

FAIRFAX COUNTY PARK AUTHORITY
Ash Grove
MEP Assessment

8881 Ashgrove House Lane
Vienna, VA 22182

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INTRODUCTION

The Fairfax County Park Authority is evaluating historic Ash Grove for the Resident Curator program. Ash Grove is located on Ashgrove Lane in Tysons. The purpose of this report is to document the existing conditions of the mechanical, electrical, and plumbing systems and to identify deficiencies. Recommendations for corrections are based on the building remaining a residential use. An Opinion of Probable Cost is provided for correcting the deficiencies. The Opinion of Cost assumes that the party who enters into a contract with the County will perform the role of General Contractor.

MECHANICAL CONDITION ASSESSMENT

Mechanical System

There are five HVAC systems that condition the house:

The first system consists of a nominal 18 MBH (1.5 ton) Sanyo ductless mini-split heat pump system that is connected to two nominal 9 MBH (3/4 ton) wall mounted air handling units (AHU). One AHU is located in the first floor kitchen and the other AHU is located in the family room off the kitchen. The fan was operational on the kitchen AHU but the heating or cooling did not work and disabled the fan when selected at the wireless remote control. The outdoor unit did not appear to be operational. The system is dated November 2000 and is past its useful life.

The second system consists of a nominal 30 MBH (2.5 ton) Bryant heat pump split system with a matching vertical AHU located in the basement. An Aprilaire dehumidifier is connected to the return ductwork in a sidestream configuration. The AHU is ducted up to supply registers in the first floor in the dining room, passage area, library, main entry hall, and parlor. The return is ducted to a large floor grille in the passage area. There are also supply registers in the bottom of the ductwork mains in the basement. The ductwork is comprised of galvanized steel mains with flexible duct runouts to the floor diffusers. The outdoor unit and the dehumidifier were operating, however the AHU fan did not appear to be working and the refrigerant piping was frozen which means the coil was also likely frozen. The equipment is believed to be dated March 2001 which puts it at the end of its useful life.

The third system consists of a nominal 18 MBH (1.5 ton) Bryant ductless mini-split heat pump system that is connected to one nominal 9 MBH (3/4 ton) wall mounted AHU. The AHU is located in between the two bedrooms on the second floor. The fan was operational but cooling and heating were not. The outdoor unit appears to be in very poor condition and did not appear to be operational. There is a mounting bracket for a second Bryant indoor ceiling mount AHU in the area above the garage. The AHU has been removed but the refrigerant piping and condensate pump are still installed. The system is believed to be dated April 2001 which puts it at the end of its useful life.

The fourth system consists of a nominal 30 MBH (2.5 ton) Goodman heat pump split system with a matching horizontal AHU located on the third floor. The AHU is ducted along the floor of the third floor to supply grilles located in the ceiling of the second floor in the main hallway, the two public use chambers, and the two toilet rooms off the public use chambers. The return is ducted to a grille in the ceiling of one of the public use chambers. There are also sidewall diffusers serving the third floor. The ductwork is comprised of galvanized steel mains with flexible duct runouts to the ceiling diffusers. The system was operating however it wasn't very comfortable. This could be due to the fact that the other HVAC systems were not operational, the high ambient outdoor temperature, it could be inadequately sized, or it may have been turned on right before we arrived. The equipment is believed to be dated November 2006 and appeared to be in decent condition. It should have another 4 or 5 years of useful life.

The fifth system is a thru-the-wall unit located in one of the public use chambers. It appears to be in poor condition, past its useful life, and not operational.

The first-floor toilet room does not have an exhaust fan. The second floor bathroom has an operational exhaust fan light combination fixture.

The range is missing in the kitchen, however there is a duct for range exhaust that is routed above the ceiling and discharges to a louver in the exterior wall.

The laundry area is in the kitchen with domestic water and drain stubouts for a utility sink. There is also a drain standpipe and hot/cold water valves for a clothes washer. The dryer exhaust is a flexible duct that is routed through the garage to a vent on the exterior wall.

There are two electric wall heaters located in the area above the garage, one in the family room off the kitchen, and one in the second floor bathroom. The heaters were not tested to see if they are operational.

The crawl spaces are open to the basement and the original crawl space ventilation openings have been covered with plexiglass. The basement does have supply registers as described in the second HVAC system above.

The condensate drain piping for the HVAC air handling units discharges into a pit with a sump pump. The sump pump appears to discharge to the sanitary system. The pit does not have a lid.

Proposed Mechanical

- Remove and replace HVAC system 1 with a new ductless split system to condition the kitchen and family room area.
- Remove and replace HVAC system 2 with a new split system. The dehumidifier can be reused.
- Remove and replace HVAC system 3 to condition the upstairs bedroom and the area above the garage.
- Inspect and service HVAC system 4 to verify it is operating properly.
- Clean the existing ductwork.
- Remove the thru-wall HVAC unit (system 5) on the second floor. Seal and insulate the penetration.
- Provide an exhaust fan for the first floor toilet room and duct to a louver/hood on the exterior wall.
- Add a range hood for the new cooking appliance and connect to existing ductwork.
- Replace the flexible clothes dryer exhaust duct with rigid duct.
- Verify electric wall heaters operate properly.
- Provide a separate dehumidifier just for the basement area.
- Provide a gasketed lid on the sump pump.

Existing Plumbing

The utility-provided ¾" domestic water service enters the basement. It has a ball valve for isolation. There is a pressure reducing valve on the service that can be isolated by another ball valve. The domestic water piping is copper with soldered and push connection type fittings. Only a portion of the domestic water piping in the basement is insulated.

The electric 50 gallon domestic water heater has a 4500 W heating element and was installed sometime before 1994.

There are at least two hose bibbs on the exterior of the house.

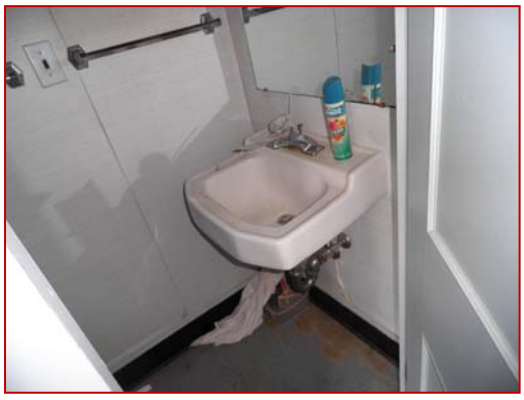
The county records show that the house is connected to the utility sewer system and is not septic. Visible sanitary piping in the basement consisted of case iron and PVC.

The kitchen has a double compartment sink with faucet and separate pull out sprayer as well as a garbage disposer. There is a space under the counter for a dishwasher that was once plumbed, however the dishwasher has been removed.

The first floor has a toilet room with water closet and a counter-mounted lavatory. The plumbing fixtures appear to be in decent condition.

The laundry area in the first floor kitchen is discussed in the mechanical section above.

The second floor bathroom has two counter-mounted lavatories, a water closet, and a corner shower.



There are two small half baths, each with a water closet and a wall-mounted lavatory located in each of the public use chambers on the second floor.

The roof has gutters with downspouts that discharge directly onto grade. There are no splash blocks.

Proposed Plumbing

- Replace the electric water heater.
- Insulate the domestic hot and cold water piping in the basement.
- Provide new faucet for the kitchen sink.
- Replace the garbage disposer.
- Provide a dishwasher.
- Add a laundry sink (optional, but is currently plumbed for it)
- Provide clothes washer and dryer.
- Replace faucets in all toilet/bath rooms, unless the FCPA wants to retain any for historical purposes. The water service was turned off to the building, so the faucets could not be verified if they are functioning.
- Replace flapper and fill valves in all toilets.
- Clean gutters and downspouts to verify they are clear.
- Provide splash blocks at all downspouts.

ELECTRICAL CONDITION ASSESSMENT

General Electrical.

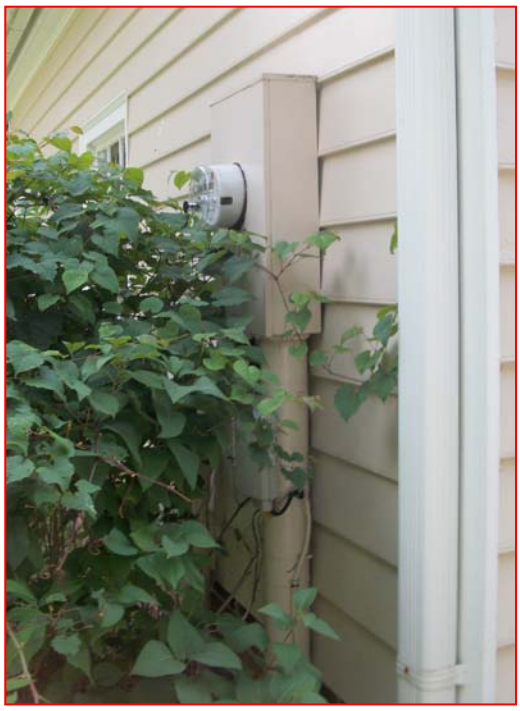
The existing electrical system is assumed to have been installed in the 1960s when the building was repaired following a fire, as noted in the April 2000 report. The observed electrical equipment confirms this assumption.

The building is approximately 5,000 square feet and served by two 200A, 120/240V, single phase, electric distribution panels. This yields approximately 15 watts/square foot, which is adequate for a residential building.

Electrical Service Entrance

Electrical power is brought to the building by an underground 120/240V, single-phase, three-wire service connecting to a an electric meter on the outside corner of the garage. From the meter the utility service feeds a wire way where the feeder is tapped to supply several pieces of equipment. A bare ground wire is also connected to the wire way. The wire way was not opened to confirm, but it appears to supply four pieces of equipment:

- 200A Removable Fuse Holder
- 200A Disconnect Switch
- 60A Fuse Box
- 30A Disconnect Switch.

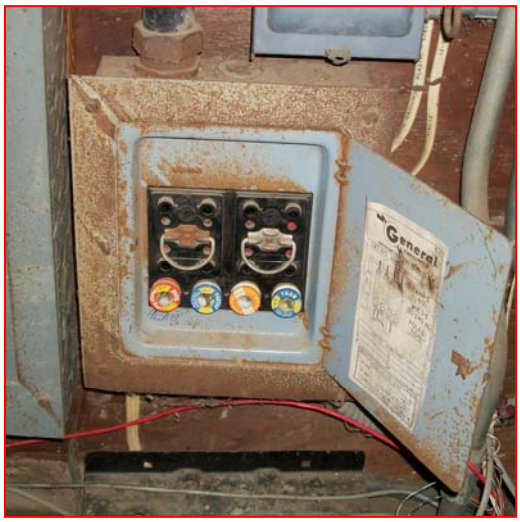


The two 200A devices appear to supply the two 200A panelboards in the basement, although only one feeder was observed. The 60A fuse box appears to supply four small loads, one marked "shed" as well as a panelboard which supplies power to the garage and the exterior lights. The

30A disconnect switch appears to supply power to one of the out buildings, although it is not labeled.

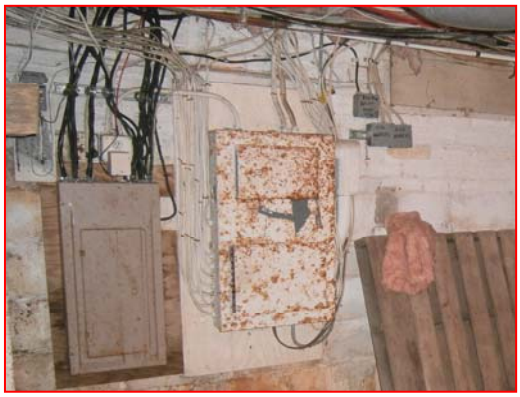
The 60A fuse box and garage panelboard are in poor condition and should be replaced. There are a number of loose low voltage wires which do not appear to be in use.

A telephone company entrance box was also noted in the garage, but did not appear to be functional.



There are two 200A panelboards in the basement. The panelboard on the left feeds HVAC/Furnace loads (two pole loads) and is the newer panel, although neither is dated. The 200A panelboard on the right, which appears to have been installed as part of the 1960s renovation, feeds the kitchen and other building receptacle loads. Both panelboards have extensive exterior rust damage which implies the interior of the circuit breakers are also rusted. The panelboards should be replaced.

The insulation on the cables being supplied by the panelboards does not appear to be damaged and should be able to be reused.



Receptacles and Mechanical Equipment Circuits

In general, receptacles are present in sufficient numbers and locations to provide adequate power to the space. The 2017 National Electric Code (NEC) has been released, but not adopted in

Virginia where the 2014 code is currently in use. The NEC requires Ground Fault Protection (GFI) in Bathrooms, Garages, Outdoors, Kitchens, Basements, and Laundry areas. The NEC also requires Arc-Fault Circuit Interruption Protection (AFCI) in most other areas in a dwelling unit. Protection can be provided by individual receptacles or be provided on the branch circuit breakers supplying the receptacles. While upgrading is not code required, it is recommended to provide GFI and AFCI circuit breakers in the panelboards that have been recommended for replacement.

The NEC also requires one receptacle per 12 linear feet of wall space, which has not been strictly met in the building. Dedicated kitchen circuits are also now required by the NEC as well a minimum of two dedicated above-counter receptacles. The above counter receptacles are in place, but the circuiting was not verified.

In the space two non-grounded receptacle where found which should be replaced.

In the small toilet rooms off the large bedrooms no receptacle was found.

Disconnecting means for mechanical equipment appeared sufficient and in good repair.

Lighting

The NEC requires a switched light fixture in every habitable room, kitchen and bathroom. In rooms other than the kitchen and bathrooms the requirement can be met with a switched receptacle. Although not all light fixtures were functional (the cause was not determined) NEC requirements appear to have been meet. Wall sconces are used in hallways and bathrooms with overhead light fixtures found in the garage, basement and kitchen. Switched receptacles were found in the bedrooms. Exterior lights were noted and appear to be wired through a time clock, but their operation was not verified.

The light fixture adjacent to the sump pump appears to be temporary. It is not supported or wired properly.

Life Safety

Battery powered smoke detectors were observed throughout the building, but their operation was not verified.

Proposed Electrical

- Replace garage service entrance equipment
- Replace (2) 200A (40 pole) panelboards in basement with GFI and AFCI circuit breakers.
- Replace light fixture by sump pump and other non-functioning light fixtures.
- Add receptacles in in toilet rooms off the main bedrooms.
- Replace non-grounded receptacles
- Replace smoke detectors. Recommend networked building powered in lieu of battery powered.
- Feeders to HVAC system 1, 2 and 3 may be reused if sized correctly for the proposed equipment.
- Provide power for proposed exhaust fan in toilet room
- Provide power for proposed dehumidifier in basement

Ash Grove House
Opinion of Probable Construction Cost

		SWSG Estimate
Division 1 - General Requirements		3,000
Division 2 - Site Work		0
Division 3 - Concrete		0
Division 4 - Masonry		0
Division 5 - Metals		0
Division 6 - Carpentry		0
Division 7 - Thermal & Moisture Protection		0
Division 8 - Doors & Windows		0
Division 9 - Building Finishes		0
Division 10 - Specialties		0
Division 11 - Equipment		0
Division 12 - Furnishings		0
Division 13 - Special Construction		0
Division 14 - Conveying Systems		0
Division 15 - Mechanical		33,900
Division 16 - Electrical		14,100
Subcontracted Construction Cost		51,000
GC Overhead	10.0%	5,100
GC Profit	10.0%	5,610
Other		0
Other		0
Other		0
Other		0
Contingency	15%	9,257
Estimated Project Cost		**$70,967**

Notes:
1. Excludes general contractor fees
2. Excludes payment and performance bonds
3. Excludes engineering plans

SWSG, PC
555 Herndon Parkway Sute 260
Herndon, Virginia 20170

Budget Estimate

	Category/Trade	Qty	Unit	Unit Price	Estimated Cost	Subtotals
	Division 1 - General Requirements					
1.01	Superintendent	0	week	3,000.0	0	
1.02	GC Project Manager	0	MH	85.0	0	
1.03	Estimator	0	Man-days	600.0	0	
1.04	Office Staff	0	man-weeks	600.0	0	
1.05	Laborers	0	man-weeks	1,600.0	0	
1.06	Closeout Documents	1	LS	500.0	500	
1.07	Trash Removal	1	LS	1,000.0	1,000	
1.08	Temporary Protection	1	LS	500.0	500	
1.09	Permits	1	LS	1,000.0	1,000	
						3,000
	Division 2 - Site Work					
2.01	Miscellaneous		SF	0.0	0	
						0
	Division 3 - Concrete					
3.01	Miscellaneous		SF	0.0	0	
						0
	Division 4 - Masonry					
4.01	Miscellaneous		LS	0.0	0	
						0
	Division 5 - Metals					
5.01	Miscellaneous		EA	0.0	0	
						0
	Division 6 - Carpentry					
6.01	Miscellaneous		LF	0.0	0	
						0
	Division 7 - Thermal & Moisture Protection					
7.01	Miscellaneous		SF	0.0	0	
						0
	Division 8 - Doors & Windows					
8.01			EA	0.0	0	
						0
	Division 9 - Building Finishes					
9.01			SY	0.0	0	
						0
	Division 10 - Specialties					
10.01			LS	0.0	0	
						0
	Division 11 - Equipment					
11.01			LS	0.0	0	
						0
	Division 12 - Furnishings					
12.01			LS	0.0	0	
						0
	Division 13 - Special Construction					
13.01			LS	0.0	0	
						0
	Division 14 - Conveying Systems					
14.01			LS	0.0	0	
						0
	Division 15 - Mechanical					
15.01	Demolition	1	LS	500.0	500	
15.02	HVAC system 1	1	LS	6,500.0	6,500	
15.03	HVAC system 2	1	LS	8,500.0	8,500	
15.04	HVAC system 3	1	LS	6,500.0	6,500	
15.05	HVAC system 4 service	1	LS	300.0	300	
15.06	Remove and seal HVAC system 5	1	LS	500.0	500	
15.07	First floor toilet exhaust	1	LS	350.0	350	
15.08	Gas range	1	EA	900.0	900	
15.09	Range hood	1	LS	500.0	500	
15.10	Clothes dryer exhaust	1	LS	500.0	500	
15.11	Ductwork cleaning	1	LS	750.0	750	
15.12	Basement dehumidifier	1	EA	500.0	500	
15.13	Sump pump lid	1	EA	250.0	250	
15.14	Water heater	1	EA	1,100.0	1,100	
15.15	Insulation - piping	1	LS	750.0	750	
15.16	Kitchen sink faucet	1	EA	350.0	350	
15.17	Garbage disposer	1	EA	400.0	400	
15.18	Dishwasher	1	EA	700.0	700	
15.19	Laundry sink	1	EA	750.0	750	

15.20	Clothes washer and dryer	1	LS	1,500.0	1,500	
15.21	Lavatory faucets	5	EA	200.0	1,000	
15.22	Toilet flapper and fill valves	4	EA	75.0	300	
15.23	Clean gutters and downspouts	1	LS	250.0	250	
15.24	Splashblocks	1	LS	250.0	250	
						33,900
	Division 16 - Electrical					
16.01	Service Entrance					
16.02	Demolition	1	LS	250.0	250	
16.03	Wireway	1	LS	500.0	500	
16.04	200A, 240V Disconnect Switch	2	EA	650.0	1,300	
16.05	100A, 120/240V 1-phase panelboard + GFI CBs	1	LS	1,000.0	1,000	
16.06	Ground conductor	1	LS	200.0	200	
16.07	200A, 120/240V 1-phase panelboard + GFI/AFCI CBs	2	EA	1,200.0	2,400	
16.08	Light Fixture Replacement	1	LS	750.0	750	
16.09	Toilet Ropm Receptacles	2	EA	325.0	650	
16.10	Replace receptacles w/Grounded type	1	LS	250.0	250	
16.11	Replace Smoke detectors with AC powered type	1	LS	1,200.0	1,200	
16.12	Support HVAC replacements	1	LS	5,000.0	5,000	
16.13	Add toilet room exhaust	1	LS	350.0	350	
16.14	Add power for dehumidifier	1	LS	250.0	250	
16.15	Misc. Electrical		LS		0	
						14,100
	Estimated Construction Costs					**51,000**