.32	25861.77	0.00	0.00
Pumps -- General	0.00	0.00	0.00	0.00
Water Systems -- General	0.00	0.00	0.00	0.00
Water Systems -- Service Hot Water Heating	0.00	0.00	29459.69	1877482.52

Proposed Model Output Reports (Buildings 2,3)

	Electricity Energy Use [kWh]	Electricity Demand [W]	Natural Gas Energy Use [therm]	Natural Gas Demand [Btu/h]
Heating -- General	69035.88	154978.84	0.00	0.00
Cooling -- General	35523.30	50308.91	0.00	0.00
Interior Lighting -- General	29171.41	3330.07	0.00	0.00
Interior Lighting -- Residential	31914.44	8108.45	0.00	0.00
Exterior Lighting -- Residential Fans	459.88	105.00	0.00	0.00
Interior Equipment -- General	3885.47	999.02	0.00	0.00
Interior Equipment -- Residential	114315.90	26999.48	0.00	0.00
Fans -- Ventilation (simple)	0.00	0.00	0.00	0.00
Fans -- General	135905.50	15514.31	0.00	0.00
Pumps -- General	0.00	0.00	0.00	0.00
Water Systems -- General	122510.04	44002.59	0.00	0.00

ASHRAE Baseline Building Output Reports

EAp2-4/5. Performance Rating Method Compliance (Building 1)

	Electricity Energy Use [kWh]	Electricity Demand [W]	Natural Gas Energy Use [therm]	Natural Gas Demand [Btu/h]
Heating -- General	741114.42	1241906.75	0.00	0.00
Cooling -- General	712615.39	497531.99	0.00	0.00
Interior Lighting -- General	358367.57	46491.51	0.00	0.00
Interior Lighting -- Residential	268843.78	68304.71	0.00	0.00
Exterior Lighting -- Elevator LTG	1576.80	180.00	0.00	0.00
Exterior Lighting -- Elevator	123127.01	44680.00	0.00	0.00
Exterior Lighting -- Elevator Vent	516.84	59.00	0.00	0.00
Exterior Lighting -- Exterior Lights	21780.02	5000.00	0.00	0.00
Exterior Lighting -- Garage Lighting	178106.27	27109.00	0.00	0.00
Exterior Lighting -- Garage Vent	98427.88	32103.00	0.00	0.00
Exterior Lighting -- RES Fans	6055.11	1382.44	0.00	0.00
Interior Equipment -- General	209859.00	43304.11	0.00	0.00
Interior Equipment -- Residential	1105342.16	261063.13	0.00	0.00
Fans -- General	736333.95	84056.32	0.00	0.00
Pumps -- General	0.00	0.00	0.00	0.00
Water Systems -- General	0.00	0.00	0.00	0.00
Water Systems -- Service Hot Water Heating	0.00	0.00	39328.12	1938793.21

EAp2-4/5. Performance Rating Method Compliance (Buildings 2,3)

	Electricity Energy Use [kWh]	Electricity Demand [W]	Natural Gas Energy Use [therm]	Natural Gas Demand [Btu/h]
Heating -- General	135360.50	224684.80	0.00	0.00
Cooling -- General	68275.69	80738.19	0.00	0.00
Interior Lighting -- General	29171.41	3330.07	0.00	0.00
Interior Lighting -- Residential	31914.44	8108.45	0.00	0.00
Exterior Lighting -- Residential Fans	459.88	105.00	0.00	0.00
Interior Equipment -- General	3885.47	999.02	0.00	0.00
Interior Equipment -- Residential	100081.21	28214.48	1350.00	210207.22
Exterior Equipment -- Not Subdivided	0.00	0.00	0.00	0.00
Fans -- Ventilation (simple)	0.00	0.00	0.00	0.00
Fans -- General	101872.28	11629.25	0.00	0.00
Pumps -- General	0.00	0.00	0.00	0.00
Water Systems -- General	166849.83	48360.45	0.00	0.00

Acronym Legend

AHU	Air-Handling Unit
CHW	Chilled Water
COP	Coefficient of Performance
CRI	Color Rendering Index
CS	Core & Shell
CW	Condenser Water
DEC	Design Energy Cost
DHW	Domestic Hot Water
EA	Energy & Atmosphere
ECM	Electronically Commutated Motor
EEO	Energy Efficiency Opportunity
EER	Energy Efficiency Ratio
EF	Energy Factor
EUI	Energy Use Index (kBtu/sf)
FCU	Fan Coil Unit
FP	Fan-Powered
GHG	Green House Gas
HP	Heat Pump OR Horsepower
HSPF	Heating Seasonal Performance Factor
HW	Hot Water
IEER	Integrated Energy Efficiency Ratio
LED	Light Emitting Diode
LPD	Lighting Power Density
NC	New Construction
PRM	Performance Rating Method
REC	Renewable Energy Credit
RTU	Rooftop Unit
SAT	Supply Air Temperature
SC	Shading Coefficient
SEER	Seasonal Energy Efficiency Ratio
SHGC	Solar Heat Gain Coefficient
SSHP	Split System Heat Pump
VAV	Variable Air Volume
VFD	Variable Frequency Drive
VRF	Variable Refrigeration Flow
VRV	Variable Refrigeration Volume
VSD	Variable Speed Drive
VT	Visible Transmittance

4600 Fairfax - Building 1 and Triplex 2&3

LEED-Homes v4: Multifamily Midrise

April 27, 2023

Site Plan Submission

Scorecard

Credit		Requirement & Comments	Responsible Party	Yes	Maybe	Action
General Information						
LEED Certification		Project is required to achieve LEED Gold as part of the Sector Plan requirements. Building 1 will pursue LEED v4 MFMR and Triplexes 2,3,4 will pursue LEED v4 MFMR as a Batch Submission. See attached Appendix A Site Plan indicated LEED submission project boundaries.	Team	Y		SBP to track progress throughout project.
Permitting		The applicant recognizes the LEED Conditions Packet requirements at specific permitting milestones. Those requiremnets applicable to achieving LEED Gold + 20% energy cost savings will be provided during the permitting process. The applicant will follow the conditions written in the Board Report and the guidelines here: https://environment.arlingtonva.us/energy/green-building/leed-permit-submission/	Team	Y		SBP to track progress throughout project.
Arlington County Sustainability		The project is subject to the 2020 Green Incentive Policy requirements. The project is targeting 0.25 bonus density. Summary of mandatory baseline requirements to be included in project: - LEED Gold - ENERGY STAR Score 75 - 20% Energy cost Savings - In-unit ENERGY STAR Appliances and Fixtures (clothes washers, dishwashers, clothes dryers, refrigerators, and 90% of lighting) - WaterSense labeled in-unit toilets, lavatory faucets, and showerheads - Refrigerant leakage verification by CxA - Air sealing of ventilation supply and exhaust w/ aeroslized duct sealant - Human interaction with nature - Bird Friendly Glass - 4% EV Charging Stations &15% EV Ready - Renewable Energy (2W/sf, or 12% green roof w/ 1.5 W/sf, or 1 pt under LEED v4.1 Renewable Energy Credit(Tier 2). Tier 2 is currently off-site purchase of new renewable energy built within past 5 years representing a 10% offset of annual energy useover 10 years). - Light pollution reduction for 90% of exterior fixtures (do not emit above 90 degrees with no sag/drop lenses or side light panels and <3000K temperature; must also be placed on motion/photo/timeclock control - Equity, diversion, and inclusion program	Team	Y		The following requirements not addressed in the credits below require action by the team. 1) Bird Friendly Glass - Confirm bird friendly glass provided for between 8-36 ft above grade. Note that ArlCo has confirmed that the height should not be an average and instead should be measured from grade on all sides of the building. Drawings A4.01 to A4.04 indicate "Bird-Friendly Glass zone" between 8 - 36 ft above grade. Window schedule on A9.31 specifies use of bird-friendly glass. 2) Exterior lights - provide fixture schedule and control information. Select full cut-off facade fixtures and put all amenity lights on time-clock control. 3) Air sealing of supply and exhaust ventilation ductwork - Include aerosolized duct sealant in specfiications. 4) Equity, diversion, and inclusion program - Confirm which company will be documented for project.
Integrative Process						3)
Credit 1	Integrative Process	**Option 1. Integrative Project Team (1 pt)** - Team includes 3 skill sets - Team involved in 3 phases of design and construction - Team conducts monthly meetings Option 2. Design Charrette (1 pt) - 1 full day or 2 half day workshop no later than DD **Option 3. Trades Training (1 pt)** - Combined 8 hours of green training for subcontractors	SBP	2		Maintain list of meetings (date, attendees, length, agenda) Note: SBP will conduct trades training before start of construction.
Location and Transportation (min 8 pts total in LT and EA reqd)						
Prereq 1	Floodplain Avoidance	**Option 1. Project is not built in 100-year floodplain** Option 2. Project building in flood hazard area iaw local flood provisions Option 3. Project is previously developed building and hardscape Observed: Project not built in 100-year floodplain	SBP	Y		**No Action Required**

2701 Prosperity Ave
Suite 100
Fairfax, VA 22031

703.970.2890
www.sustainbldgs.com

4600 Fairfax - Building 1 and Triplex 2&3
LEED-Homes v4: Multifamily Midrise
April 27, 2023
Site Plan Submission

Scorecard

Credit		Requirement & Comments	Responsible Party	Yes	Maybe	Action
Credit 1	Site Selection	Option 1. Sensitive Land Protection (3-4 pts) **Path 1. Previously Developed (4 pts)** - 75% of buildable land located on previously developed land. Path 2. Avoidance of Sensitive Land (3 pts) - Project does not consist of prime farmland, public parkland, 100-year floodplain, endangered species habitat, w/in 50' wetlands, w/in 100' water Observed: Project is built on previously developed land.	SBP	**4**		**No Action Required**
		Option 2. Infill Development (2 pts) - 75% of land w/in 1/2 mi of project boundary is previously developed Observed: <75% of land w/in 1/2 mile of the project is previously developed	SBP	**2**		**No Action Required**
		Option 3. Open Space (1 pt) **-** Built w/in 1/2 mi public open space > 3/4 acres or public open space provided on project Observed: Project is built within 1/2 mile walking distance from Wellburn Square and Fields Park.	SBP	**1**		**No Action Required**
		Option 4. Street Network (1 pt) **-** Project is in area w/ existing streets and sidewalks that create 90 intersections per sqmi Observed: Spreliminary assessment identifies 283 per sq mi (based on H+T Index Tool).	SBP	**1**		**No Action Required**
		Option 5. Bicycle Network (1 pt) **-** Meet all of the following: - Provide bike storage w/in 200 yds of bike network that connects to ≥ 10 uses, school or employment center, or bus rapid transit/rail/ferry terminal w/in 3 mi of project - Short term bike parking = 32 (2.5% occupants, min 4 spaces) - Long term bike parking = 189 (167 Bldg 1) (15% occupants, min 1 per 3 res units) (v4.1) Observed: Bicycle storage rooms provided on Ground Floor for Building 1.	HCM	**1**		Quantity of bike spaces to be confirmed.
Credit 2	Compact Development	Required: Meet the following density (dwelling units/acre) ≥ 30 (1 pt) ≥ 55 (2 pts) ≥ 80 (3 pts) Observed: Lot Size = Building 1 is 1.9436 ac, Triplex forthcoming # of Units = 477 Building 1 Approximately 245 DU/acre Building 1	SBP	**3** Bldg 1 **1** Triplex		**No Action Required. Will confirm Triplexes at design.**
Credit 3	Community Resources	Required: Provide community resources w/in 1/2 mi walking distance: 4-7 uses (1 pt) 8-11 uses (1.5 pt) 12-15 uses (2 pt) 16-19 uses (+0.5 pt EP) **20 uses (+1 pt EP)** Observed: Projects located within 1/2 mi walking distance of 20 use categories.	SBP	**2**		**No Action Required**

2701 Prosperity Ave
Suite 100
Fairfax, VA 22031

703.970.2890
www.sustainbldgs.com

4600 Fairfax - Building 1 and Triplex 2&3
LEED-Homes v4: Multifamily Midrise
April 27, 2023
Site Plan Submission

Scorecard

Credit		Requirement & Comments	Responsible Party	Yes	Maybe	Action
Credit 4	Access to Transit v4.1	Required: - 1/4 mi walking distance of bus OR - 1/2 mi walking distance of bus rapid, lt/hvy rail, ferry AND - Meet min transit stops below Multiple Transit Weekday / Weekend Trips / Multifamily Points 72 / 30 / 1 100 / 70 / 2 144 / 108 / 3 Observed: The project is located next to Ballston Metro (Orange + Silver lines) as well as bus lines.	SBP	**2**		**No Action Required**
Sustainable Sites						
Prereq 1	Construction Activity Pollution Prevention	Required: 1. Include ESC measures in drawings - stockpiling topsoil - manage path/velocity of runoff - protect storm sewers/streams/lakes - divert surface water from hills - stabilize soils +15% slope - prevent air pollution from dust) 2. Provide ESC drawings that meet 2012 EPA CGP or local codes	WLP	**Y**		Include ESC drawings.
Prereq 2	No Invasive Plants	Required: Do not install invasive plants Observed: Plant plan for site included.	LandDesign	**Y**		1. Design for all native plants. Include plant list in drawings. 2. Provide list of invasive plants created by third part for comparison.
Credit 1	Heat Island Reduction	Option 1. Shading: Shade hardscape and roof w/ 10 year plant canopy **Option 2. Nonabsorptive Materials:** Use any of the following for hardscape and roof: - ENERGY STAR roofing material - Vegetated Roof - Open Pavers - Paving w/ 3-year SR ≥ 0.28 (or initial SR ≥ 0.33) Total Area met by Option 1 or Option 2: **50-75% (1 pt)** >75% (2 pts)	HCM	**1**	**1**	Wiill explore feasibility. Clarify extent of vegetated roof and PV. Identify other SRI compliant roofing and hardscape materials to be used.

2701 Prosperity Ave
Suite 100
Fairfax, VA 22031

703.970.2890
www.sustainbldgs.com

Credit		Requirement & Comments	Responsible Party	Yes	Maybe	Action
Credit 2	Rainwater Management	Case 1. Permeable Lot Area (1-3 pts) Use low impact development (LID) techniques to minmize the amount of rainwater that leaves the site. Examples include planting areas with native or adaptive plants, installing a vegetated roof, permeable paving or infiltration collection features. - 50-64% (1 pt) - 65-79% (2 pts) - ≥80% (3 pts) **Case 2**. Percentile of Rainfall Events (1-3 pts) (LEED v4 NC credit) Retain on site the runoff from the developed site area for at minimum 80th percentile rainfall events using low-impact development practices. - 95th Percentile (2 pts) - 98th Percentile (3 pts) Zero Lot Line projects 85th (3 pts) Observed: Vegetated roofs planters noted in the drawing notes.	Bowman		**3**	Clarify the stormwater management strategy for the project.
Credit 3	Nontoxic Pest Control	Required: - Implement IPM Plan (Reqd) Up to (2 pts, each additional +0.5 pt EP up to 1 EP: - Steel mesh barrier termite control system (1 pt) - Physical termite barrier system (1 pt) **- Below grade walls solid concrete, masonry w/ bond beam, concrete filled block (0.5 pt)** - Post-tension slabs (0.5 pt) - Borate treatment of wood framing (0.5 pt) - Non-wood structural elements (0.5 pt) - Ports/openings at slab plumbing penetrations (0.5 pt) - 6"+ space btw landscape grade/nonmasonry siding (0.5 pt) **- Seal cracks/joints/penetrations, install pest screens (0.5 pt)** **- Water discharge points 24"+ from foundation (0.5 pt)** - 18"+ btwn landscape and exterior wall (0.5 pt)	HCM	**1**	**1**	1. Confirm IPM will be implemented. SBP can provide for review and approval or provide copy of one currently in use. 2. Advise if any of the options can be incorporated into design. Add drawing details/notes/specs for selected measures Suggest the following: - Soild concrete below grade walls (0.5 pt) - Seal all cracks/joints/penetrations, install pest proof screens (0.5 pt) - Water discharge points 24"+ from foundation (0.5 pt)
Water Efficiency (min 3 pts reqd)						
Prereq 1	Water Metering	Required: Install water meter for each unit or entire building Observed: Whole buidling water meter vaults shown.	WLP	**Y**		Clarify whether aindividual unit water meters will be provided.
Credit 1	Total Water Use *Performance Path* *ArlCo GIP Alignment*	Required: Reduce total water use (indoor + outdoor) 10% (1 pt) to 65% (12 pts), 70% (+1 EP). 35% - 6 pts 40% - 7 pts *ArlCo - Provide WaterSense labeled tank water closets, private lavatory faucets, and showerheads. Provide ENERGY STAR clothes washers, dishwashers, and refrigerators.* Observed: - Unit Fixtures = unknown - Outdoor Water Use - irrigation design unknown	HCM	**6**	**2**	1. Incorporate low-flow plumbing fixture selections and Energy Star appliances. Target the following: - WC = 1.28gpf & WaterSense - Lav = 1.0 gpm & WaterSense - Kitchen = 1.5 gpm - Shwr = 1.75 gpm & WaterSense - CW = Energy Star - DW = Energy Star 2. Clarify irrigation strategy. Design for drip irrigation, moisture sensors, and controller or NO Irrigation. Note, to perform preliminary calculations at DD, provide: - Area of each irrigation zone (shrubs, groundcover, trees) - Irrigation type for each zone (drip, sprinkler) - Confirm smart controller with efficiency of 0.7 can be installed.

2701 Prosperity Ave
Suite 100
Fairfax, VA 22031
703.970.2890
www.sustainbldgs.com

4600 Fairfax - Building 1 and Triplex 2&3
LEED-Homes v4: Multifamily Midrise
April 27, 2023
Site Plan Submission

Scorecard

Credit		Requirement & Comments	Responsible Party	Yes	Maybe	Action
Energy and Atmosphere (min 8 pts total in LT and EA reqd)						
Prereq 1	Minimum Energy Performance *ArlCo GIP Alignment*	Required: **Energy Model** 1. Meet mandatory provisions of ASHRAE 90.1-2010 2. Achieve 5% (prereq) to 90% (29 pts). Over 65% earns project +1 EP energy cost savings over ASHRAE 90.1-2010 3. *ArlCo GIP Requirement - Achieve 20% energy cost savings* AND Option 1. ENERGY STAR MFHR Testing and Verification Protocols OR Option 2. Commissioning 1. In-Unit Duck Leakage (4 cfm25 per 100 sf of conditioned floor area) (6 cfm25 per 100 sf for units smaller than 1,200 sf) (8 cfm25 per 100 sf of conditioned floor area total) 2. Central HVAC - meet NC v4 requirements 3. Include air barrier, compartmentalization sheet, and elements to be sealed. 4. Provide load calculations, system selection, and duct sizing calculations.	HCM MEP	**Y**		MEP: 1. Review the Energy Star v3 checklists. Meet or exceed these requirements. 2. Provide load calculations, system selection, and duct sizing calculations. HCM: 1. Include air sealing and compartmentalization details in the drawings.
Prereq 2	Energy Metering	Required: 1. Electric submeters in each Unit 2. Whole building gas meter or submeter in each Unit	MEP	**Y**		1. Confirm electric submeter for each unit 2. Confirm whole building gas meter. 3. Confirm no combustion equipment in units.
Prereq 3	Education of Homeowner, Tenant or Building Manager	Required: 1. Provide O&M binder/CD to those responsible for maintaining Units 2. Perform 1-hr walkthrough of home with occupants and building manager	Cooper Carry	**Y**		Confirm O&M material will be provided and 1-hour walk-through will occur with tenants and building manager.
Credit 1	Annual Energy Use *ArlCo GIP Alignment*	Required: Achieve savings from 1% (1pt) to 90% (29 pts). Over 65% earns project +1 EP. *ArlCo GIP Requirement* - Achieve 20% energy cost savings Observed: Early home size adjustment calculations - 10.5 pts (Building 1) / 2.5 pts (Triplexes) up to 5 points	SBP		**1**	SBP to complete Box Model. Consider EEOs to achieve at least 15 pts (20% energy cost savings) on Building 1 and Triplexes.
Credit 2	Efficient Hot Water Distribution System	Option 1. Efficient Hot Water Distribution (2 pts) 1. Circulating Pump Systems - On timer or water temperature sensor - Demand activated by momentary switch, motion sensor, flow switch, door switch, voice command - Operates until water temperature rises 10degF above initial temp of water in pipe and max temp is 105degF - Automatic or accessible manual switch to turn off pump when not in use 2. Piping is insulated if heat trace is installed and Path 1. Max Allowable Pipe Length (2 pts) Path 2. Max Allowable Pipe Volume (2 pts) OR Option 2. Performance Test (3 pts) - For no circulation loop or heat trace: Meets WaterSense Labeled New Homes requirements or no more than 0.5 gall water stored in pipe - For circulation loop or heat trace: No more than 0.25 gall water stored in pipe and pipes insulated OR **Option 3. Pipe Insulation (2 pts): R-4 insulation on all domestic water piping**	MEP		**2 (Bldg 1)**	1. Clarify water heating strategy for units. Meet max allowable pipe length requirement - from hot water heater to furthest point (1/2" - 43'; 3/4" - 21';1" - 13') OR 2. Include R-4 insulation to hot water piping in units.

2701 Prosperity Ave
Suite 100
Fairfax, VA 22031

703.970.2890
www.sustainbldgs.com

4600 Fairfax - Building 1 and Triplex 2&3
LEED-Homes v4: Multifamily Midrise
April 27, 2023
Site Plan Submission

Scorecard

Credit		Requirement & Comments	Responsible Party	Yes	Maybe	Action
Credit 3	Advanced Utility Tracking *ArlCo GIP Alignment*	**Option 1. Electric and Water (1 pt):** Meet one: - Units: permanent energy-monitoring system at 1-hr interval **- Irrigation:** irrigated area 1,000sf+ w/ submeter AND/OR **Option 2. Third Party Utility Reporting (1 pt):** Meet one: - Share utility data with USGBC - 50% of unit owner share utility data with USGBC for 1 year. *- ArlCo GIP requirement - report data yearly for 10 years and achieve ENERGY STAR Score of 70.* +1 EP for metering 4 end uses (i.e. space heating, DHW, lighting, plug loads)	WLP	**1**	**1**	1. Confirm an area ≥1,000 sf will be provided and irrigation submeter will be installed.
Materials and Resources						
Prereq 1	Certified Tropical Wood	Required: All wood is nontropical, reused/reclaimed, FSC	HCM	**Y**		Confirm no tropical wood planned for project (i.e. IPE)
Prereq 2	Durability Management	Required: 1. Complete ENERGY STAR for Homes v3 Water Management System Checklist 2. Implement the following: - Nonpaper faced backer board in baths/showers/spas - Water-resistant flooring in kitchen/bath/laundry/spa - Water-resistant flooring in entry w/in 3 feet exterior door - Drain+pan, pan+auto water shut off, or FD+slope for tank water heaters and clothes washers over living space - Exhaust clothes dryers	HCM MEP	**Y**		Arch 1. Confirm non-paper faced backer board is used at shower/tub. Include note in drawings or specifications. 2. Confirm requirements of Water Management System Checklist are included in drawings (attached) MEP Confirm drain+pan OR pan+auto water shut-off provided at clothes washer and water heaters
Credit 1	Durability Management Verification	Required: ENERGY STAR for Homes v3 Water Management System Checklist verified by Verification Team	SBP	**1**		**No Action Required** Construction Activity
Credit 2	Environmentally Preferable Products	**Option 1. Local Production:** 50% of products extracted, processed, and manufactured w/in 100 mi project site - Framing (0.5 pt) **- Concrete aggregate (0.5 pt)** - Drywall and interior sheathing (0.5 pt) **Option 2. Environmental Preferable Products:** Provide 25% reclaimed / extended producer responsibility, 25% pre and 50% post consumer, FSC, sustainable agriculture standard, 30% fly ash/slag+50% recycled aggregate/90% recycled for 90% of the following - no floor covering (2 pts) - flooring (1 pt) - insulation (1 pt) - sheathing (1 pt) - framing (1 pt) - drywall (1 pt) - concrete (1 pt) - roofing (1 pt) - siding (1 pt) - 3 of the following (1 pt): doors, cabinets, counters, interior trim, decking/patio, windows For Option 2, earn 4 points to earn another +2 EP	HCM	**.5**		Local concrete aggregate expected. Include Spec 018113 in Project Manual or add notes to drawings.
Credit 3	Construction Waste Management v4.1	Required: - Divert at least 50% (1 pt) or 75% (2 pts) of construction waste from landfill (CIR 10479).	SBP	**2**		SBP will provide specification language.

2701 Prosperity Ave
Suite 100
Fairfax, VA 22031
703.970.2890
www.sustainbldgs.com

4600 Fairfax - Building 1 and Triplex 2&3
LEED-Homes v4: Multifamily Midrise
April 27, 2023
Site Plan Submission

Scorecard

Credit		Requirement & Comments	Responsible Party	Yes	Maybe	Action
Indoor Environmental Quality (min 3 pts rqd)						
Prereq 1	Ventilation	Required: 1. Local exhaust - Meets ASHRAE 62.2-2010 Sections 5-7 for baths (50 cfm) and kitchens (100 cfm) - Exhausted to outdoors - Bath fans ENERGY STAR - Kitchen exhaust > 400 cfm as makeup air 2. Whole Unit mechanical ventilation that meets ASHRAE 62.2-2010 Sections 4-7 3. Non-Unit spaces met ASHRAE 62.1-2010 Sections 4-7	MEP	Y		1. Clarify ventilation strategy for buildings. OA must be ducted to residential units and compliance demonstrated as follows: - Units using ASHRAE 62.2-2010 - Common Spaces using ASHRAE 62.1-2010 using the USGBC Calculator 2. Specify ENERGY STAR bath fans that exhaust at 50 cfm to outdoors 3. Specify kitchen exhaust fans that exhaust at 100 cfm to outdoors
Prereq 2	Combustion Venting	Required: 1. No unvented combustion appliances (ovens/range excl) 2. CO monitor in each unit 3. Fireplaces must have doors or glass enclosure, closed-combustion or power-vented or passes BPI/RESNET 4. Combustion space and water heating must have closed combustion, or power-vented exhaust, or in detached building/open air facility	MEP	Y		1. Clarify whether combustion equipment will be provided in Units (must be vented, space and water heating must have closed combustion or power exhaust) 2. Include CO sensor in Units 3. Clarify whether any fireplaces will be installed
Prereq 3	Garage Pollutant Protection	Required: 1. Locate all AHU equipment and ductwork outside garage or ensure it is positively pressurized and running continuously. 2. For conditioned space next to/above garage - Seal surfaces - Seal penetrations and connecting floors/ceilings - Weather strip doors - CO detectors in rooms that share door w/ garage - Seal penetrations and cracks	MEP	Y		Provide mechanical drawings indicating all of the requirements within the parking garage spaces.
Prereq 4	Radon-Resistant Construction	Required: For Zone 1, design and build with radon-resistant construction techniques. Follow all the requirements listed in Indoor airPLUS, 2.1: - Provide a capillary break per the Indoor airPLUS 2.1: - Provide an electrical outlet near vent piping in the attic to facilitate future fan installation - Install a 3- or 4-inc diameter gas tight vertifcal vent pipe with no bends greater than 45 degrees extending up through the conditioned spaces. *A garage under a building is an acceptable alternative. Observed: Project located in Zone 2.	MEP	Y		**No Action Required.**
Prereq 5	Air Filtering	Required: Recirculating Space Conditioning - MERV 8 filters OA Systems - MERV 6 filters	MEP	Y		Specify minimum MERV 8 filters on Unit HVAC systems and MERV 6 on OA systems
Prereq 6	Environmental Tobacco Smoke v4.1	Required: Include signage that prohibits smoking in - interior common areas - outside the building except in designated smoking areas within 25 feet of all entries, OA intakes, operable windows	HCM	Y		1. Provide lease agreement that indicates smoking is prohibited in common areas (and Units for credit) 2. Advise if a designated smoking area will be provided outside. Must be >25' from the building. 3. Include signage detail in drawings that states "No smoking within 25 feet of building"
Prereq 7	Compartmentalization	Required: Meet all of the following for Units: 1. Seal all penetrations 2. Weatherstrip all doors to common halls 3. Weatherstrip all exterior door and operable windows 4. Achieve max leakage rate of 0.23 cfm50 per sqft (if average unit size is < 1,200 sf max 0.30 cfm50 per sqft)	HCM	Y		1. Include compartmentalization sheet in drawings. 2. Add weather-stripping requirement to door schedule, window schedule, and/or specifications for all Unit entry doors, exterior doors, and operable windows.

2701 Prosperity Ave
Suite 100
Fairfax, VA 22031

703.970.2890
www.sustainbldgs.com

Credit		Requirement & Comments	Responsible Party	Yes	Maybe	Action
Credit 1	Enhanced Ventilation	**Option 1. Enhanced Local Exhaust (1 pt):** Provide one of the following for bath exhaust fans in Units: - occupancy sensor - automatic humidistat controller - continuous fan - timer that runs fan for 20+ min post occupancy AND/OR Option 2. Enhanced Whole-House Ventilation (2 pts): Provide whole-house ventilation system that meets ASHRAE 62.20-2010 Sections 4-7 in each Unit. Do not exceed requirements by more than 10%. Note: Exhaust only and Supply only systems not eligible.	MEP	**1**	**2**	Specify Bath Exhaust Fan to meet one of the following: - occupancy sensor - automatic humidistat controller - continuous fan - timer that runs fan for 20+ min post occupancy
Credit 2	Contaminant Control	**Option 1. Walk-off Mats (0.5 pt):** Provide the following: - 4' permanent walk-off mat at primary Unit entryways from outdoors - 10' permanent entryway system at publicly accessible exterior entries to common space AND/**OR** **Option 2. Shoe Removal and Storage (0.5 pt):** Provide permanent architectural shoe removal and storage system in Unit entryway without carpet. AND/OR Option 3. Preoccupancy Flush (0.5 pt): - During Construction: seal all ducts and vents - After Construction: remove dust/debris from ducts and flush Unit for 48+ hours w/ all windows open and a continuous fan or all HVAC fans/exhaust fans AND/OR Option 4. Air Testing (1 pt): Testing building for air contaminants Achieve 2.5 pts for earn +0.5 EP	HCM		**.5**	Walk of Mats Provide 10' long entry mats at publicly accessible entrances. Note: Roll-out mats are acceptable as long as they are cleaned 1x/week.
Credit 3	Balancing of Heating and Cooling Distribution Systems	For Forced-Air Systems (up to 3 pts) **Option 1. Multiple Zones (1 pt):** Meet one of the following: - 2 space-conditioning zones with independent thermostats **- Average unit size is < 1,200 sf** AND/OR Option 2. Supply-Air Flow Testing (1 pt): Supply airflow rates are within +/- 20% (or +/- 25 cfm) of Manual J calculations AND/OR Option 3. Pressure Balancing (1 pt): Pressure differential between bedroom and rest of Unit is < 3 Pa (transfer grilles)	MEP	**1**		**Building 1 - No Action Required** Average unit size is < 1,200 sf. Advise of any changes.
Credit 4	Enhanced Compartmentalization	Required: Achieve max leakage rate of 0.15 cfm50 per sqft For project with average unit size < 1,200 sf, achieve max leakage rate of - 0.23 cfm50 sqft (1 pt) - 0.15 cfm50 (3 pts)	SBP		**3**	**No Action Required** Will determine likelihood of achieving credit during testing.
Credit 5	Enhanced Combustion Venting	Option 1. No Fireplaces or Woodstoves (2 pts) OR Option 2. Enhanced Combustion Venting Measures (1 pt): Meet the following: - wood/pellet burning fireplace is power or direct vented - gas/propane/alcohol stove is approved by testing facility and is power or direct vented - gas/propane/alcohol stove has permanently fixed glass front or gasketed door and electronic pilot	MEP	**1**	**1**	Clarify whether any fireplaces are planned.

2701 Prosperity Ave
Suite 100
Fairfax, VA 22031
703.970.2890
www.sustainbldgs.com

4600 Fairfax - Building 1 and Triplex 2&3
LEED-Homes v4: Multifamily Midrise
April 27, 2023
Site Plan Submission

Scorecard

Credit		Requirement & Comments	Responsible Party	Yes	Maybe	Action
Credit 6	Enhanced Garage Pollutant Protection	Option 1. Exhaust Fan on Controls for Garage (1 pt): Meet all of the following: - ASHRAE 62.1-2010 garage ventilation requirements - Negative pressure created - Self-closing doors - Deck-to-deck partitions or hard lid ceiling - Continuous exhaust fan OR CO sensor activated at 35 ppm OR Option 2. Detached Garage or No Garage or Carport (1 pt): No garage or a detached garage has been constructed	HCM MEP	1		1. Meet ASHRAE 62.1-2010 garage ventilation requirements. 2. Include CO sensors in conditioned areas that connect to garage. 3. Include requirement for door closers
Credit 7	Low-Emitting Products	Required: Meet requirement for at least 90% of the following components (up to 3 pts): **- Site-applied interior paints/coatings: CA 1350 (0.5 pt)** - Site-applied interior adhesives/sealants: CA 1350 (0.5 pt) - **Flooring: CA 1350 (0.5 pt)** **- Insulation: CA 1350 (0.5 pt)** - Composite wood products: CARB ULEF (1 pt)	HCM MEP	1		Include Specification 018113 to be provided by SBP. (SBP can review finish schedule).
Credit 8	No Environmental Tobacco Smoke v4.1	Required: Prohibit smoking in the entire building (including units).	Hoffman	1		Provide lease language that prohibits smoking in Units. Language must include restrictions and provisions for enforcement
Innovation in Design						
Credit 1	Exemplary Performance	Community Resources - 20 uses	SBP	1		**No Action Required**
Credit 2	Exemplary Performance	Access to Transit	SBP	1		**No Action Required**
Credit 3	Innovation in Design v4.1 *ArlCo GIP Alignment*	Green Vehicles: Install electrical vehicle supply equipment (EVSE) in 2% of all parking spaces. The EVSE must: - Provide a Level 2 charing capacity - Comply with J1772 - Be vehicle to grid connected and network connection. *ArlCo GIP requirement - Provide EV charging stations for 4% of parking spaces and EV ready infrastructure for 15% of parking spaces.* Observed: - 355 parking spaces Building 1.	HCM MEP	1		Provide electrical infrastructure and equipment to support the following: - Building 1 > 15 parking spaces with EV stations & 54 EV-ready spaces Mark location of spaces in drawings.
Credit 4	Innovation in Design	Identify a credit **- EPDs (20 products)** - Enhanced Commissioning - Purchase Protected Land - Water Restoration Certificates - Material Ingredients (20 products)	Team	1		SBP to track at construction.
Credit 5	Pilot Credit	Identify a credit.	SBP		1	Identify a credit
Credit 6	LEED AP for Homes	LEED AP	SBP	1		**No Action Required**

2701 Prosperity Ave
Suite 100
Fairfax, VA 22031

703.970.2890
www.sustainbldgs.com

4600 Fairfax - Building 1 and Triplex 2&3

LEED-Homes v4: Multifamily Midrise

April 27, 2023

Site Plan Submission

Scorecard

Credit		Requirement & Comments	Responsible Party	Yes	Maybe	Action
Regional Priority						
Credit 1	Regional Priority	Site Selection (8 pts)	SBP	1		No Action Required
Credit 2	Regional Priority	Community Resources	SBP	1		No Action Required
Credit 3	Regional Priority	Access to Transit	SBP	1		No Action Required
Credit 4	Regional Priority	Total Water Use (12), Rainwater Management (3), Construction Waste M. (3)	SBP		1	See credit requirements.

2701 Prosperity Ave
Suite 100
Fairfax, VA 22031

703.970.2890
www.sustainbldgs.com

LEED for Homes v4: Multifamily Mid-Rise

4600 Fairfax - Building 1

April 27, 2023

SUSTAINABLE BUILDING PARTNERS

2	0	0	Integrative Process	Possible Points	2
Y	?	N			
2			Credit	Integrative Process	

15.0	0	0	Location and Transportation	Possible Points	15
Y	?	N			
Y			Prereq	Floodplain Avoidance	Required
8			Credit	Site Selection	8
3			Credit	Compact Development	3
2			Credit	Community Resources	2
2			Credit	Access to Transit	2

2	5	0	Sustainable Sites	Possible Points:	7
Y	?	N			
Y			Prereq	Construction Activity Pollution Prevention	Required
Y			Prereq	No Invasive Plants	Required
1	1		Credit	Heat Island Reduction	2
	3		Credit	Rainwater Management	3
1	1		Credit	Non-Toxic Pest Control	2

6	2	4	Water Efficiency	Possible Points:	12
Y	?	N			
Y			Prereq	Water Metering	Required
6	2	4	Credit	Total Water Use	12

26.5	5	6	Energy and Atmosphere	Possible Points:	37
Y	?	N			
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Energy Metering	Required
Y			Prereq	Education of the Homeowner, Tenant or Building Manager	Required
25.5	2	3	Credit	Annual Energy Use	30
	2	3	Credit	Efficient Hot Water Distribution	5
1	1		Credit	Advanced Utility Tracking	2

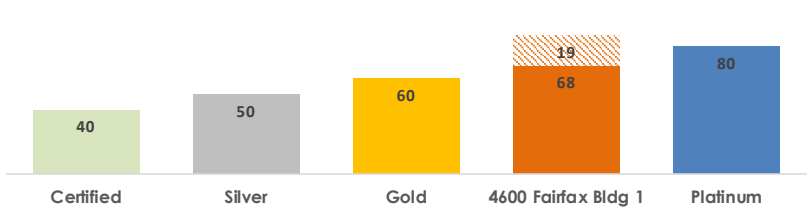
3.5	0	5.5	Materials and Resources	Possible Points:	9
Y	?	N			
Y			Prereq	Certified Tropical Wood	Required
Y			Prereq	Durability Management	Required
1			Credit	Durability Management Verification	1
0.5		4.5	Credit	Environmentally Preferable Products	5
2		1	Credit	Construction Waste Management	3

6	4	8	Indoor Environmental Quality	Possible Points:	18
Y	?	N			
Y			Prereq	Ventilation	Required
Y			Prereq	Combustion Venting	Required
Y			Prereq	Garage Pollutant Protection	Required
Y			Prereq	Radon-Resistant Construction	Required
Y			Prereq	Air Filtering	Required
Y			Prereq	Environmental Tobacco Smoke	Required
Y			Prereq	Compartmentalization	Required
1	2		Credit	Enhanced Ventilation	3
0.5		1.5	Credit	Contaminant Control	2
1		2	Credit	Balancing of Heating and Cooling Distribution Systems	3
		3	Credit	Enhanced Compartmentalization	3
1	1		Credit	Enhanced Combustion Venting	2
1			Credit	Enhanced Garage Pollutant Protection	1
0.5	1	1.5	Credit	Low Emitting Products	3
1			Credit	No Environmental Tobacco Smoke	1

4	2	0	Innovation	Possible Points:	6
Y	?	N			
3	2		Credit	Innovation	5
1			Credit	LEED AP Homes	1

3	1	0	Regional Priority Credits	Possible Points:	4
Y	?	N			
1			Credit	Site Selection (8 pts)	1
1			Credit	Community Resources (2 pts)	1
1			Credit	Access to Transit (2 pts)	1
	1		Credit	Total Water Use (12), Rainwater M. (3), Const. Waste M. (3)	1

68	19	24	Possible Points:	111



Note:
- min 8 points total in LT and EA required
- min 3 points in WE required
- min 3 points in EQ required

LEED for Homes v4: Multifamily Mid-Rise

4600 Fairfax - Triplex Buildings 2 and 3 (Batch Submission)

April 27, 2023

SUSTAINABLE BUILDING PARTNERS

Y	?	N			
2	**0**	**0**	**Integrative Process**	**Possible Points**	**2**
2			Credit	Integrative Process	

Y	?	N			
13.0	**0**	**2**	**Location and Transportation**	**Possible Points**	**15**
Y			Prereq	Floodplain Avoidance	Required
8			Credit	Site Selection	8
1		**2**	Credit	Compact Development	3
2			Credit	Community Resources	2
2			Credit	Access to Transit	2

Y	?	N			
2	**5**	**0**	**Sustainable Sites**	**Possible Points:**	**7**
Y			Prereq	Construction Activity Pollution Prevention	Required
Y			Prereq	No Invasive Plants	Required
1	**1**		Credit	Heat Island Reduction	2
	3		Credit	Rainwater Management	3
1	**1**		Credit	Non-Toxic Pest Control	2

Y	?	N			
6	**2**	**4**	**Water Efficiency**	**Possible Points:**	**12**
Y			Prereq	Water Metering	Required
6	**2**	**4**	Credit	Total Water Use	12

Y	?	N			
19	**2**	**10**	**Energy and Atmosphere**	**Possible Points:**	**37**
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Energy Metering	Required
Y			Prereq	Education of the Homeowner, Tenant or Building Manager	Required
17.5	**1**	**5**	Credit	Annual Energy Use	30
		5	Credit	Efficient Hot Water Distribution	5
1	**1**		Credit	Advanced Utility Tracking	2

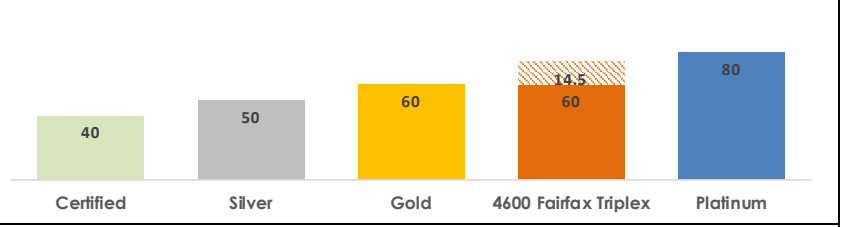
Y	?	N			
3.5	**0**	**5.5**	**Materials and Resources**	**Possible Points:**	**9**
Y			Prereq	Certified Tropical Wood	Required
Y			Prereq	Durability Management	Required
1			Credit	Durability Management Verification	1
0.5		**4.5**	Credit	Environmentally Preferable Products	5
2		**1**	Credit	Construction Waste Management	3

Y	?	N			
7	**3.5**	**7.5**	**Indoor Environmental Quality**	**Possible Points:**	**18**
Y			Prereq	Ventilation	Required
Y			Prereq	Combustion Venting	Required
Y			Prereq	Garage Pollutant Protection	Required
Y			Prereq	Radon-Resistant Construction	Required
Y			Prereq	Air Filtering	Required
Y			Prereq	Environmental Tobacco Smoke	Required
Y			Prereq	Compartmentalization	Required
1	**2**		Credit	Enhanced Ventilation	3
0.5		**1.5**	Credit	Contaminant Control	2
1		**2**	Credit	Balancing of Heating and Cooling Distribution Systems	3
		3	Credit	Enhanced Compartmentalization	3
1	**1**		Credit	Enhanced Combustion Venting	2
1			Credit	Enhanced Garage Pollutant Protection	1
1.5	**0.5**	**1**	Credit	Low Emitting Products	3
1			Credit	No Environmental Tobacco Smoke	1

Y	?	N			
5	**1**	**0**	**Innovation**	**Possible Points:**	**6**
4	**1**		Credit	Innovation	5
1			Credit	LEED AP Homes	1

Y	?	N			
3	**1**	**0**	**Regional Priority Credits**	**Possible Points:**	**4**
1			Credit	Site Selection (8 pts)	1
1			Credit	Community Resources (2 pts)	1
1			Credit	Access to Transit (2 pts)	1
	1		Credit	Total Water Use (12), Rainwater M. (3), Const. Waste M. (3)	1

60	**15**	**29**	**Possible Points: 104**



Note:
- min 8 points total in LT and EA required
- min 3 points in WE required
- min 3 points in EQ required