

I. FEASIBILITY STUDY

Philomont Fire Station



Prepared by:

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Prepared July 02, 2021



FEASIBILITY STUDY

Philomont Fire Station

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FEASIBILITY STUDY

Philomont Fire Station



A. INTRODUCTION AND OVERVIEW

Purpose. LeMay Erickson Willcox Architects (LEWA), under contract with the County of Loudoun in Virginia conducted a feasibility study to determine if the needs of the department can be met on the current site of the Philomont Fire Department. The study will review three possibilities as outlined below: renovation/addition of the existing station, demolition and new construction on existing site, new construction with consolidation of the adjacent County owned property.

The Feasibility Study was completed by a multi-disciplinary team conducting visual inspections of the existing building, systems, and site, review of existing building drawings, and interviews with the Philomont Volunteer Fire Department and Loudoun County Fire Department staff.

LEWA Architect, Michele Ferri, AIA, LEED AP BD + C and consulting engineers from Ehlert Bryan visited Philomont Fire Station on March 11, 2021 to assess the facility, observe the existing building conditions and to verify the existing structural framing and layout conformed to the existing drawings. The visit included a guided tour of the existing Fire Station building and property with Fire Department officers.

A Program of Requirements (POR) was developed, in collaboration with the County and Fire Department, based on the 2018 Loudoun County Fire Station Design Manual standards for a Type 4 fire station, as well as the Loudoun County Fire and Rescue Station 12 program recently completed. The Program of Requirements serves as the basis of the building footprint for the feasibility studies.

The feasibility study included conceptual site studies for each of the three County requested options for the Philomont Fire Station noted above and expanded below:

- 1.) Renovation / Addition to the existing fire station on the existing site
- 2.) Demolition of the existing station and replacement with a new station on the existing site.
- 3.) Consolidation with a contiguous County owned parcel and demolition and replacement of the existing station with a new station on the consolidated site.

This report documents a compiled study including site plan diagrams showing how the proposed footprint based on the Program of requirements (POR) may fit on the existing site and studied the consolidation of the existing and neighboring site. Conceptual studies are also included consisting of block floor plans providing adjacencies and room areas from the program. The layouts conform to current architectural design standards for comparable fire and rescue facilities consistent with other Loudoun County Fire Department stations. Issues of building code compliance are based on comparison to building codes as adopted by the Commonwealth of Virginia, including but not limited to IBC 2018 and ANSI A117.1-2003. The conclusions in this report are based on the depth of experience of the LeMay Erickson Willcox Architects (LEWA) Team in the design of similar facilities.

Additionally, each of the main studies address existing site conditions by maintaining operations of the existing cell tower, utilizing limited site areas to the north for septic drain fields, and retaining the existing well location when possible. Community activities currently found on the site include parking for the adjacent community center and a recycling center in the northwest edge of the parking lot which create safety hazards for children and

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pedestrians being placed in travel paths of responding emergency apparatus. Because these community amenities are not related to fire department operations and cannot be safely accommodated on these sites, relocation off-site or adding them to the community center parcel will be required.

The limited site acreage, in addition to the site conditions referenced above and the topography, has restricted the design options to two level stations adding features such as stairs and an elevator to the layouts. Single story design options were unable to be accommodated on this site.

Lastly, on-going operations for the fire department remain a necessary and top priority of all the proposed options. The viable areas of the site for construction of the station are in the area of the existing building and parking lot. This usable building area is limited by the sloping topography on the northern portion of the site and the centrally located cell tower, which must remain in operation in all the schemes. With the area, virgin soil, and slope requirements for the expanded septic drainfields needed for a station of this size, the only viable location for these drainfields is in the open northern portion of the site. A final consideration for land use during construction is to provide on-site staging areas for the general contractor. Once all these factors are taken into consideration, there is not sufficient area on the site for a “temporary facility” to house on-going fire operations during construction. Therefore, we will recommend that on-going fire operations are temporarily relocated off-site during construction of all schemes. This study assumes the temporary facility will be at the horse show grounds. If not, additional land acquisition costs must be considered.

Zoning and Legislative Evaluation. This site is governed by the Loudoun County Revised 1993 Zoning Ordinance and is labeled, “RC – Rural Commercial” in the Zoning Plan. A fire and/ or rescue station currently requires a Special Exception use approval by the Board of Supervisors for construction in this district.

Limitations.

- The scope of this survey was limited to visual observation of the general conditions of the building and site. No physical testing was performed on the building; no existing finishes were removed, and no hazardous material assessments are included.
- Underground utilities were studied for the purposes of this report utilizing surface geophysical and electromagnetic tools and techniques to approximate the existence of most existing utilities. Underground sprinklers, irrigation systems, building grounding systems, gravity-flow storm and sanitary systems, and potential cell tower underground systems are excluded from this investigation.
- The well locations identified are preliminary in scope and definition. Clearances to structures, property lines, utilities, sewage systems and pollution systems have been conceptually reviewed. Further procedural reviews with the County and the Virginia Office of Drinking Water will be required.
- This study recognizes the importance of the community functions currently found on this site including parking for the adjacent community center and the recycling area. Site area limitations, topography, utilities, and other site constraints require the relocation of these functions off-site, or having them added to the community center parcel.

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LeMay Erickson Willcox Architects and its consulting engineers performed services in a manner consistent with that level of care and skill ordinarily exercised by members of the architectural profession currently practicing in the same locality under similar conditions. No other representation, express or implied, and no warranty or guarantee is included or intended in this report.

B. GENERAL INFORMATION



The Philomont Fire Station serves one of the most rural and diverse portions of Loudoun County. The current Fire Station was built as a two-bay building in 1956 and expanded in 1975 to include an additional bay. In 1994, the station was expanded yet again to include a four-bay addition onto the east side of the station. Currently, the facility is 9,287 gross square feet and is located on an approximate 2.28 acre parcel. When the station was constructed, there was no in-station staffing under normal conditions. Today the station is staffed 24 hours per day with 4 personnel provided by Loudoun County Fire and Rescue and supplemented with additional staffing provided by the Philomont Volunteer Fire Department.

The facility is crowded and lacks many of the programmatic space requirements to support the staff safely and efficiently because of it not having been designed for 24-hour occupancy. Deficiencies of the current station include inadequate sleeping quarters, no separate showers and locker facilities for men and women, inadequate administrative and exercise space,

FEASIBILITY STUDY

Philomont Fire Station



inadequately sized emergency vehicular bays, and a lack of support areas for equipment and gear storage. The facility also lacks dedicated ingress/egress for emergency vehicles, adequate parking and fire protection system. Furthermore, it lacks health and safety features to help reduce firefighter's exposure to carcinogens and pollutants and does not meet current Americans with Disabilities Act (ADA) regulations.

**Philomont Fire Station
Program of Requirements**

May 17, 2021



Fire Station Apparatus & Staffing:

Vehicle Types				Vehicles	Staff		Comments
(Paramedic) Fire Engine				1	4		Increase staff from 3 to 4
EMS Ambulance				1	2		Possible future addition to station
Tanker				1	2		1 staff increased to 2 staff in inclement weather
Brush Unit				1	0		Cross staffed by personnel assigned to the fire engine
Mobile Air Unit				1	0		Cross staffed by personnel assigned to the fire engine and/or tanker
Command Unit				1	0		Staffed with one (1) person when a command level officer from the Philomont Volunteer Fire Department is available
Service Unit				1	0		
Utility Truck					0		
Chase Vehicle					0		
Medical Chase					0		
Total				7	6 to 8		Staff / shift based on primary vehicle staffing/use.
Station Staffing					14		Staffing number for bunks = 14 / LCFR referenced total staffing based on 3 Shifts + additional shift for surge capacity = 24 - 32

Fire Station Building Program:

Administration			Area (s.f.)	Quantity	Proposed Area (s.f.)	Comments
Lobby					120	Secure lobby, drinking fountain, information display
HC Accessible Unisex Toilet					64	Accessible from lobby
Training Room					450	Classroom for 15-20 with chairs, TV monitor, whiteboards
Training Room Storage					120	
Watch Office					275	5 workstations at 50 s.f. each - 25 s.f. - Secured from public, adjacent to Lobby
Command Suite						
Office					120	
Locker alcove					50	4 lockers, Include small base cabinet and bench
Bunk Room					100	
Toilet/Shower					88	42"x42" shower
Station Commander					120	
Duty Officer					120	
Volunteer Office					120	
Study					150	
Work / Copy Room					100	
Supply Room					50	
Total Administration					2,047	
Dormitory						
Bunkrooms:						
Standard Bunkroom - 2 person			135	7	945	(7) 2-person bunks = 14 person surge capacity/shift x 3 shifts = 42 total crew capacity
Men's Lockers			7.5	42	315	42 Lockers 18" x 24" x 72" (total surge capacity) linen locker below, no built-in combination lock
Men's Toilet					340	3 lavatories, 2 wc, 2 urinals, 4 showers (42"x42" - 1 ADA)
Women's Lockers			7.5	21	158	21 Lockers 18" x 24" x 72" (half total surge capacity) linen locker below, no built-in combination lock
Women's Toilet					200	2 lavatories, 2wc, 2 showers (42"x42" - 1 ADA)
Unisex Toilet					100	Gender neutral, 1 lavatory, 1wc, 1 shower, 3 lockers
Kitchen					298	Kitchen shall include Ice Machine and Commerical coffee maker on 34" counter.
Kitchen Storage/Pantry					194	Pantry Storage (4 lockable pantries, +/- 24" deep by 36" wide) and Separated Refrigerators/freezers (3 Larger Refrigerators/ 1 Freezer; Under-counter ice maker; Commercial coffee maker (single).

**Philomont Fire Station
Program of Requirements**

May 17, 2021



Dining					300	Seating for 10, coffee area, marker board at one end, no cabinets required
Vending/Recycling					40	At least (1) vending machine, waste receptacle - preferred adjacency to kitchen
Day Room					350	10 La-Z-boy recliners, wall mounted screen.
Laundry					125	2 washers/2 dryers (GE Harmony or equal) mop sink, ironing board, folding table; Wall hooks for mops, brooms; floor drains. Potentially combine with J.C. Base cabinet next to washers and option for wall cabinet
Exercise/Weight					480	provide one wall with full height glass mirror; visibility; potential exterior access; (2) monitors; Towel/cleaner storage.
General Storage					40	
Janitor					46	wire storage
Total Dormitory					3,931	

Support			Area (s.f.)	Quantity	Proposed Area (s.f.)	Comments
Mechanical					409	provide desk area
Electrical					186	
Data/IT					139	provide desk area
Sprinkler					146	
Fire Pump					140	
General Storage					200	Boat Motors, Fuel Cans, Etc.
Volunteer's Storage					165	
Total Support					1,385	
Operations						
Apparatus Bay					5360	Four 16' x 80' Bays; plus 18" x 80' on side (2) Bays; (1280sf x 4) + (120 x 2). Assumes outswing Bi-fold doors.
Cascade Room					215	
SCBA - Compressor					150	
SCBA - Shop/Repair					200	
Shop/Hose Storage					242	Hose storage included. (LCFR to confirm hose storage quantity.)
Ready Gear (Lockers)					324	36 Lockers - 20" wide
Decontamination Suite (Decon Wash/Dry Combined)					300	Eye wash, pressure sprayer, sst 2 compartment sink with drainboards, extractor, dryer cabinet, w/d
Decon Toilets / Showers			75	2	150	1 lavatory, 1 wc, 1 shower, 42"x42" showers
Decon Personnel Lockers					75	Small lockers located in passage / alcove outside decon toilet / showers
PPE Drop					176	
EMS Storage					73	Conditioned room; ALS cabinet with E lock
Truck / Bay Wash					96	
Training Mezzanine					313	Not a program requirement rather an opportunity to be used only if a mezzanine is used in the design to support other requirements (i.e. electrical room, mechanical room, storage, etc.)
Total Operations					7,674	
Building Subtotal					15,037	
35% Building Circulation, Structure, Partitions					3,975	
Total Gross Area					19,012	

Philomont Fire Station
Program of Requirements

May 17, 2021



Additional Spaces:		
Water Source Storage Tank		Underground 30,000 gallon tank
Sprinkler Water Storage Tank		Tank capacity TBD
Dining Patio w/ Grill	225	
Exercise Patio	375	
Outdoor Storage (Remote)		40'x40' placeholder on site plan - plywood storage, snow blower, lawnmower, riding lawnmower, wheel chains, salt, pickup truck
Generator		100% Full Facility Back-up

ARCHITECTURAL NARRATIVE

Philomont Fire Station



III. ARCHITECTURAL NARRATIVE

SCHEME 1A – RENOVATION / NO NEW ADDITION

The programmed square footage cannot be achieved within the approximate 9300 s.f. existing facility.

SCHEME 1B – RENOVATION / ADDITION

This Scheme retains the existing building shell and interior structure wherever feasible and provides a complete rehabilitation of the existing building. Because the program requires considerably more area than exists in the current structure, the concept envisions two building expansions: 1) a new second floor above the existing apparatus bays, and 2) a new wing with four (4) drive-through apparatus bays and associated bay support spaces. All new HVAC, electrical, plumbing and IT systems are proposed to provide an extended life span and optimal thermal and energy performance for the revitalized station. Scheme 1 includes 19,520 GSF and has an estimated construction cost of \$15,229,292 with an 18-month construction time. Temporary off-site quarters would be required at an additional estimated cost of 2.4 million.

Key features of the scheme include the following:

- The existing cell tower is maintained with little impact on its existing subgrade utilities.
- New parking with grading is located in the general area of the existing septic drainfield. Disruption to the existing system is unavoidable therefore, a new septic drainfield is proposed downhill from the new station along the northern property line. An alternative system design is anticipated due to the limited site area available.
- Four new drive-through apparatus bays are provided in a new addition to the east of the existing building in the area currently serving as the station parking lot. Clockwise apparatus site circulation is provided by an entrance on Snickersville Pike serving the rear 60' apron and bay doors. The front bay doors and 60' apron are oriented directly toward JEB Stuart Road for prompt and safe emergency response.
- Emergency responder parking is provided on the rear drive aisle, with a sidewalk providing entry for the crew into the rear of the station.
- A new public entry is created on the front of the station with two parking spaces (1 HC space, 1 visitor space) accessed from JEB Stuart Rd. A covered walkway and HC ramp provide pedestrian access to the new building entry.
- Other site features include flagpoles at the new entry, and a relocated fuel station, future storage building, underground 30,000 gallon water source tank, and an above ground domestic/sprinkler water tank.
- The existing well is relocated to the rear of the property.
- Community activities currently found on the site not provided include parking for the adjacent community center and a recycling center. These functions are moved to the community center parcel.
- Internally, the building is organized in a functional and efficient manner:
 - **First floor spaces** within the existing building consist of a public entry with HC toilet, administrative offices and meeting rooms, and decontamination spaces (in accordance with established Hot Zone strategies for mitigation of cancer)

ARCHITECTURAL NARRATIVE

Philomont Fire Station



- Two new stairs are introduced for fire egress and emergency response to the apparatus bays from the second floor.
- A new two stop, walk-through elevator provides HC access to the second floor in compliance with federal ADA regulations. All building floor levels will be accessible.
- Four new drive-through bays meeting contemporary standards are housed in a new building wing, accompanied by bay support spaces on the far east end of the building.
- **Second floor spaces** within the existing building consist of communal rooms (kitchen, dining, dayroom, exercise room), as well as bunkrooms and toilet/locker rooms.
- The recently renovated kitchen is retained, as are the large open dining and dayroom areas located in the former social hall.
- A large exercise room is located in the area currently occupied by two bunkrooms.
- A new second floor is proposed above the existing apparatus bays, requiring removal of the existing roof and insertion of steel columns and a new concrete floor slab, which will align with the original second floor slab. This portion of the building will house 7 semi-private bunkrooms, separate men's and women's toilet/lockers, a personnel laundry, two new egress/response stairs, and the elevator.
- Due to the existing building undergoing such an extensive renovation, it is not available to use for on-going operations during construction. Additionally, reserving the downhill area of the site for the septic drain field restricts the site further, and thereby forces operations to move off site into a temporary structure for the duration of construction. Costs of offsite construction of a new temporary fire station and supporting site work is included in the projected costs. The new building is anticipated to be modular unit construction with a metal frame supported membrane fabric structure for the bays. The facility is an assumed 7400 s.f. Land acquisition, relocation expenses, or demolition/removal of the temporary structure in the future is not projected in the cost estimate.
- Construction staging in this scheme is anticipated on the downhill area of the site accessed from Snickersville Pike.
- With this scheme LCFR would make several compromises from their standard design program requirements including a two-story station vs. a one-story station, a hot/cold decontamination circulation path, and a non-preferred layout in order to fit the space available.
- Existing building conditions were structurally surveyed with this feasibility study with a visual field assessment. Unknown conditions remain with unobserved structural footings, steel, soils, etc. A structural risk factor shall be assessed on this scheme with an unknown conditions allowance added to the anticipated costs.

SCHEME 2 – NEW BUILDING (Existing Site)

This scheme envisions a new free-standing fire station located on the rear of the property with the existing station remaining in operation throughout the construction period. Scheme 2 includes 18,944 GSF and has an estimated construction cost of \$17,302,429 with an 18-month construction time.

ARCHITECTURAL NARRATIVE

Philomont Fire Station



Key features of the scheme include the following:

- The existing cell tower is maintained in its current location. However, due to the placement of the new fire station, additional site investigation is required to confirm the exact location of the existing underground utilities and whether the new building construction will require relocation of those utilities.
- The new building and building aprons are located in the general area of the existing septic drainfield. Therefore, a new septic drainfield is proposed downhill from the new station along the northern property line. An alternative system design is anticipated due to the limited site area available.
- Counter-clockwise circulation for four new drive-through apparatus bays is provided by a new site entrance on JEB Stuart Road and new primary response exit onto Snickersville Pike.
- Emergency responder parking is provided in a new double loaded parking lot placed in the location of the existing station, parallel to JEB Stuart Road. This strategy provides entry for the crew into the rear of the new station.
- A new public entry is created on the front of the station with two parking spaces (1 HC space, 1 visitor space) accessed from Snickersville Pike.
- Other site features include flagpoles at the new entry, and a relocated fuel station, future storage building, underground 30,000 gallon water source tank, and an above ground domestic/sprinkler water tank.
- The existing well remains in operation at its current location.
- Community activities currently found on the site not provided include parking for the adjacent community center and a recycling center. These functions are moved to the community center parcel.
- Internally, the building is organized in a functional and efficient manner:
 - **First floor spaces** consist of a public entry with HC toilet, administrative offices and meeting rooms, and decontamination spaces (in accordance with established Hot Zone strategies for mitigation of cancer). A large exercise room is placed at the rear of the station adjacent to a spacious outdoor exercise patio.
 - Two stairs are introduced for fire egress and emergency response to the apparatus bays from the second floor.
 - A conventional two stop elevator provides HC access to the second floor in compliance with federal ADA regulations.
 - Four new drive-through bays meeting contemporary standards are housed at the ground level, accompanied by bay support spaces on the far northern end of the building.
 - **Second floor spaces** consist of communal rooms (kitchen, dining, dayroom), as well as bunkrooms and toilet/locker rooms.
 - The kitchen and dining room are placed along the eastern end of the building and are served with a full-length exterior deck for outdoor dining, cooking, and crew discussions.
 - The dayroom is located adjacent to the kitchen and dining rooms to create a spacious “great room”.

ARCHITECTURAL NARRATIVE

Philomont Fire Station



- The opposite end of the second floor will house 7 semi-private bunkrooms, separate men's and women's toilet/lockers, and a personnel laundry.
- Due to parking issues and limited site area, the existing building is not available to use for on-going operations during construction. Operations are forced to move off site into a temporary structure for the duration of construction. Costs of offsite construction of a new temporary fire station and supporting site work is included in the projected costs. The new building is anticipated to be modular unit construction with a metal frame supported membrane fabric structure for the bays. The facility is an assumed 7400 s.f. Land acquisition, relocation expenses, or demolition/removal of the temporary structure in the future is not projected in the cost estimate.
- Construction staging in this scheme is anticipated on the uphill area of the site accessed from JEB Stuart Road.
- With this scheme LCFR would make several compromises from their standard design program requirements including a two-story station vs. a one-story station, a hot/cold decontamination circulation path, and a non-preferred layout in order to fit the space available.

Scheme 2 embodies a new free-standing fire station on a site that is severely limited by the restrictions of the existing cell tower and equipment enclosure. New cell tower equipment constructed/relocated to an area on the same site within close proximity could be considered for an estimated cost in the range of \$400,000 to \$500,000 for this scheme. As a result this scheme could orient a "mirrored" plan with the front bay doors and 60' apron oriented directly toward JEB Stuart Road. A cell tower relocation would have significant time impacts with potential legislative approval and contract negotiations with the providers.

SCHEME 3 – NEW BUILDING (Expanded Site)

This scheme evaluates the potential for the fire station if the adjacent community center property was considered for use in conjunction with the fire station construction project. Any scheme on the combined property would require the demolition of the existing Community Center. This study recognizes the importance of the community center buildings and therefore this scheme is not being considered as being feasible.

ARCHITECTURAL NARRATIVE

Philomont Fire Station



COSTS

SCHEME 1B:

ESTIMATED CONSTRUCTION COST AT AWARD	\$15,229,292
TEMPORARY FACILITY	\$2,400,000
COMMUNITY CENTER PARKING & RECYCLING AREA	\$200,458
<u>UNKNOWN CONDITIONS ALLOWANCE (10% BASE COST)</u>	\$1,228,902
TOTAL =	\$19,058,652

SCHEME 2:

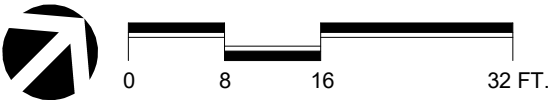
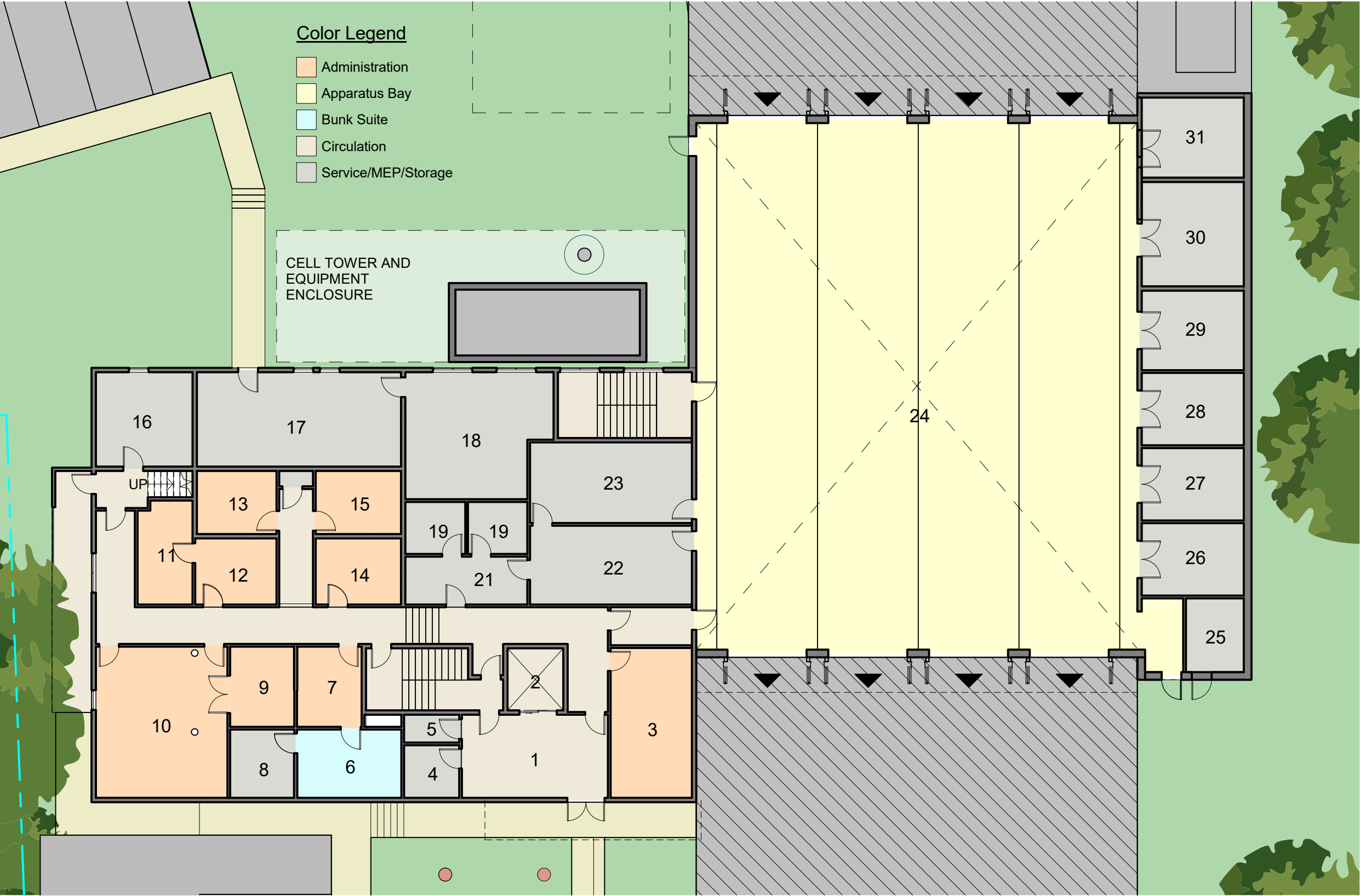
ESTIMATED CONSTRUCTION COST AT AWARD	\$17,302,429
TEMPORARY FACILITY	\$2,400,000
<u>COMMUNITY CENTER PARKING & RECYCLING AREA</u>	\$200,458
TOTAL =	\$19,902,887

Room Legend

- 1 Lobby
- 2 Elevator
- 3 Watch Room
- 4 Uni-Sex Toilet
- 5 Storage
- 6 Command Bunk
- 7 Command Office
- 8 Command Locker/Shower
- 9 Training Storage
- 10 Training Room
- 11 Supply Room
- 12 Work/Copy Room
- 13 Duty Officer
- 14 Station Commander
- 15 Volunteer Office
- 16 Sprinkler/Fire Pump
- 17 Electrical /IT Room
- 18 Mechanical
- 19 Decon Toilet/Shower
- 20 Janitor
- 21 Decon Lockers
- 22 Decon
- 23 Ready Gear
- 24 Apparatus Bay
- 25 PPE Drop
- 26 Hose/Storage
- 27 Compressor
- 28 SCBA Shop/Repair
- 29 Cascade Room
- 30 General Storage
- 31 Volunteer Storage

Color Legend

- Administration
- Apparatus Bay
- Bunk Suite
- Circulation
- Service/MEP/Storage



PHILOMONT FIRE STATION

SCHEME 1 FIRST FLOORPLAN

*CONCEPTUAL LAYOUTS FOR FEASIBILITY STUDY ONLY

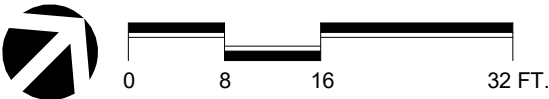
4/9/2021

Room Legend

- 1 Dining
- 2 Dayroom
- 3 Study
- 4 Elevator
- 5 Laundry
- 6 Bunk Rooms
- 7 Women's Lockers
- 8 Women's Toilets
- 9 Men's Toilets
- 10 Men's Lockers
- 11 Gender Neutral
- 12 Exercise Room
- 13 Kitchen/Pantry
- 14 Exercise Patio

Color Legend

- Bunk Suite
- Circulation
- Living Space
- Service/MEP/Storage



PHILOMONT FIRE STATION

SCHEME 1 SECOND FLOORPLAN

*CONCEPTUAL LAYOUTS FOR FEASIBILITY STUDY ONLY

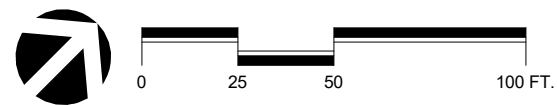
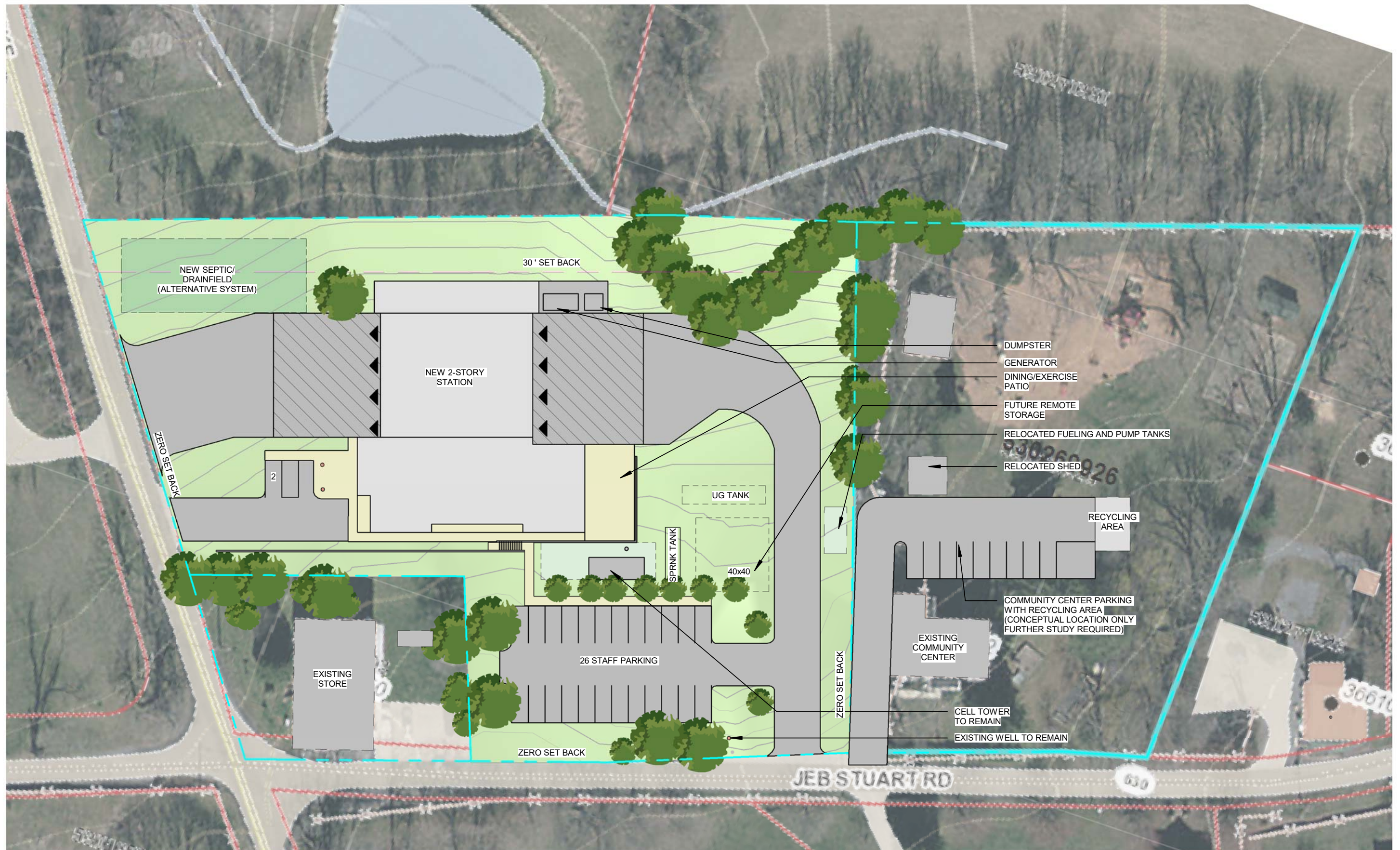


PHILOMONT FIRE STATION

SCHEME 1 - 3D

*CONCEPTUAL LAYOUTS FOR FEASIBILITY STUDY ONLY

4/9/2021



PHILOMONT FIRE STATION

SCHEME 2 - SITE PLAN

*CONCEPTUAL LAYOUTS FOR FEASIBILITY STUDY ONLY

7/2/2021

Room Legend

- 1 Vestibule
- 2 Lobby
- 3 Uni-Sex Toilet
- 4 Watch Room
- 5 Training Room/Storage
- 6 Storage
- 7 Station Commander
- 8 Duty Officer
- 9 Volunteer Officer
- 10 Work/Copy Room/Supply Room
- 11 Not Used
- 12 Study
- 13 Command Suite
- 14 Command Suite Bunk
- 15 Command Suite Toilet/Shower
- 16 Fire Pump
- 17 Sprinkler
- 18 Decon Lockers
- 19 Decon Toilet/Shower
- 20 Decon
- 21 EMS Storage
- 22 Truck/Bay Washing
- 23 IT Room
- 24 Ready Gear
- 25 Elevator
- 26 Exercise Room
- 27 Exercise Patio
- 28 Apparatus Bay
- 29 PPE Drop
- 30 Hose/Storage
- 31 Compressor
- 32 SCBA Shop/Repair
- 33 Cascade Room
- 34 General Storage
- 35 Volunteer Storage

Color Legend

- Administration
- Apparatus Bay
- Bunk Suite
- Circulation
- Living Space
- Service/MEP/Storage



PHILOMONT FIRE STATION
SCHEME 2 FIRST FLOORPLAN



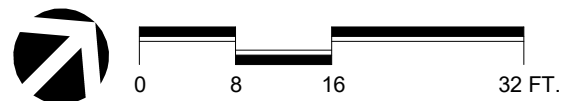
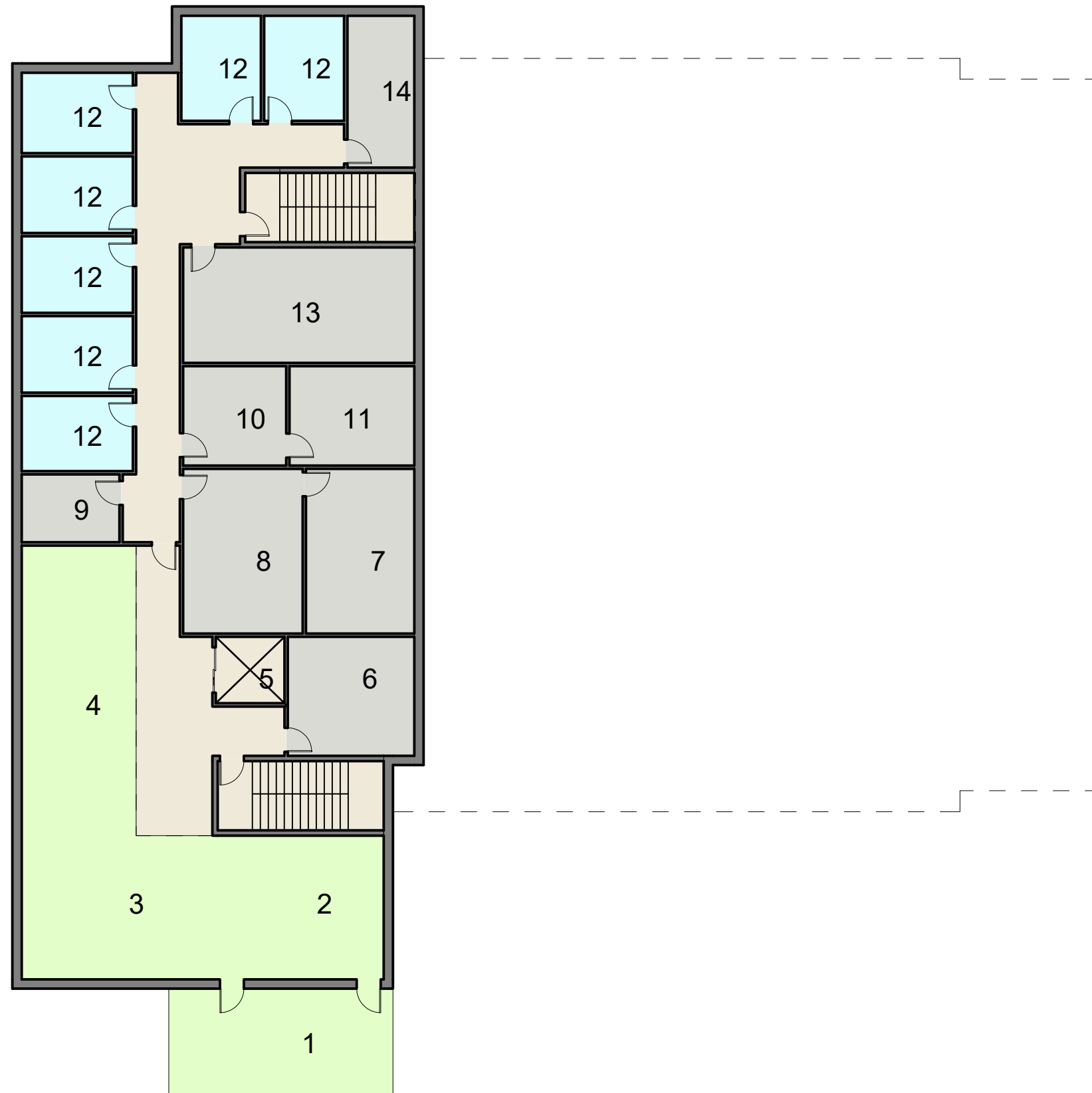
*CONCEPTUAL LAYOUTS FOR FEASIBILITY STUDY ONLY

Room Legend

- 1 Outdoor Patio
- 2 Kitchen/Pantry
- 3 Dining
- 4 Dayroom
- 5 Elevator
- 6 Electrical
- 7 Men's Toilet
- 8 Men's Lockers
- 9 Gender Neutral Locker/Toilet
- 10 Women's Lockers
- 11 Women's Toilets
- 12 Bunk Room
- 13 Mechanical
- 14 Laundry

Color Legend

- Bunk Suite
- Circulation
- Living Space
- Service/MEP/Storage



PHILOMONT FIRE STATION

SCHEME 2 SECOND FLOORPLAN

*CONCEPTUAL LAYOUTS FOR FEASIBILITY STUDY ONLY

4/9/2021



PHILOMONT FIRE STATION

SCHEME 2 - 3D

*CONCEPTUAL LAYOUTS FOR FEASIBILITY STUDY ONLY

4/9/2021

March 24, 2021

LeMay Erickson Wilcox Architects
11250 Roger Bacon Dr., Suite 16
Reston, VA 20190

Attn: Michele Ferri, AIA

RE: Philomont Fire Station – Feasibility Study

EB#: 2073001.00.V

Dear Ms. Ferri:

As part of our feasibility study, I visited the above-referenced site on March 11, 2021 and met with you and Mr. Richard Pearsall of the Philomont Volunteer Fire Department to observe the existing building conditions and to verify the existing structural framing conformed to the existing drawings. Most of the structure was not visible due to hard ceilings, bulkheads, and other architectural items. However, the visible structure appeared to be in good condition and Mr. Pearsall did not report any complaints of structural deterioration.

EXISTING STRUCTURE

The existing drawings provided to us are architectural plans of the first and second floors (1993), two structural drawings showing the structural plans and details (1993), and an architectural drawing for some renovations (2010).

Original 1956 Building

- Most of the layout in the original building shown in the 1994 architectural plans has remained. While some of the partition walls at the Day Room have moved and partition walls have been added to expand the Furnace Room, the structural configuration does not appear to have been altered.
- It was discussed that the overhead doors for the apparatus bay are too short for a full-size fire truck. The second floor is too low for the height of overhead doors to increase without significantly altering the second floor.
- There were very few cracks observed in the slab on grade in the apparatus bay and there were no other visible signs of deterioration.

1973 Addition

- The stairs leading up to Level 2 between the original 1956 building and 1994 addition were changed from an exterior stair to a metal stair. It was discussed that these stairs are noisy when in use.

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1994 Addition

- The steel joists and metal roof deck appear to be in good condition. No visible signs of deterioration were observed.
- The existing structural drawings show an option of 28LH09 long span joists spaced at 5'-0" on-center or 30K11 standard joists spaced at 4'-0" on-center. I was able to access one of these joists on a ladder and verify that the joist is significantly deeper than 28" so the joists are likely 30K11's.
- The observable structure appeared to match the details on the existing drawings.

Existing Masonry Walls Code Analysis

It is unclear from the existing drawings and visual observation whether the existing masonry walls are reinforced. If the walls are unreinforced, then the main lateral force resisting system of the fire station would be classified as type "A11" ("Ordinary plain masonry shear walls") per Table 12.2-1 of ASCE 7-10. According to ASCE 7-10, this fire station would be rated risk category IV. If the seismic design category is A, then type "A11" (unreinforced) masonry walls is an acceptable lateral system for the fire station.

A geotechnical analysis should be performed to confirm the site class and seismic design accelerations to verify that the seismic design category is A per chapter 11 of ASCE 7-10. Seismic design category B is not possible per Tables 11.6-1 and 11.6-2 of ASCE 7-10 but if the category is C, then the masonry walls will need to be reinforced. In which case, further investigation may be warranted to determine whether the masonry walls have reinforcing either by destructive testing or by a third party using GPR or X-ray to detect reinforcing. If no reinforcing is found, then reinforcing would be required to be added to the existing masonry walls to meet the requirements for risk category IV.

POSSIBLE ADDITIONS

As described above, the existing structure appears to generally be in good condition. While some structure may need to be strengthened or altered where load is added, the structure does not appear to require rehabilitating modifications to serve a new addition. The existing structure that was observed and shown on the existing drawings is appropriately sized for the current structure. The masonry walls could potentially support addition load from a vertical expansion, but no information is known about their foundations. The existing steel columns would likely need to be strengthened and their footings modified if a vertical expansion is added above them. A horizontal expansion could be structurally possible but may not be feasible due to other site considerations.

If you have any questions, please do not hesitate to contact me.

Yours truly,

Ehlert Bryan

Andrew T. Schon, PE

Loudoun County PHILOMONT FIRE STATION FPME Concept Design Intent Narrative

Prepared for: Lemay Erickson Willcox Architects | April 9, 2021

Submitted by: 2RW Consultants, Inc.
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EXECUTIVE SUMMARY

2RW Consultants, Inc. (2RW) has been engaged by Lemay Erickson Willcox Architects and Loudoun County to provide concept design services for mechanical, electrical, plumbing, and fire protection (MEP/FP) systems for the proposed renovation/addition or replacement to the existing Philomont Fire Station. The proposed floorplans are depicted in the various scheme and space layouts floor plans prepared by Lemay Erickson Willcox Architects. All the concept schemes will be provided with all new MEP/FP systems. The following design intent narrative is an overview of the proposed engineering systems in the context of the proposed renovation/addition or replacement of the existing facility.

CODES, REGULATIONS, AND DESIGN STANDARDS

The design of building systems will be in accordance with the following applicable codes, mandates, standards, guidelines, and handbooks. The code or standard applicable to the project is the code or standard that in place at the time the contract was signed.

- Virginia Construction Codes (VCC)
 - Virginia Building Code (VBC), 2015
 - Virginia Fire Code (VFC), 2015
 - Virginia Mechanical Code (VMC), 2015
 - Virginia Plumbing Code (VPC), 2015
 - Virginia Fuel Gas Code (VFGC), 2015
 - Virginia Energy Conservation Code (VECC), 2015
 - Virginia Green Conservation Code (VGCC), 2015
 - National Electrical Code (NEC), 2014
- Institutional Codes Standards and Guidelines
 - ASHRAE Standards and Guidelines
 - Standard 15 2019 “Safety Standard for Refrigeration Systems”
 - Standard 55 2017 “Thermal Environmental Conditions for Human Occupancy”
 - Standard 62.1 2019 “Ventilation for Acceptable Indoor Air Quality”
 - Standard 90.1 2019 “Energy Standard for Buildings except Low-Rise Residential Buildings”
 - Standard 135-2016 “BACnet A data Communication Protocol for Building Automation and Control Networks”
 - National Fire Protection Association (NFPA)
 - NFPA 13 “Standard for the Installation of Sprinkler Systems” 2015
 - NFPA 14, Standard for the Installation of Standpipe and Hose Systems 2015
 - NFPA 20 Standard for the Installation of Stationary Pumps for Fire Protection 2015
 - NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances 2015
 - NFPA 54 National Fuel Gas Code
 - NFPA 70, National Electrical Code, 2018
 - NFPA 72 National Fire Alarm Code
 - Code 90a-2015 “Standard for the Installation of Air-Conditioning and Ventilating Systems”
 - Code 90b-2015 “Standard for the Installation of Warm Air Heating and Air Conditioning Systems”
 - NFPA 101 Life Safety Code, 2015

- NFPA 110 Standard for Emergency and Standby Power Systems
- Associated Air Balance Council (AABC) Commissioning Standards and Procedures
- American National Standards Institute (ANSI)
- Air Conditioning and Refrigeration Institute (ARI)
- American Society of Mechanical Engineers (ASME)
- American Society for Testing and Materials (ASTM)
- American Welding Society (AWS)
- IESNA Lighting Handbook, 10th ed
- Manufacturers Standardization Society of Valve and Fitting Industry (MSS)
- Plumbing Drainage Institute (PDI)
- SMACNA
- SMACNA HVAC Duct Construction Standards: Metal & Flexible 2005 3rd Edition
- SMACNA Seismic Restraint Manual 2008 - Guidelines for Mechanical Systems
- SMACNA HVAC Air Duct Leakage Test Manual

FIRE PROTECTION

DESIGN APPROACH

The fire station shall be provided with a complete automatic sprinkler system per NFPA 13. The incoming fire service shall be zoned into for each floor level of the building with required zone control valves and flow switches located within the water/fire service room. There will be Fire Department Connection (FDC) provided on the address side of the building. It is anticipated that an exterior fire suppression storage tanks will be required due to limitations in available water utilities at the project site. An electric fire pump in a dedicated fire service room shall be provided to supply the required pressure for the automatic sprinkler system.

The automatic sprinkler system shall be a 'wet-pipe' as all areas of the building shall be provided with heat for freeze protection. All aboveground fire protection piping shall be Schedule 40 steel. Quick response sprinkler heads shall be provided throughout the building with concealed or semi-recessed heads in finished ceilings or upright pendent heads in exposed areas. Wire metal guards shall be provided on area subject to damage.

PROPOSED NEW WORK

System	Description
Fire Service	A new 6" fire service line shall be provided from the site water utility terminated in the proposed water/fire service Room with a backflow preventer device, fire department connection (FDC). A backflow preventer test header shall be provided.
Water Storage Tanks	Exterior below grade water storage tanks for fire service supply.
Fire Pump	A new fire pump with jockey pump and all required controls/accessories shall be located in a dedicated fire service room with automatic transfer connection to the building emergency power systems.
Automatic Fire Suppression Systems	Automatic Sprinkler Systems – All occupied and other interior heated areas will be protected by a wet sprinkler system. Sprinkler zone mains lines from incoming fire service location will be routed to feed the automatic sprinkler systems within the building. Each automatic sprinkler zone connection will be provided with a control valve, a check valve, a water flow switch, inspector's test connection, a pressure gauge, a pressure relief valve, and an express drain to permit testing and draining of the individual system.

PLUMBING

All plumbing systems shall be provided in accordance with the latest plumbing codes and regulations, and the latest adopted codes of the Virginia Plumbing Code (VPC).

PROPOSED NEW WORK

System	Description
Domestic Water Service	A 2-1/2" water service shall be routed to the building and provided with an approved backflow preventer at the service entrance assembly.
Domestic Water Piping	All domestic water shall be distributed through the areas of work via insulated copper piping with code compliant piping insulation. Pressure regulating valves shall be provided as required on the piping to ensure the pressure is at acceptable level for equipment connections. Isolation valves shall be provided as necessary to separate zones.
Sanitary Waste and Vent Piping	<p>A 4" sanitary lateral shall be routed from the building general quarters, locker rooms, kitchen and restrooms connected to the site sanitary sewer infrastructure. The lateral location and invert shall be coordinated with the proposed site septic field.</p> <p>An independent 4" sanitary lateral shall be routed from the building apparatus bay and support spaces with an exterior underground oil interceptor prior to connection to the site sanitary sewer infrastructure to the septic field.</p> <p>2-inch to 6-inch PVC Schedule 40 pipes can be used for under slab sanitary systems. All other sanitary piping shall be cast iron. All horizontal sanitary piping 2-inch and smaller shall be sloped at 1/4" per foot and 3-inch and larger piping shall be sloped at 1/8" per foot. Floor drains will be provided with a trap primer to introduce small amounts of water to ensure the trap seal does not evaporate and allow the sanitary gases to rise into the occupied space. Water saver models shall be utilized connected to the new plumbing fixtures.</p>
Storm Water Systems	<p>Storm water collected on the flat roofs of the building structure shall be drained through internal rain leaders to below grade storm water laterals. These storm water laterals shall connect to the site storm sewer infrastructure. If required based on the new civil utility drawings, backwater valves shall be provided on the proposed storm laterals.</p> <p>2-inch to 6-inch PVC Schedule 40 pipes can be used for under slab storm systems. All other storm piping shall be cast iron. All horizontal sanitary piping 2-inch and smaller shall be sloped at 1/4" per foot and 3-inch and larger piping shall be sloped at 1/8" per foot. All internal storm water piping located above slab within the building envelope shall be insulated.</p>
Domestic Hot Water Systems	<p>The domestic hot water demand for the proposed building shall be provided by a propane, gas-fired instantaneous tank-less water heaters. Four (4) 199MBH wall mounted water heaters rated for 285 GPH (@80°F Rise) recovery shall be provided.</p> <p>The system shall be provided with an expansion tank and domestic hot water recirculation pump with pipe loop system. A master thermostatic mixing valve shall be provided to limit the loop hot water temperature at 120 degrees F and ASSE 1070 compliant point-of-use thermostatic mixing valves shall be provided as required at individual hand washing fixtures.</p>
Plumbing Fixtures	All new plumbing fixtures to be specified to meet the standards of the Americans with Disabilities Act (ADA) and as low consumption models with automatic flush valves and touchless operation. The water closets shall be sensor operated flush valve type. All lavatories will have low flow faucets or aerators specified that are sensor operated. Water hammer arrestors shall be placed on plumbing fixture supply piping in accordance with applicable codes. These are used to minimize transference of water vibration noise to the space. Minimum flow performance scheduled below.

Propane Gas Service

The building will be provided with two (2) 1000-gallon exterior propane storage tanks to provide propane service to serve the mechanical equipment, plumbing domestic water heater/s and kitchen appliances. Gas piping distribution for the building shall be Schedule 40 black steel piping and fittings suitable for the gas pressure.

DESIGN APPROACH**Plumbing Fixtures**

All plumbing fixtures will be institutional grade, vitreous china or stainless steel as required. All new fixtures shall meet the standards of the Americans with Disabilities Act (ADA).

- Ultra-low-flow fixtures shall be utilized which include:

Fixture Type	Max Flow Rate
Low flow lavatory and sink aerators	0.5 GPM
Ultra-low flow water closets	1.28 GPF
Ultra-low flow shower heads	1.5 GPM
Ultra-low flow urinals	0.125 GPF

- Sensor operated faucets (water operated charging type) and flush valves will be used to improve water efficiency. Water hammer arrestors will be provided for all fixtures with quick closing devices. Water hammer arrestors shall be placed on plumbing fixture supply piping in accordance with the latest adopted version of the IPC. The water hammer arrestors shall be installed in an accessible location. These are used to minimize transference of water vibration noise to the space.
- Water connections and accessories to plumbing fixtures and equipment in the Decon Wash/Dry Room.
- Water connections, isolation valve, backflow preventer and accessories for fill water valve in the Apparatus Bay.
- Water connections, isolation valves, and accessories for hose connections in the four corners of the Apparatus Bay. Two (2) corners shall be provided with wall mounted, pressure wash stations with all required accessories for hose and power wash wand. The other two (2) corners shall be provided with 1" hose connections and reel system.
- Trough/trench drain and accessories to equipment in the Shop/Hose Room.
- Self-contained, hand-free operation stainless steel fully recessed dual height electric water coolers including bottle filler shall be provided per floor (stainless steel).
- Mop sinks shall be provided in each janitor's closet.
- Interior hose bibs – chrome plated in finished areas, rough brass in mechanical/plumbing rooms, furnished with vacuum breaker, ¾" hose outlet.
- Wall hydrant – non-freeze type in recessed box, ¾" hose outlet.
- Floor drains shall be provided in all large mechanical rooms, locker rooms, kitchen, storage rooms and restrooms. Trench drains shall be provided in the Apparatus Bay and equipment support rooms.

MECHANICAL

DESIGN APPROACH

Outdoor Air Conditions

The outside ambient conditions that will be used for design of HVAC and mechanical systems are based upon the latest ASHRAE Handbook of Fundamentals (HOF) 2017 Weather Data for Dulles, VA at Dulles International Airport located in Climate Zone 4A.

- Outdoor Conditions:
 - ASHRAE Summer 1% conditions: 94 degrees F. db/75 degrees F. wb.
 - ASHRAE Winter 99.6% condition: 16 degrees F. db

Indoor Air Conditions

Indoor Building Average Occupied Conditions:

- Summer: 74°F db, +/- 2° and 50% RH
- Winter: 70°F db, +/- 2°

Apparatus Bay Conditions:

- Summer: Ventilation Only
- Winter: 55°F db

Apparatus Support Space Conditions:

- Summer: Ventilation Only
- Winter: 60°F db

Telecom Space Conditions:

- Summer: 72°F db, +/- 2° and 50% RH
- Winter: 72°F db, +/- 2° and 50% RH

Exterior Building Load Assumptions

Envelope Component Opaque and Fenestration	90.1 Minimum Values	Proposed Design
Roofs		
Insulation Entirely above Deck	U-0.068, R-20.0 c.i.	TBD
Walls, Above Grade		
Mass	U-0.104, R-9.5 c.i.	TBD
Floors		
Mass	U-0.087, R-8.3 c.i.	TBD
Slab, On Grade Floors		
Unheated	F-0.730, NR	TBD
Opaque Doors		
Swinging	U-0.700	TBD
Vertical Glazing, 0-40% of Wall		
Metal Framing (curtainwall storefront)	U-0.5, SHGC-0.4 ALL	TBD
Metal Framing (entrance door)	U-0.85, SHGC-0.4 ALL	TBD
Metal Framing (All Other)	U-0.55, SHGC-0.4 ALL	TBD

- Infiltration = 0.02 CFM/sq ft exterior exposure

Occupant Loads

Location(s)	Degree of Activity	Sensible Btu/hr	Latent Btu/hr
Offices, Bunk Rooms	Moderately active office work	250	200
Fitness Rooms	Athletics	710	1010

Lighting Loads

Lighting loads are based on ASHRAE 90.1 as shown below with a reduction factor of 20% for all LED lighting, and control systems. Load calculations and energy model shall be refined to meet the actual lighting loads specified as the project develops.

Common Space Type	Heat Gains Watts/SF
Bunk Rooms	0.25
Conference / Meeting Room	1.23
Day Room	1.23
Corridor, In all other corridors	0.66
Exercise	0.9
Electrical / Mechanical Room	0.42
Dining	0.65
Kitchen	0.99
Office, Enclosed	1.11
Office, Open Plan	0.98
Restroom, All other restrooms	0.98
Locker Rooms	0.75
Stairway, Stairwell	0.69
IT/Telecom	1.5
Storage rooms <50 ft ²	1.24
Apparatus Bay	0.56
All other storage rooms	0.63

Miscellaneous Equipment:

Equipment loads shall initially be based on a minimum of 25% of the building total energy use from the energy simulation. Load calculations and energy model shall be refined to meet the actual equipment specified as the project develops.

Area	Sensible
Offices	150 watts/workstation
Bunk Rooms	0.5 watts/sq.ft.
Conference/Break Rooms	1.0 watts/sq.ft.
Kitchen	1.0 watts/sq.ft.
Exercise	0.5 watts/sq.ft.

Electrical Equipment Rooms	10.0 watts/sq. ft.
Communication/IT Closets	15.0 watts/sq.ft.

Pressurization

The building and zones within it will be pressurized to control infiltration and contaminants to the appropriate zones per best practices for 'Hot Zone' design.

Space	Pressure	With Respect to
Building Occupant Areas	Positive	Apparatus Bay
Apparatus Bay and Support Areas	Negative	Occupant Areas
	Positive	Decon Areas
Decontamination and Storage	Negative	Occupant Areas
	Negative	Apparatus Bay
Locker Room	Negative	surrounding spaces
Restrooms & Custodial Closets	Negative	surrounding spaces
Shower Room	Negative	surrounding spaces

Exhaust Airflow Rate

Exhaust shall be provided in required spaces per code required rate minimums and to maintain the pressurization control described above.

- The building will be lightly pressurized to combat infiltration. Areas that require negative pressurization will be maintained at a pressure that is negative relative to adjacent zones. The building and zones within it will be pressurized to control infiltration and contaminants to the appropriate zones per best practices for 'Hot Zone' design.
- The exhaust air from the building shall be exhausted to outdoor through new dedicated exhaust air systems with energy recovery.
- In accordance with ASHRAE thermal Comfort minimum ventilation will be distributed directly to the space and in the Breathing Zone at a velocity under 50 fpm

Noise & Sound Requirements

- All noise and vibration criteria will be in accordance with general data indicated in ASHRAE Systems Handbook.
- Acoustical and vibration treatment will be provided, as required, to all system components, to maintain specified space noise criteria.
- The TAB contractor will be required to take sound readings. AABC Test Guidelines will be used.

Vibration

- Vibration isolators and flexible connections will be provided for all rotating equipment such as pumps, fans, etc.
- Vibration isolation hangers will be provided when applicable within 50 feet of pumps.

PROPOSED DESIGN SYSTEMS

A packaged, direct expansion (DX) rooftop unit (RTU) with propane gas heating section will be provide the air conditioning and ventilation for the living quarters, offices, and support spaces. The unit shall be configured as a multi-zone Variable Air Volume (VAV) with medium pressure ductwork distribution to Air Terminal Units (ATUs) serving the various thermal control zones. The ATUs shall be provided with hot water reheat coils and low-pressure ductwork distribution to ceiling diffusers and registers. A separate Energy Recovery Ventilator shall be provided to collect the exhaust from the locker room and surrounding areas for energy recovery pretreatment of the ventilation outside air mixed with the RTU return air. All of the system return shall be fully ducted, and no return air plenums shall be utilized for the project.

The decontamination room and adjacent gear storage rooms shall be provided with an independent air distribution systems to maintain ventilation rates and ensure the spaces are negatively pressurized with respect to the surrounding areas and maintaining best practices for 'Hot Zone' contaminant control.

Two (2) gas-fired hot water boilers shall be provided to supply the hot water for the ATUs' reheat coils and the ERVs heating coils. The boiler shall be provided with boiler circulator pumps decoupled from two base mounted main system distribution pumps.

The Apparatus Bay and adjacent support spaces will be provided with heating and ventilation only systems. The Apparatus Bay will be provided with a radiant heat slab system with dedicated gas-fired boiler, circulation pump, controls and manufacturer provided manifold controls for the in slab PEX piping circuits. The support spaces shall be provided with hot water unit heaters.

Exhaust fans will meet code ventilation requirements and negatively pressurize required spaces, including but not limited to restrooms, janitor closets storage and other support rooms. Mechanical exhaust shall be routed through the ERV unit to the outdoors. Mechanical and Electrical rooms shall be ventilated mechanically via an exhaust fan and line voltage thermostat.

The Apparatus Bay shall be provided with AirVac 911 system units with manufacturer controller with door sensors/switches to enable the system. A general exhaust fan system shall be provided for summer ventilation. The system will be provided CO and NO2 system controls interlocked with the ventilation system and AirVac 911 systems. The general exhaust system shall be provided with thermostat control and manual switch override control. Destratification fans with clean air UV technology will also be provided within the Apparatus Bay.

The kitchen shall be provided with a commercial kitchen hood UL listed for grease exhaust systems and provided with an integrated Ansul fire suppression system.

Conventional air distribution systems shall be through metal ductwork with exterior duct insulation. All the system return air distribution shall be fully ducted to the spaces served, and no return air plenums shall be utilized for the project. All concealed ductwork systems shall be insulated galvanized steel sheet metal in accordance with SMACNA standards.

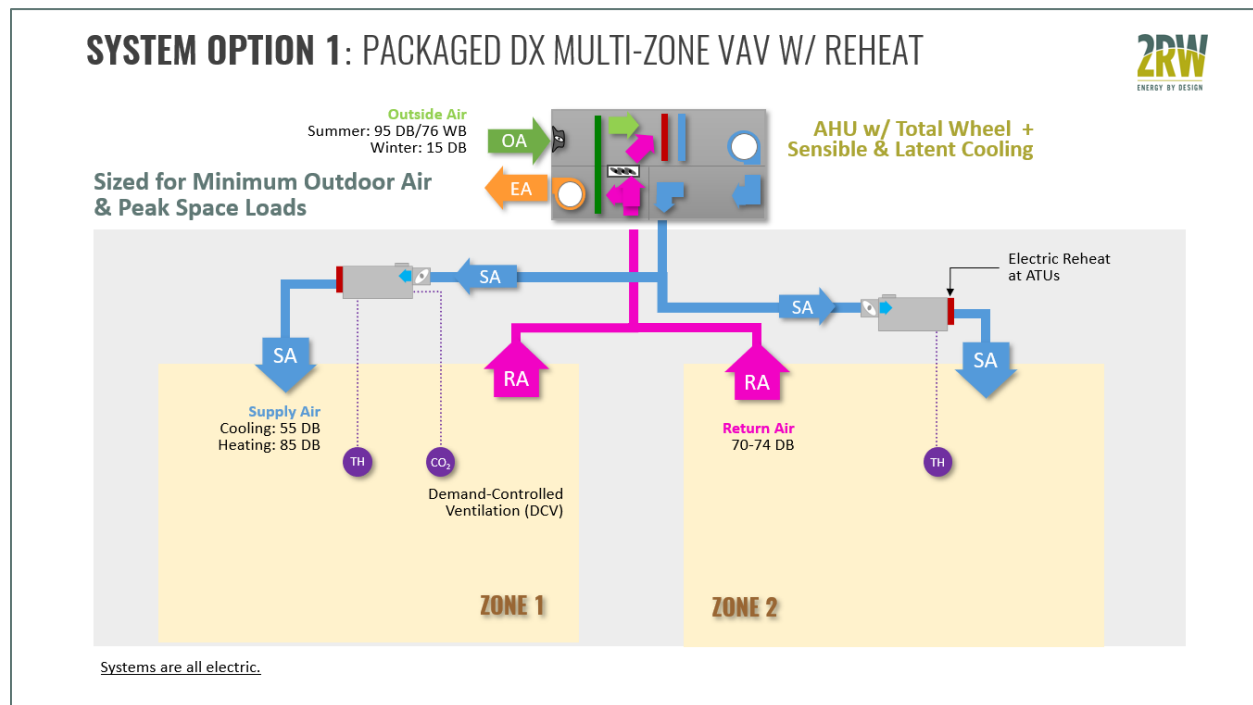
IT spaces shall be served by ductless split systems, consisting of an exterior condensing unit (CU), a wall mounted indoor terminal unit (IAHU) and distribution refrigerant piping.

All refrigerant piping shall be field installed pre-insulated copper piping and routed per manufacturer recommendations. Any central distribution piping shall be routed above the ceilings of central corridors. Condensate piping shall be minimum 1" copper material, routed to the nearest roof or floor drain for central equipment and collected to common condensate drains for interior terminal units.

Electric unit heaters shall be provided in mechanical rooms, external storage areas and other utility spaces as necessary. (Unit heaters may be hydronic if central hydronic system is provided.)

Electric wall heaters shall be provided in exterior stairwells and vestibules as necessary.

A central building automation system (BAS) with direct digital controls (DDC) shall be provided throughout the building for all new HVAC systems. Automation and management for building use functions, thermal comfort, and energy efficiency shall be fully programmable and adjustable by the user and/or owner. The BAS shall have full capabilities of scheduling controlling, monitoring, trending, and alarming for the system. Systems shall provide for zoning and submetering of all spaces. The unit's factory supplied internal controls shall provide setpoints, diagnostics, and alarms to the user for monitoring capabilities. The BAS will include provisions for connecting an Owner-furnished laptop workstation with full system graphics.



Unit Tag (Location)	Area Served	Unit Qty.	Est. Total Capacity (Cooling/Heating)	Est. Flow Rate Range	Remarks
RTU	Occupied Areas	1	30 tons 350 MBH	10,000 CFM	Packaged DX VAV RTU w/ Gas-Fired Heating Section
ERV 1	Occupied Areas	1	2,850 CFM OA 1,400 CFM EA	-	Packaged Roof ERV with Total Energy Recovery Wheel
ERV 2	Decon and Storage	1	60 MBH	2,000 CFM	Split-System ERV with Heating Coil and Energy Recovery Core
HWB-1/HWB-2	Occupied Areas	2	200 MBH	20 GPM	Gas-Fired Condensing Boilers
BCP-1/BCP-1	HWB-1/HWB-2	2	½ HP	20 GPM	Inline Circulator Pump
HWP-1/HWP-2	Hot Water System	2	3 HP	40 GPM	Base mounted, end suction w/ VFD, operating/standby
HWB-3	Apparatus Bay	1	400 MBH	40 GPM	Gas-Fired Condensing Boiler

BCP-3	HWB-3	2	3 HP	40 GPM	Inline Circulator Pump
Radiant Heat System	Apparatus Bay	1	300 MBH	30 GPM	In Slab Radiant Heat System
VAV Air Terminal Units	Occupied Areas	20-25	0.5-2 tons	200-1000 CFM	Sensible hydronic cooling, hydronic heating, fan in series position
AirVAC 911 Units	Apparatus Bay	6	-	1000 CFM	Apparatus Bay Exhaust Filtration System Fans
Destrat Fans	Apparatus Bay	2	-	20,000 CFM	Apparatus Bay Destratification System Fans
Ventilation Fan	Apparatus Bay	1	-	30,000 CFM	Apparatus Bay Summer Ventilation Fan System
Kitchen Hood	Kitchen	1	-	600 CFM	Kitchen Hood Exhaust System w/ Ansul Suppression, Roof Upblast Fan
Ductless Split System Unit	Telecom Room	1	24,000 MBH	-	Wall mounted, condensing unit located on roof or grade-mounted
General Exhaust Air Fans	Support Areas	5	1/2 HP	300 CFM	Roof Mounted Downblast Fans
General Unit Heaters	Support Areas	6	16 MBH	-	Hot Water Unit Heaters
Electric Unit Heaters	Stairs/Vestibule	4	9 MBH	-	Electric Wall Heaters

ELECTRICAL

OWNERS PROJECT REQUIREMENTS & GUIDELINES

The electrical systems will include all work associated with the power, lighting, and emergency/standby power systems. Provide adequate power for general receptacles, lighting, mechanical, and plumbing equipment. Provide lighting levels in accordance with the latest IES recommendations. Provide code compliant lighting controls. All wiring to be copper and routed in PVC/EMT/RGS raceway.

PROPOSED NEW WORK

System	Description
Electrical Service	<p>New building electric service to be installed. The existing site utility infrastructure is only for a 240/120V, 1Ø service and 208/120V, 3Ø availability will have to be coordinated with the power utility. Based on visual review, 208/120V, 3Ø is available approximately 0.2 miles west on State Route 734 (Snickersville Turnpike). The overhead would need to be extended to the property and a new underground service feed to grade mounted site transformer. A dedicated utility meter and distribution will be secured from the main electric rooms. An exterior CT cabinet is planned.</p> <p>The new estimated electric service ampacity is 1200A at 208/120V, 3Ø. A Main Switchboard (MSB) with 1600A 208/120V, 3Ø bus shall be provided to allow connection of any site Photovoltaic (PV) Array to the utility distribution.</p> <p>The power distribution system will be designed with ample capacity for proposed building use, as well as a minimum of 25% additional capacity for future growth.</p>
Normal Power Distribution	<p>All power distribution will be located in the electrical rooms throughout the building.</p> <p>All equipment and lighting will utilize 208/120V power.</p> <p>Integral TVSS on main 208/120V distribution panels.</p> <p>Main distribution panel to feed 208/120V distribution panels throughout the building.</p> <p>Main distribution panel to feed large mechanical equipment load(s).</p>
Emergency Generator Power Distribution	<p>A diesel backup generator will be provided to provide backup power for the entire facility including life safety loads (NEC 700), normal loads (NEC 702), and the fire pump transfer switch (NEC 695). The generator capacity is estimated at 250 kW. The generator will be equipped with a Level 2 sound enclosure. We will coordinate with the mechanical design so that any fresh air intake louvers are located as far away from the generator as possible. Automatic transfer switches and branch panelboards will be provided for "Life Safety" and "Normal Standby" loads. ATS-LS will serve life safety loads (egress and exit lights, fire alarm system) and ATS-EQ for back-up of the normal power building systems. The fire pump ATS will be provided by the fire pump vendor. Generator distribution shall include a 1200A dual source dual purpose docking station: Trystar DBDS or equal.</p>
Lighting Systems & Lighting Controls	<p>All lighting in the new areas will be from a variety energy efficient light emitting diode (LED) fixtures. All fixtures shall be suitable for use in the various support spaces and Apparatus Bay. All spaces will utilize occupancy sensors and daylight harvesting where required by code. Conference rooms & other instruction spaces and similar will have dimmable controls with scene presets. Systems will have lighting relay room controllers, lighting control station switches and ceiling mounted sensors to control lighting fixtures and provide multiple levels of lighting. Refer to the illumination level table below for design lighting levels. All lighting to be 3500K color temperature with 80 CRI minimum. Lighting control systems will consist of a digital lighting control system (CAT 5 based or similar) capable of building wide interconnection/communication. Provide cost for building wide interconnection and head end interface including all network bridges and manufacturing programming to manage light levels and color temperature during evening operation of the fire station.</p>

Emergency lighting will automatically be switched on during a power outage.

Exterior Lighting	Exterior lighting (parking lot, etc) will be lit with pole mounted full cutoff light emitting diode (LED) lighting fixtures and will be designed to shield adjacent residences from intrusive glare while maintain high levels for safety and security purposes. The lighting fixtures will be full cutoff with no uplight to minimize light pollution into the night sky. There will be building mounted lighting around the perimeter of the building. Fixtures will be controlled through the building lighting control system (time schedule). Integral dimming occupancy sensors will be included were useful and safe.
Specialty Systems	All telecommunication, security, and AV system design shall include by not limited to internet, security, and Westnet alert systems.

DESIGN APPROACH

Lighting Illumination Levels

Space	Foot Candle Range	Comments
Offices, Breakrooms	25-45	measured at desk height
Conference Rooms	25-40	
Apparatus Bays	50-70	
Bunk Rooms	15-25	
Corridors	15-20	
Fitness Rooms	30-50	
Storage	20-40	
Mechanical, Electrical, Support Areas	35-50	

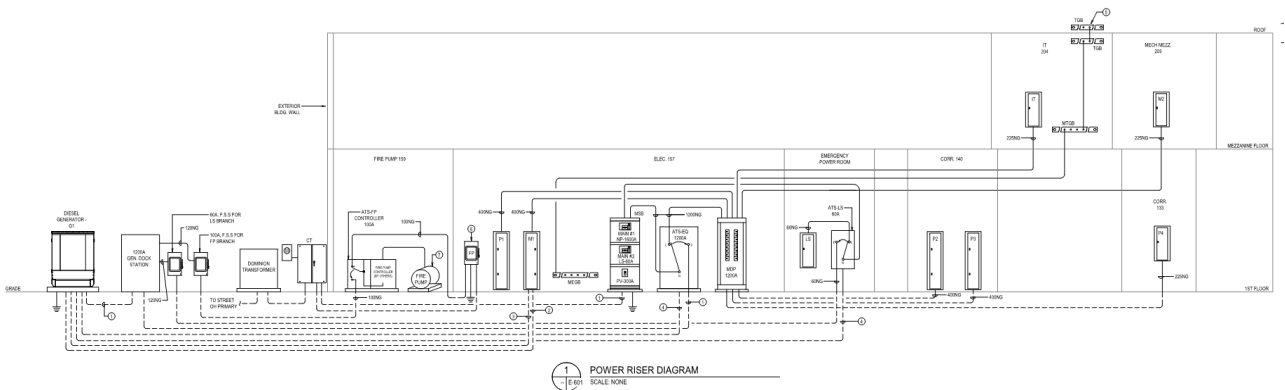
Preliminary Electrical Distribution Equipment List

Equipment Name	Floor	Location	Systems Served	Fed From	Voltage	Bus/MCB Rating (A)	Distribution
MSB	1 st	Main Electric Room	Building	Utility Transformer	208/120	1600/1200, 60, and 300	MDP, LS, and PV
MDP	1 st	Main Electric Room	Normal Systems	MSB	208/120	1200/1200	Single Distribution Section
ATS-LS	1 st	Emergency Power Room	Life Safety	MDP/Generator	208/120	60	N/A
Panel LS	1 st	Emergency Power Room	Life Safety	ATS-LS	208/120	60/MLO	42 Pole
ATS-EQ	1 st	Main Electric Room	Normal Systems	MDP/Gen	208/120	1200	N/A
Panel P1	1 st	Main Electric Room	Normal Systems	MDP	208/120	400/MLO	84 Pole
Panel M1	1 st	Main Electric Room	Normal Systems	MDP	208/120	400/MLO	84 Pole
Panel P2	1 st	-	Normal Systems	MDP	208/120	400/MLO	84 Pole

Panel P3	1 st	-	Normal Systems	MDP	208/120	225/MLO	84 Pole
Panel P4	1 st	Kitchen	Normal Systems	MDP	208/120	225/MLO	84 Pole
Panel M2	2 nd	Mechanical Mezzanine	Normal Systems	MDP	208/120	225/MLO	42 Pole
Panel IT	2 nd	IT Room	Normal Systems	MDP	208/120	225/MLO	42 Pole

Preliminary Electrical Power Generation Equipment List

Equipment Name	Floor	Location	Systems Served	Fuel	Voltage	Bus/MCB Rating (A)	Distribution
GEN-1	Grade	Exterior	NEC 700, 702, 695	Diesel	208/120	1200/1200	1 output breaker



FIRE ALARM SYSTEM

OWNER PROJECT REQUIREMENTS & GUIDELINES

The fire alarm system will be in accordance with Virginia Building Code standards/requirements. Below is a brief description of systems for reference.

PROPOSED NEW WORK

System	Description
Fire Alarm Systems	<p>Provide the building with new digital, addressable Fire Alarm (FA) system with notification and initiating devices, equipment, and all new wiring. A new fire alarm control panel shall be installed in the main fire service or electrical room. The system shall be provided with auto-dialer for remote site monitoring of the fire alarm system. A new fire alarm graphic annunciator panel (FAAP) with fire zones designated per current codes shall be installed in the entrance vestibule of the building.</p> <p>Smoke detection shall be limited within the building as allowed by code for a fully sprinklered building. New duct smoke detectors shall be provided for the HVAC systems. The new high-density storage system shall be connected to the fire alarm system for occupant notification and control integration.</p>

A complete audible and visual alarm system shall be provided throughout the building to meet current codes and ADA requirements.

The following new FA device types shall be connected and supervised by the new fire alarm system:

- Duct and space mounted smoke detectors
 - Manual pull stations
 - Audio/Visual notification devices
 - Sprinkler valves and tamper valve switches
 - Fire Pump
 - Ansul Hood System
-

COMMUNICATIONS

OWNERS PROJECT REQUIREMENTS & GUIDELINES

Communication systems shall be provided per current Loudoun County DIT requirements. A dedicated IT/telecom room shall be provided per the size requirements for the four (4) IT racks to serve the IT/Westnet/CCTV and other required components. The room will also be provided with space for the building BDA system and separate installation location for the building security system components. Four (4) 4" Schedule 40 PVC pipes shall be provided for pathway to the site utility for incoming telecommunication providers. The IT/Telecom room shall be provided with a dedicated HVAC system as described above in the mechanical section.

Provisions for data, voice and video distribution systems to include; receptacles, conduits, back boxes, wiring, face plates, jacks, CATV type "F" outlets, conduit sleeves, Communications Room sizing, including termination equipment and distribution equipment that will be provided under the construction contract and shall be based on Loudoun County DIT standards. Data and Voice distribution systems shall be a Commscope Systimax solution (no substitutions permitted) based on a Category 6 rated performance and serviced by the main Communications Room. The video distribution system will be a home-run type design with all TV outlets and coaxial cabling provided in the design package (County to provide the system SOW to the Engineer). The Communications Room will be conditioned independently of the building HVAC system and will be powered with emergency power circuits. A dedicated telecommunications grounding system will be provided and bonded to the building main grounding system. Cable tray will be provided in the Comm Room (only) to support the Cat. 6 and telecom cables.

All Voice and Data equipment including, but not limited to: phone switches, phone sets, servers, routers, network switches and computer workstations will be provided by Loudon County.

The building shall be provided with a Bi-Directional Amplifier (BDA) System. This facilitates the ability to monitor and maintain equipment distributed across multiple county facilities. The current required specification for all new BDAs is the Commscope Public Safety BDA for 700 AND 800 MHz 0.5W CLASS A AC or equivalent. The installed configuration must be capable of amplifying signals in the 700 MHz and 800 MHz public safety radio spectrum (769-805 MHz and 806-870 MHz). Each component within the head-end of the system shall be individually grounded to meet R56 standards. All connections to the bus bar shall be made using 16 mm² csa (#6 AWG) or coarser, tinned or un-tinned, copper conductors.

ELECTRONIC SAFETY AND SECURITY

OWNER PROJECT REQUIREMENTS & GUIDELINES

Electronic Security is comprised of subsystems of access control, intrusion detection, surveillance and incident assessment based on an identification of assets and an understanding of the risks, threats and vulnerabilities associated with this particular location in support of the mission of the client. Specific subsystems to be deployed as countermeasures to address vulnerabilities and mitigate risks include an electronic access control system (ACS), intrusion detection system (IDS), electronic surveillance (CCTV) and intercom system.

The Access Control System (ACS) shall be provided per current Loudoun County system requirements. Card readers shall be provided at exterior entrances and at interior doors to limit access to controlled areas.

The Intrusion Detection System (IDS) shall be provided per current Loudoun County system requirements. The system shall consist of door contact switches and arm/disarm keypads and readers. All IDS alarms shall be automatically reported to the central Loudoun County monitoring station and integration with the building CCTV shall be provided.

The CCTV cameras shall be provided at locations throughout the facility based on the proposed layout. All cameras shall be IP based, power over ethernet. Exterior cameras shall be rated for use and provided with pan/tilt/zoom (PTZ) control and digital zoom. The CCTV HDR video recorders shall be installed in a dedicated rack within the IT/Telecom room.

The fire station shall be provided with a WestNet alerting station and system per Loudoun County requirements.



Site Context

The existing Philomont Fire Station site is located in Loudoun County, Virginia, at the intersection of Jeb Stuart Road and Snickersville Turnpike (refer to Attachment A). The existing fire station facility on site was built in 1956. Based on Loudoun County Tax Map records (refer to Attachment B), the parcel number is 530267406000 which is owned by Philomont Volunteer Fire Dept. Additionally, the site consists of +/- 2.28 acre parcel with an existing facility that has approximately 5,128 square feet of gross floor area. The site is bounded by Snickersville Turnpike on the west and Jeb Stuart Road on the south. Across Jeb Stuart Road and Snickersville Turnpike are existing residential single-family homes; to the north of the site is a single-family home; and to the east is Philomont Community Center. The site generally slopes from the southeast toward the northwest top of the site with an overall grade change of $\pm 28'$ (refer to Attachment C). Refer to the Storm Water Management Section later in the report for additional information on drainage. There is no sidewalk on any side of the existing site.

Zoning Evaluation and Building Setbacks

The site is governed by the Loudoun County Revised 1993 Zoning Ordinance and is labeled, "RC – Rural Commercial" in the Zoning Plan.

Residential Commercial (RC) District Regulations: (refer to Loudoun County Revised 1993 Zoning Ordinance- Section 2-905-C)

Front. No requirement

Side. No requirement, except fifteen (15) feet for a non-residential use abutting a lot for residential purposes or a lesser distance to continue the setback of an existing building.

Rear. No requirement, except thirty (30) feet for a non-residential use abutting a lot for residential purposes or a lesser distance to continue the setback of an existing building.

Jeb Stuart Road and Snickersville are front yards, therefore, the north and the east. Sides are considered rear yards. The rear yard of 30 feet applies to the northern property because it is residential use.

Public Utilities

The facility is currently outside of Loudoun Water service area. Currently, the facility is using a well on the site for water systems and a septic tank for sanitary sewer systems. Based on the information provided by the architect, the septic/drain field is shown to be relocated. The well potentially needs to be relocated, and we understand a separate consultant is evaluating that. There is no existing storm infrastructure onsite. Runoff from the existing site currently sheet flows north of the site to the neighboring pond.

Private Utilities

While private utilities are being evaluated by a separate consultant (refer to their report) it shall be noted that along the perimeter of the site distribution lines are required to be undergrounded per Loudoun County Revised 1993 Zoning Ordinance- Section 2-907-F.

Storm Water Management

There is an existing offsite pond to the north of the site. It has not been determined if this pond provides any SWM or BMP requirements for the site. Therefore, for planning purposes, it should be assumed that new onsite SWM and BMP facilities would be required. Considering scheme 2 has the highest proposed impervious area out of all proposed schemes, deemed to be the worst-case scenario, it was used for preliminary water quantity and quality evaluation. The existing site has approximately ± 0.72 acres of impervious area. Scheme 2 proposed an increase of ± 0.52 acres (54.4% of total site area) for a total of ± 1.24 acres impervious. This data was inputted into the DEQ Virginia Runoff Reduction Method Re-Development Compliance Spreadsheet – Version 3.0, and based on this, the site would need to remove 1.33 lb/yr of phosphorus (see preliminary comps in Attachment D). This could be obtained through a variety of measures including vegetated roof, Bioretention, and manufactured filtering devices. If the count allows, and credits are available, nutrient credit purchase may be an option to consider. Preliminary SWM comps (see Attachment E) indicate a total storage volume of $\pm 10,000$ cf would be needed. This would likely be provided with underground storage due to the grade drop-off at the north side of the site not being conducive to an above-grade facility. Based on an assumed vault height of 6 feet (5 feet of storage) this would be a $\pm 2,000$ square feet vault. However, a larger vault may be needed for adequate outfall.

Grading

There is a significant grade change across the site of ± 28 feet. Based on preliminary grading (refer to Attachment F), retaining walls will be needed. Special attention will be needed to coordinate the proposed outfall with the existing conditions.

Soil

The site consists of +/- 2.28 acre parcel with two types of soils. Based on Loudoun County Tax Map records, approximately 86.4% of the site soil is Purcellville Series soil (type 20C) and 13.6% is Swampoodle Series soil (type 22B) (refer to Attachment G). Based on Interpretive Guide to The Use of Soils Maps by the Department of Building and Development (refer to Attachment H), Soil 20C has a depth to hard bedrock generally greater than 6' and soil 22B has a depth to bedrock generally greater than 5'.

Soil Name Slope Hydrologic Group	Soil Characteristics	General Development Central Water and Sewer/Depth to Rock	Conventional Septic Tank Drain Fields
20C Purcellville (7-15%) (B)	a complex of very deep, well-drained yellowish-red silty Purcellville and moderately deep well-drained, yellowish-brown loamy soils on convex upland positions; developed in residuum weathered from mixed granite gneiss and metadiabase rock	II R – fair potential; depth to rock depth to hard bedrock is generally greater than 6' in Purcellville	II - fair potential: depth to rock
22B Purcellville-Swampoodle (2-7%) (B)	a complex of very deep, well-drained yellowish-red silty Purcellville and very deep moderately well-drained, strong brown and mottled strong brown and gray silty Swampoodle soils in broad, nearly level to concave upland positions; developed in residuum weathered from mixed granite gneiss and metadiabase rock	II WP – fair potential; seasonal water table depth to hard bedrock is generally greater than 5'	II – poor potential; seasonal water table, slow permeability

List of Attachments

Attachment A – Existing Site Aerial Image

Attachment B – Loudoun County Tax Map – Parcel Information

Attachment C – Existing Conditions Survey

Attachment D – VRRM Redevelopment Compliance Spreadsheet

Attachment E – Preliminary SWM Comps – Hydro CAD

Attachment F – Proposed Grading

Attachment G – Loudoun County Tax Map – Soil Type

Attachment H – Department of Building and Development - Soil Type

Attachment A
Existing Site Aerial Image





03/29/2019

© All Pictometry

Attachment B
Loudoun County Tax Map- Parcel
Information

WebLogis April 7, 2021

Parcel Information

PIN	<u>530267406000</u>
Tax Map #	/56////////10C
Property Address	36560 JEB STUART RD
Town Zip	PURCELLVILLE VA 20132
Subdivision	
Primary Zoning	RC
GIS Parcel Type	Parcel

Platfile Information

Plat Number	2009-0196
Plat Title	PHILOMONT FIRE DEPARTMENT
Project Number	BLAD-2009-0044
MCPIU Parent	530267406000
Tax Parent	/56////////10C

PARID: 530267406000

PHILOMONT VOLUNTEER FIRE DEPT

36560 JEB STUART RD

Owner

Name	PHILOMONT VOLUNTEER FIRE DEPT
Care Of	
Mailing Address	PO BOX B
.	
.	PHILOMONT VA 20131-0160
Instrument Number	
Book	
Page	

Parcel

Primary Address	36560 JEB STUART RD
Tax Map #	/56////////10C
State Use Class	Exempt
Total Land Area (Acreage)	2.28
Total Land Area (SQFT)	
Election District	BLUE RIDGE
Billing District	Blue Ridge District
Billing Split Notes 1	
Billing Split Notes 2	
Special Ad Valorem Tax District	None
Special Project District	
Living Units	
Structure Occupancy	EDUCATIONAL
Garage/PrkgSp Community	NO
Subdivision	
Affordable Dwelling Unit (Y/N)	NO: PROPERTY IS NOT ADU.
Ag District	
Ag District Starting Date	
Ag District End Date	
Deactivation Status	
Solar Exemption?	NO

Legal Description

Legal Description	IN PHILOMONT
.	358--34 464--650 200308220109720 ESMT
.	201001080001172P

General Information

Loudoun County is providing public record information as a public service in accordance with Virginia Code Title 58.1-3122.2 (1998). The Loudoun County Commissioner of the Revenue provides annual valuations and maintenance of fair market values for equitable assessments on all types of real property.

The property information made available on this site includes ownership and deed information, legal description, sales information, assessment values and house characteristics and can be searched by Parcel ID Number, Address and Tax Map Number. The site is updated weekly. Parcels are linked

to the Loudoun County GIS, with map overlays displaying boundary and environmental information such as topography, soils, flood plain and major roads.

Condominium garage units or assigned parking spaces associated with condominiums may have separate parcel identification numbers - and may be assessed separately.

[Tax History / Payment](#)

Click on the Parcel ID to view its related document

[530267406000](#)

PARID: 530267406000

PHILOMONT VOLUNTEER FIRE DEPT

36560 JEB STUART RD

Commercial Buildings

Improvement Name	
Property Address	36560 JEB STUART RD
Location 2	
City, State, Zip	PURCELLVILLE, VA, 20132
Land Use Code	Exempt
Structure Code	
Card #	1
Building #	
Year Built	1111
Gross Floor Area	5,128
Units (if applicable)	
Identical Units	
CDU	Average
Interior Walls	
Air Conditioning	
Foundation Area	None
Year Remodeled	
Year Addition	
Roof Type	None
Roof Material	Unknown
Covered Parking	
Uncovered Parking	

Commercial Sections

1 of 2

Card	1
Section ID #	1
Section Type	Fire Station (Staff)
Units	
Bldg Class	C
Year Built	
Floor	From 01 to 02
Total SF	4,608
Stories	2
Wall Height	14
Ecn Depr % Good	-
% Complete	

Structure Summary

Property Name	Land Use Code	Structure	Year Built	GFA	Units
		FIRE DEPT	1111	5,128	

Attachment C

Existing Conditions Survey

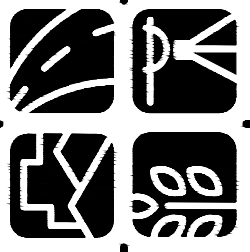


EXISTING CONDITIONS

**PHILOMONT
FIRE STATION**
BLUE RIDGE
LOUDOUN, VIRGINIA

SCALE: 1"=30'

DATE: April, 2021

$$\text{C.I.} = 2$$


urban

Planners • Engineers • Landscape Architects • Land Surveyors

Urban, Ltd.
7712 Little River Turnpike
Annandale, Virginia 22003
Tel. 703.642.8080
Fax. 703.642.8251
www.urban-ltd.com

[illegible]



NOTE: EXISTING CONDITIONS
BASED ON GIS DATA

[illegible]

Attachment D
VRRM Redevelopment Compliance
Spreadsheet

DEQ Virginia Runoff Reduction Method Re-Development Compliance Spreadsheet - Version 3.0

BMP Design Specifications List: 2013 Draft Stds & Specs

Site Summary

Project Title: Philomont Fire Station

Date: 44295

Total Rainfall (in):	43
Total Disturbed Acreage:	2.28

Site Land Cover Summary

Pre-ReDevelopment Land Cover (acres)

	A soils	B Soils	C Soils	D Soils	Totals	% of Total
Forest/Open (acres)	0.00	0.00	0.00	0.00	0.00	0
Managed Turf (acres)	0.00	0.21	1.35	0.00	1.56	68
Impervious Cover (acres)	0.00	0.10	0.62	0.00	0.72	32
					2.28	100

Post-ReDevelopment Land Cover (acres)

	A soils	B Soils	C Soils	D Soils	Totals	% of Total
Forest/Open (acres)	0.00	0.00	0.00	0.00	0.00	0
Managed Turf (acres)	0.00	0.14	0.90	0.00	1.04	46
Impervious Cover (acres)	0.00	0.17	1.07	0.00	1.24	54
					2.28	100

Site Tv and Land Cover Nutrient Loads

	Final Post-Development (Post-ReDevelopment & New Impervious)	Post- ReDevelopment	Post- Development (New Impervious)	Adjusted Pre- ReDevelopment
Site Rv	0.62	0.52	0.95	0.52
Treatment Volume (ft ³)	5,097	3,303	1,793	3,303
TP Load (lb/yr)	3.20	2.08	1.13	2.08

Pre- ReDevelopment TP Load per acre (lb/acre/yr)	Final Post-Development TP Load per acre (lb/acre/yr)	Post-ReDevelopment TP Load per acre (lb/acre/yr)
1.18	1.40	1.18

Total TP Load Reduction Required (lb/yr)	1.33	0.42	0.91
--	------	------	------

	Final Post-Development Load (Post-ReDevelopment & New Impervious)	Pre- ReDevelopment
TN Load (lb/yr)	22.91	16.69

Site Compliance Summary

Maximum % Reduction Required Below Pre-ReDevelopment Load	20%
--	-----

Total Runoff Volume Reduction (ft ³)	0
Total TP Load Reduction Achieved (lb/yr)	0.00
Total TN Load Reduction Achieved (lb/yr)	0.00
Remaining Post Development TP Load (lb/yr)	3.20
Remaining TP Load Reduction (lb/yr) Required	1.33

Attachment E
Preliminary SWM Comps – Hydro CAD

Philomont Fire Station Hydrocad

Prepared by Urban Engineering

HydroCAD® 10.10-3a s/n 05389 © 2020 HydroCAD Software Solutions LLC

Type II 24-hr 100-yr Rainfall=7.70"

Printed 4/9/2021

Events for Subcatchment 56S: Post-Development Drainage Area

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	2.53	5.36	0.241	1.27
2-yr	3.05	7.14	0.324	1.70
10-yr	4.61	12.65	0.589	3.10
100-yr	7.70	23.60	1.147	6.03

Philomont Fire Station Hydrocad

Prepared by Urban Engineering

HydroCAD® 10.10-3a s/n 05389 © 2020 HydroCAD Software Solutions LLC

Type II 24-hr 100-yr Rainfall=7.70"

Printed 4/9/2021

Events for Subcatchment DA1: Pre-Development Drainage Area

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	2.53	3.85	0.173	0.91
2-yr	3.05	5.47	0.244	1.29
10-yr	4.61	10.71	0.485	2.55
100-yr	7.70	21.63	1.014	5.34

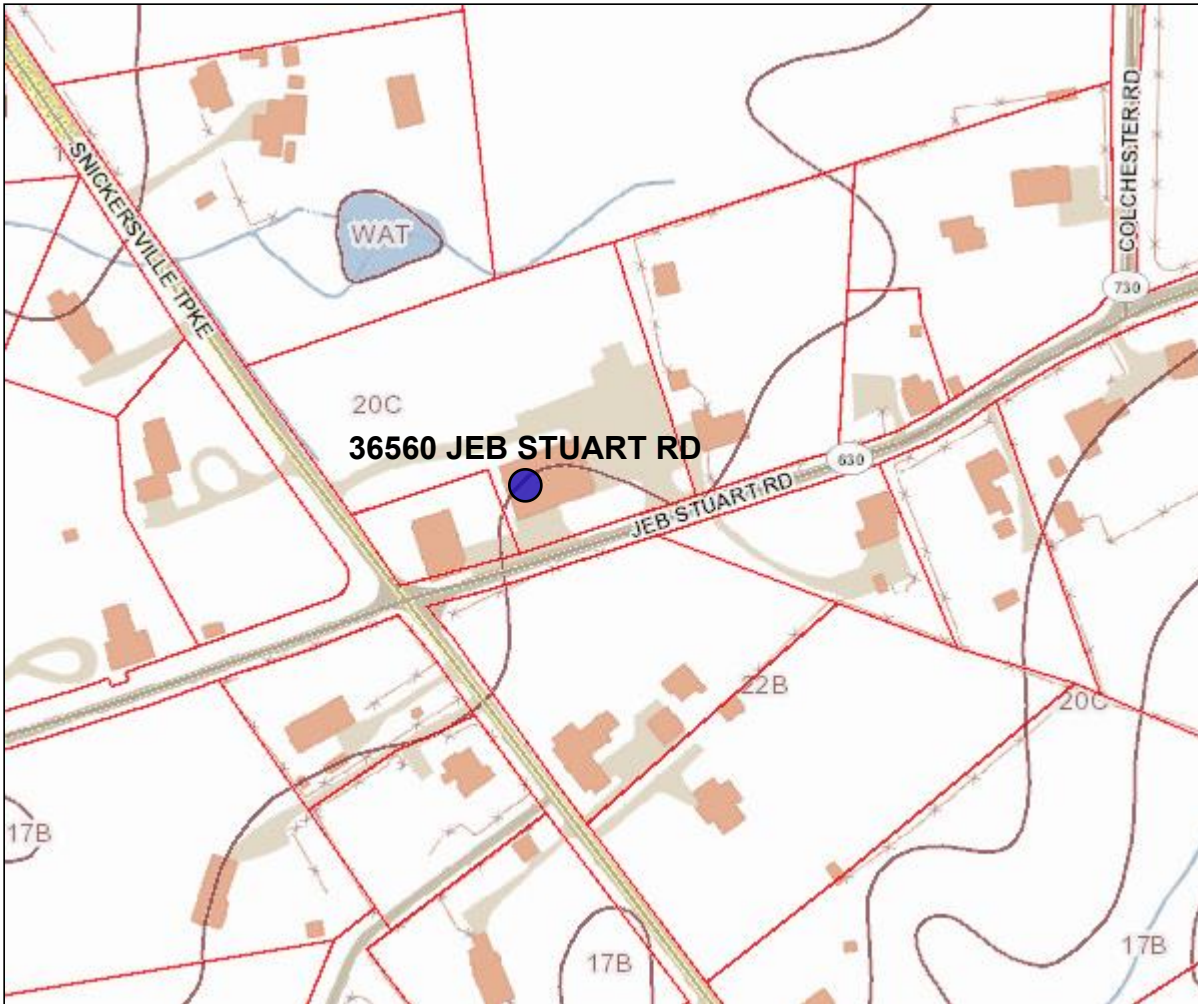
Attachment G
Loudoun County Tax Map- Soil Type



Loudoun County, Virginia

www.loudoun.gov

(map not to scale)



Attachment H
Department of Building and Development-
Soil Type

Mapping Unit Number, Name, Slope, Flooding Potential and Hydrologic Group	Soil Characteristics	Mapping Unit Potential Subclasses For Selected Uses		
		General Development Central Water and Sewer/ Depth to rock	Conventional Septic Tank Drain fields	Agricultural Forestry and Horticultural/ USDA Land use capability class
20B Purcellville and Tankerville soils, (2-7%) (B/C)	Complex of very deep, well drained yellowish- red silty Purcellville and moderately deep well drained, yellowish-brown loamy soils on convex upland positions; developed in residuum weathered from mixed granite gneiss and metadiabase rock	II R - fair potential; depth to rock	II - fair potential; depth to rock	II – secondary cropland
		depth to hard bedrock is generally greater than 6' in Purcellville and greater than 30" in Tankerville		2E, 3S
20C Purcellville and Tankerville soils, (7-15%) (B/C)	complex of very deep, well drained yellowish- red silty Purcellville and moderately deep well drained, yellowish-brown loamy soils on convex upland positions; developed in residuum weathered from mixed granite gneiss and metadiabase rock	II R - fair potential; depth to rock	II - fair potential; depth to rock	II – secondary cropland
		depth to hard bedrock is generally greater than 6' in Purcellville and greater than 30" in Tankerville		3E, 4S

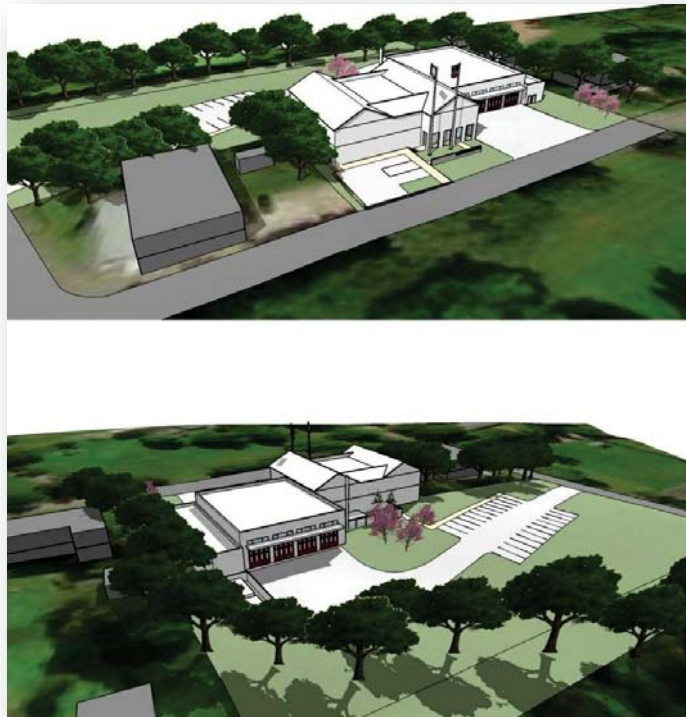
Mapping Unit Number, Name, Slope, Flooding Potential and Hydrologic Group	Soil Characteristics	Mapping Unit Potential Subclasses For Selected Uses		
		General Development Central Water and Sewer/ Depth to rock	Conventional Septic Tank Drain fields	Agricultural Forestry and Horticultural/ USDA Land use capability class
22B Purcellville- Swampoodle Complex, (2-7%) (B/C)	complex of very deep, well drained yellowish- red silty Purcellville and very deep moerately well drained, strong brown and mottled strong brown and gray silty Swampoodle soils in broad, nearly level to concave upland positions; developed in residuum weathered from mixed granite gneiss and metadiabase rock	II WP - fair potential; seasonal water table	III - poor potential; seasonal water table, slow permeability	II – secondary cropland
		depth to hard bedrock is generally greater than 5'		2E, 4W
23B Purcellville silt loam, (2-7%) (B)	very deep, well drained yellowish-red silty to loamy soil on undulating and gently sloping uplands; developed in residuum weathered from mixed granite gneiss and metadiabase	I - good potential	I - good potential	I - prime farmland
		depth to hard bedrock is generally greater than 6'		2E



**Philomont Fire Station
County of Loudoun**

Loudoun County, VA

Estimates - Concept Options (2)



Lemay Erickson Willcox Architects

11250 Roger Bacon Drive, Suite 16
Reston, VA 20190

Axias, Inc.

225 Reinekers Lane, Suite 200
Alexandria, VA 22314

July 2, 2021

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❖ EXECUTIVE SUMMARY	5
❖ CONSTRUCTION COST SUMMARY	6
❖ ESTIMATE - SCHEME 1	7
❖ ESTIMATE - SCHEME 2	13

Basis of Estimate

Scope of Work

This document contains estimates for 2 options for expanding or replacing the existing fire station to meet the needs of the department

Information Provided for Preparation of the Estimate

<u>Document Title/Reference</u>	<u>Document Dated / Received</u>
❖ Philomont Preliminary Feasibility Study by Lemay Erickson Willcox Architects	9-Apr-21
❖ Philomont Site Layouts and Block Plans - All Schemes by Lemay Erickson Willcox Architects	9-Apr-21
❖ Comments received	5-May-21
❖ Comments received	29-Jun-21
❖ Updated Philomont Site Layouts and Block Plans - Schemes 1 & 2 by Lemay Erickson Willcox	2-Jul-21

Source of Cost Data

The unit pricing reflected in this estimate is based upon a combination of sources that include but not limited to the following:
(1) Local historical costs for similar projects of size and location (2) Vendor quotes (3) Industry recognized cost pricing database such as RS Means (4) Estimator Judgment - many of the prices used are the result of first principles estimating; a determination of the actual time required to perform the activity using local labor rates, plus material costs that reflect the typically small quantities required, plus equipment rental costs as applicable. Where pricing books such as RS Means have been used they have only been used as a general guide.

Subcontractor mark-ups have been included in each line item unit price. These markups cover the cost of home office overhead and profit.

Mark-Ups

❖ Design Contingency	15.00%
❖ General Conditions / Requirements	10.00%
❖ GC Overhead & Profit	5.00%
❖ Bonds & Insurances	2.50%
❖ Escalation to Mid-Point - Excluded	Excluded

General Estimate Assumptions

- ❖ Assumed competitive bid with at least 3 general contractors and 3 subcontractors at every trade.
- ❖ Hazmat abatement is included in the demolition cost
- ❖ Estimate assumes normal working hours for the duration of construction.
- ❖ There will be no restriction on working access to the project.
- ❖ Scheme 1 - Renovation / Addition to the existing fire station on the existing site
- ❖ Scheme 2 - Demolish existing fire station and construct new building on the existing site
- ❖ Escalation is included to the mid-point of construction, assuming a start date of January 2022, with an 18 month duration. Mid-point is October 2022 and escalation is included for 16.5 months at 3.5% per annum; total of 4.8%

Estimate Exclusions

The following additional project costs are not included in this cost estimate:

- ❖ Land acquisition cost
- ❖ Cell Tower
- ❖ Community Center
- ❖ Deep foundations
- ❖ A/V equipment
- ❖ Loose furniture fixtures and equipment
- ❖ Construction contingency (owner's contingency for changes during construction)

Basis of Estimate

- ❖ Unforeseen conditions
- ❖ Non competitive bid conditions
- ❖ Sole source specifications of materials or products
- ❖ Off-site work
- ❖ Design and Consultant fees
- ❖ Any special site security requirements

Statement qualifying use of this estimate

Axias has prepared this estimate using drawings, specifications and other documents prepared by the design team, in addition to having conversations about design intent. We have applied industry-standard approaches and techniques in preparing the estimate, and applied our professional judgment in determining an overall opinion of the reasonable cost of the project. However, we have no control over the procurement strategy of the owner, or the broader impact of the marketplace, therefore cannot and do not guarantee that the lowest bid will not differ from this estimate.

The estimate is based upon the measurement of quantities where possible from the above mentioned documents issued by the design team. For the remainder, parametric measurements were used in conjunction with references from similar project recently estimated by Axias.

Axias has no control over the quality, completeness, intricacy, constructability, or coordination of design documents, or over the amount of funds available for this project. Therefore, Axias is not responsible for design revision costs in the event that the estimate is in excess of the established budget.

Unit pricing shown within the estimate reflects Axias' opinion of construction costs obtainable for the projects location area, on the date of this statement of probable costs. The intention of this estimate is to reflect fair market value for the construction of this project. It is not a prediction of low bid. Pricing is based upon competitive bidding, a minimum of 3 bidders for all subcontracted work, and a minimum of 4 bids from general contractors. If fewer bids are received bid results may be expected to vary.

Executive Summary

Project Information

Client:	<u>County of Loudoun</u>	Procurement:	<u>Competitive Bid</u>
		Start date:	<u>January 1, 2022</u>
Project Name:	<u>Philomont Fire Station</u>		
Project Address:	<u>Loudoun County</u>	Duration:	<u>18 months</u>
	<u>VA</u>		
		Scheme 1:	<u>19,520 GSF</u>
Architect:	<u>Lemay Erickson Willcox Architects</u>	Scheme 2:	<u>18,944 GSF</u>
Design Stage:	<u>Estimates - Concept Options (2)</u>		
Estimated by:	<u>Martin Miller</u>		
Phone:	<u>571-214-9967</u>		
Email:	<u>mmiller@axiasinc.com</u>		
Estimate date:	<u>July 2, 2021</u>		

Philomont Fire Station County of Loudoun



July 2, 2021

Estimates - Concept Options (2)

Construction Cost Summary		Scheme 1		Scheme 2	
		TOTAL	COST/SF	TOTAL	COST/SF
		19,520 GSF		18,944 GSF	
A10	Foundations	253,661	\$ 12.99	432,271	\$ 22.82
A20	Basement Construction	-	\$ -	-	\$ -
A	Substructure	253,661	\$ 12.99	432,271	\$ 22.82
B10	Superstructure	513,688	\$ 26.32	510,506	\$ 26.95
B20	Exterior Enclosure	1,524,110	\$ 78.08	1,490,450	\$ 78.68
B30	Roofing	406,610	\$ 20.83	381,350	\$ 20.13
B	Shell	2,444,408	\$ 125.23	2,382,306	\$ 125.76
C10	Interior Construction	1,035,660	\$ 53.06	995,688	\$ 52.56
C20	Stairways	70,000	\$ 3.59	70,000	\$ 3.70
C30	Interior Finishes	556,320	\$ 28.50	539,904	\$ 28.50
C	Interiors	1,661,980	\$ 85.14	1,605,592	\$ 84.75
D10	Conveying Systems	110,000	\$ 5.64	110,000	\$ 5.81
D20	Plumbing Systems	546,560	\$ 28.00	530,432	\$ 28.00
D30	Heating, Ventilation & Air Conditioning	1,220,000	\$ 62.50	1,184,000	\$ 62.50
D40	Fire Protection	175,680	\$ 9.00	170,496	\$ 9.00
D50	Electrical Lighting, Power & Comms	1,556,720	\$ 79.75	1,510,784	\$ 79.75
D	Services	3,608,960	\$ 184.89	3,505,712	\$ 185.06
E10	Equipment	47,500	\$ 2.43	47,500	\$ 2.51
E20	Furnishings	20,000	\$ 1.02	20,000	\$ 1.06
E	Equipment & Furnishings	67,500	\$ 3.46	67,500	\$ 3.56
F10	Special Construction	-	\$ -	-	\$ -
F20	Selective Demolition	189,356	\$ 9.70	189,356	\$ 10.00
F	Special Construction & Demolition	189,356	\$ 9.70	189,356	\$ 10.00
G10	Site Preparation	509,730	\$ 26.11	1,455,504	\$ 76.83
G20	Site Improvements	1,106,867	\$ 56.70	1,658,902	\$ 87.57
G30	Site Mechanical Utilities	682,500	\$ 34.96	682,500	\$ 36.03
G40	Site Electrical Utilities	161,143	\$ 8.26	161,143	\$ 8.51
G90	Other Site Construction	-	\$ -	-	\$ -
G	Building Sitework	2,460,240	\$ 126.04	3,958,049	\$ 208.93
Design Contingency 15.0%		1,602,916	\$ 82.12	1,821,118	\$ 96.13
ELEMENTAL COST BEFORE GC MARK-UPS		12,289,021	\$ 629.56	13,961,904	\$ 737.01
General Conditions / Requirements 10.0%		1,228,902	\$ 62.96	1,396,190	\$ 73.70
General Conditions 0.0%		-	\$ -	-	\$ -
GC Overhead & Profit 5.0%		675,896	\$ 34.63	767,905	\$ 40.54
Bonds & Insurances 2.5%		337,948	\$ 17.31	383,952	\$ 20.27
CONSTRUCTION COST BEFORE ESCALATION		14,531,767	\$ 744.46	16,509,951	\$ 871.51
Escalation to Mid-Point - Excluded 4.80%		697,525	\$ 35.73	792,478	\$ 41.83
ESTIMATED CONSTRUCTION COST AT AWARD		\$15,229,292	\$ 780.19	\$17,302,429	\$ 913.35
POTENTIAL ADDITIONAL COSTS					
Temporary off-site quarters		\$2,400,000		\$2,400,000	
Community Center Driveway, Parking and Recycling Area		\$200,458		\$200,458	

Philomont Fire Station

County of Loudoun



Estimate - Scheme 1

Item Description	Quantity	Unit	Rate	Total
A Substructure				
<u>A10 Foundations</u>				
A1010 Standard Foundations				
Foundations to new addition	7,100	GSF	\$10.00	\$71,000
A1030 Slab On Grade				
4" thick slab on grade, including vapor retarder, compacted stone, etc. complete	1,540	SF	\$10.00	\$15,400
8" thick slab in apparatus bay, including vapor retarder, compacted stone, etc. complete	5,560	SF	\$15.00	\$83,400
Linear trench drains in apparatus bay, incl. CI cover	266	LF	\$196.80	\$52,349
Trench drains in other areas incl. CI cover	36	LF	\$192.00	\$6,912
Misc items control joints, round joints	7,100	SF	\$1.00	\$7,100
Elevator pit, complete	1	EA	\$17,500.00	\$17,500
Total A10 - Foundations				\$253,661
B Superstructure				
<u>B10 Superstructure</u>				
B1010 Floor Construction				
Concrete on metal deck floor slab to 2nd floor addition	6,312	SF	\$15.00	\$94,680
Structural steel framing - columns, floor joists, and floor beams	97,600	LBS	\$2.75	\$268,400
Miscellaneous metals	19,520	SF	\$1.50	\$29,280
B1020 Roof Construction				
Roof joists (to new and 2/3rds of existing)	12,120	LBS	\$3.00	\$36,360
Metal roof deck	11,329	SF	\$7.50	\$84,968
Total B10 - Superstructure				\$513,688
<u>B20 Exterior Enclosure</u>				
B2010 Exterior Walls				
Exterior walls to new Apparatus Bay and Support Areas building, including wall cladding system and scaffolding	8,400	SF	\$65.00	\$546,000
Allowance for reconfiguring exterior walls of existing Apparatus Bay Building for 2 story structure	9,450	SF	\$10.00	\$94,500
Exterior wall cladding	9,450	SF	\$40.00	\$378,000

Estimate - Scheme 1

Item Description	Quantity	Unit	Rate	Total
B2020 Exterior Windows				
Exterior windows and storefronts	19,520	GSF	\$10.00	\$195,200
B2030 Exterior Doors				
Rear 4-fold steel doors 14' x 14' w/ 1" insulated tempered glazed panels to apparatus bay	4	EA	\$36,120.00	\$144,480
Front 4-fold steel doors 14' x 14' w/ 1" insulated tempered glazed panels to apparatus bay	4	EA	\$36,120.00	\$144,480
Exterior doors, single	5	EA	\$1,936.00	\$9,680
Exterior storefront door, double	1	EA	\$6,650.00	\$6,650
Extra for ADA operator	1	EA	\$5,120.00	\$5,120
Total B20 - Exterior Enclosure				\$1,524,110
<u>B30 Roofing</u>				
B3010 Roof Coverings				
Allowance for roof coverings (to both new and existing)	13,412	SF	\$30.00	\$402,360
B3020 Roof Openings				
Roof hatch	1	EA	\$3,000.00	\$3,000
Ladder	1	EA	\$1,250.00	\$1,250
Total B30 - Roofing				\$406,610
C Interiors				
<u>C10 Interior Construction</u>				
C1010 Partitions				
Allowance for interior partitions, including CMU, GWB and Storefronts	19,520	GSF	\$27.50	\$536,800
C1020 Interior Doors				
Interior door, single	53	EA	\$2,100.00	\$111,300
Interior door, double	8	EA	\$3,840.00	\$30,720
C1030 Fittings				
Allowance for fittings, including toilet partitions, toilet accessories, casework, lockers, signage, marker boards, etc.	19,520	GSF	\$17.00	\$331,840
Exterior building signage - ALLOW	1	LS	\$25,000.00	\$25,000
Total C10 - Interior Construction				\$1,035,660

Estimate - Scheme 1

Item Description	Quantity	Unit	Rate	Total
<u>C20 Stairways</u>				
C2010 Stair Construction				
Stairs, including railings, finishes, etc., complete (2)	4	FLIGHTS	\$17,500.00	\$70,000
C2020 Stair Finishes				
<i>Included Above</i>				
Total C20 - Stairways				\$70,000
<u>C30 Interior Finishes</u>				
C3010 Wall Finishes				
Allowance for wall finishes	19,520	GSF	\$8.25	\$161,040
C3020 Floor Finishes				
Allowance for floor finishes	19,520	GSF	\$15.50	\$302,560
C3030 Ceiling Finishes				
Allowance for ceiling finishes	19,520	GSF	\$4.75	\$92,720
Total C30 - Interior Finishes				\$556,320
D Services				
<u>D10 Conveying Systems</u>				
D1010 Elevators & Lifts				
Elevator, 2 stops, including cab finishes complete	1	EA	\$110,000.00	\$110,000
Total D10 - Conveying Systems				\$110,000
<u>D20 Plumbing Systems</u>				
Allowance for Plumbing Installation	19,520	GSF	\$28.00	\$546,560
Total D20 - Plumbing Systems				\$546,560
<u>D30 Heating, Ventilation & Air Conditioning</u>				
Allowance for HVAC Installation, including controls	19,520	GSF	\$62.50	\$1,220,000
Total D30 - Heating, Ventilation & Air Conditioning				\$1,220,000
<u>D40 Fire Protection</u>				
Allowance for Sprinkler Installation	19,520	GSF	\$9.00	\$175,680
Total D40 - Fire Protection				\$175,680
<u>D50 Electrical Lighting, Power & Communications</u>				
D5010 Electrical Service & Distribution				
Allowance for Electrical, Lighting, Power & Communications	19,520	GSF	\$79.75	\$1,556,720

Estimate - Scheme 1

Item Description	Quantity	Unit	Rate	Total
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Total D50 - Electrical Lighting, Power & Communications \$1,556,720

E Equipment & Furnishings

E10 Equipment

E1010 Commercial Equipment

Allowance for kitchen equipment	1	LS	\$30,000.00	\$30,000
Allowance for laundry equipment	1	LS	\$17,500.00	\$17,500

Total E10 - Equipment \$47,500

E20 Furnishings

Window treatments	1	LS	\$20,000.00	\$20,000
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Total E20 - Furnishings \$20,000

F Special Construction & Demolition

F20 Selective Demolition

Demolition of interior construction and finishes to existing building	6,042	SF	\$10.00	\$60,420
Remove existing roof, including structure and roofing system	6,042	SF	\$5.00	\$30,210
Allowance for HAZMAT abatement	6,042	SF	\$10.00	\$60,420
HVAC demo	6,042	SF	\$2.50	\$15,105
Plumbing demo	6,042	SF	\$1.50	\$9,063
Fire protection demo	6,042	SF	\$1.25	\$7,553
Electrical demolition	6,042	SF	\$1.09	\$6,586

Total F20 - Selective Demolition \$189,356

G Building Sitework

G10 Site Preparation

G1010 Site Clearing

Allowance for site clearance (assumed no clearing beyond parking lot; except for drainfield)	1	LS	\$7,500.00	\$7,500
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G1020 Site Demolition and Relocations

Demolition of existing walkways, roadways, steps, railings, walls, etc.; including hauling	27,000	SF	\$3.50	\$94,500
Allow for relocating existing fueling and tanks	1	LS	\$57,500.00	\$57,500

Philomont Fire Station

County of Loudoun



Estimate - Scheme 1

Item Description	Quantity	Unit	Rate	Total
G1030 Site Earthwork				
Imported fill; assume ave. 4' deep	7,224	CY	\$45.00	\$325,067
Rough and fine grading under pavements and building	3,388	SY	\$3.00	\$10,163
Allowance for erosion and sediment control measures	1	LS	\$15,000.00	\$15,000
G1040 Hazardous Waste Remediation				
N/A				
Total G10 - Site Preparation				\$509,730
G20 Site Improvements				
G2010 Roadways				
Allow for work to adjoining street	1	LS	\$10,000.00	\$10,000
Allow for curb cuts	1	LS	\$7,500.00	\$7,500
New concrete pavement, heavy duty	8,620	SF	\$12.75	\$109,905
G2020 Parking Lots				
Parking lot driveway and parking; asphalt	13,100	SF	\$6.25	\$81,875
Concrete curb and gutter	850	LF	\$25.00	\$21,250
Parking area striping, signage and miscellaneous specialties	13,100	SF	\$0.50	\$6,550
G2030 Pedestrian Paving				
Concrete walkways & patios	1,670	SF	\$11.00	\$18,370
G2040 Site Development				
Exterior signage	1	LS	\$15,000.00	\$15,000
Flag pole with halyards and pole illumination	3	EA	\$6,500.00	\$19,500
Bollards	8	EA	\$975.00	\$7,800
<i>Enclosures</i>				
Allowance for dumpster pad and enclosure	1	EA	\$15,000.00	\$15,000
Generator pad and enclosure	1	EA	\$15,000.00	\$15,000
<i>Retaining walls</i>				
Retaining wall 14' high to back of site along parking and concrete driveway	388	LF	\$1,284.00	\$498,192
Retaining wall, average 7' high along right side of site	215	LF	\$770.00	\$165,550
Railings on top of retaining walls	603	LF	\$125.00	\$75,375
Allowance for miscellaneous additional site improvements, site fixtures, etc.	1	LS	\$15,000.00	\$15,000

Estimate - Scheme 1

Item Description	Quantity	Unit	Rate	Total
G2050 Landscaping				
Landscaping allowance	1	LS	\$25,000.00	\$25,000
Total G20 - Site Improvements				\$1,106,867
<u>G30 Site Mechanical Utilities</u>				
G3010 Water Supply				
Allowance for potable water supply well with 30,000gallon storage tank	1	LS	\$150,000.00	\$150,000
Allowance for water piping and connection	1	LS	\$25,000.00	\$25,000
Allowance for above grade sprinkler tank; 15,000 gallon	1	EA	\$37,500.00	\$37,500
Allowance for associated pumps, piping and connections	1	LS	\$75,000.00	\$75,000
G3020 Sanitary Sewer				
Allowance for new septic drainfield	1	LS	\$100,000.00	\$100,000
Sanitary sewer piping and connections	1	LS	\$20,000.00	\$20,000
G3030 Storm Sewer				
Allowance for stormwater management system	1	LS	\$275,000.00	\$275,000
Total G30 - Site Mechanical Utilities				\$682,500
<u>G40 Site Electrical Utilities</u>				
Allowance for electrical service	1	LS	\$25,000.00	\$25,000
Emergency power, generator				<i>Included Elsewhere</i>
Ductbank, 2-5" PVC, primary, allowance	50	LF	\$79.91	\$3,996
Ductbank, 460V 3PH 4W, concrete encased 10-way,	100	LF	\$246.10	\$24,610
Wiire, #4-500, 8 Sets	3,840	LF	\$18.89	\$72,538
Site lighting allowance	1	LS	\$35,000.00	\$35,000
Total G40 - Site Electrical Utilities				\$161,143

Estimate - Scheme 2

Item Description	Quantity	Unit	Rate	Total
A Substructure				
<u>A10 Foundations</u>				
A1010 Standard Foundations				
Foundations to new addition	18,944	GSF	\$10.00	\$189,440
A1020 Special Foundations				
N/A				
A1030 Slab On Grade				
4" thick slab on grade, including vapor retarder, compacted stone, etc. complete	7,010	SF	\$10.00	\$70,100
8" thick slab in apparatus bay, including vapor retarder, compacted stone, etc. complete	5,560	SF	\$15.00	\$83,400
Linear trench drains in apparatus bay, incl. CI cover	266	LF	\$196.80	\$52,349
Trench drains in other areas incl. CI cover	36	LF	\$192.00	\$6,912
Misc items control joints, round joints	12,570	SF	\$1.00	\$12,570
Elevator pit, complete	1	EA	\$17,500.00	\$17,500
Total A10 - Foundations				\$432,271
B Superstructure				
<u>B10 Superstructure</u>				
B1010 Floor Construction				
Concrete on metal deck floor slab to 2nd floor	6,065	SF	\$15.00	\$90,975
Structural steel framing - columns, floor joists, and floor beams	94,720	LBS	\$2.75	\$260,480
Miscellaneous metals	18,944	SF	\$1.50	\$28,416
B1020 Roof Construction				
Roof joists	12,120	LBS	\$3.00	\$36,360
Metal deck roofing	12,570	SF	\$7.50	\$94,275
Total B10 - Superstructure				\$510,506
<u>B20 Exterior Enclosure</u>				
B2010 Exterior Walls				
Exterior walls, including wall cladding system and scaffolding	15,240	SF	\$65.00	\$990,600
B2020 Exterior Windows				
Exterior windows and storefronts	18,944	GSF	\$10.00	\$189,440

Estimate - Scheme 2

Item Description	Quantity	Unit	Rate	Total
B2030 Exterior Doors				
Rear 4-fold steel doors 14' x 14' w/ 1" insulated tempered glazed panels to apparatus bay	4	EA	\$36,120.00	\$144,480
Front 4-fold steel doors 14' x 14' w/ 1" insulated tempered glazed panels to apparatus bay	4	EA	\$36,120.00	\$144,480
Exterior doors, single	5	EA	\$1,936.00	\$9,680
Exterior storefront door, double	1	EA	\$6,650.00	\$6,650
Extra for ADA operator	1	EA	\$5,120.00	\$5,120
Total B20 - Exterior Enclosure				\$1,490,450

B30 Roofing

B3010 Roof Coverings

Allowance for roof coverings	12,570	SF	\$30.00	\$377,100
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B3020 Roof Openings

Roof hatch	1	EA	\$3,000.00	\$3,000
Ladder	1	EA	\$1,250.00	\$1,250

Total B30 - Roofing				\$381,350
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C Interiors

C10 Interior Construction

C1010 Partitions

Allowance for interior partitions, including CMU, GWB and Storefronts	18,944	GSF	\$27.50	\$520,960
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C1020 Interior Doors

Interior door, single	48	EA	\$2,100.00	\$100,800
Interior door, double	7	EA	\$3,840.00	\$26,880

C1030 Fittings

Allowance for fittings, including toilet partitions, toilet accessories, casework, lockers, signage, marker boards, etc.	18,944	GSF	\$17.00	\$322,048
Exterior building signage - ALLOW	1	LS	\$25,000.00	\$25,000

Total C10 - Interior Construction				\$995,688
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C20 Stairways

C2010 Stair Construction

Stairs, including railings, finishes, etc., complete (2)	4	FLIGHTS	\$17,500.00	\$70,000
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Estimate - Scheme 2

Item Description	Quantity	Unit	Rate	Total
C2020 Stair Finishes <i>Included Above</i>				
Total C20 - Stairways				\$70,000
<u>C30 Interior Finishes</u>				
C3010 Wall Finishes				
Allowance for wall finishes	18,944	GSF	\$8.25	\$156,288
C3020 Floor Finishes				
Allowance for floor finishes	18,944	GSF	\$15.50	\$293,632
C3030 Ceiling Finishes				
Allowance for ceiling finishes	18,944	GSF	\$4.75	\$89,984
Total C30 - Interior Finishes				\$539,904
D Services				
<u>D10 Conveying Systems</u>				
D1010 Elevators & Lifts				
Elevator, 2 stops, including cab finishes complete	1	EA	\$110,000.00	\$110,000
Total D10 - Conveying Systems				\$110,000
<u>D20 Plumbing Systems</u>				
Allowance for Plumbing Installation	18,944	GSF	\$28.00	\$530,432
Total D20 - Plumbing Systems				\$530,432
<u>D30 Heating, Ventilation & Air Conditioning</u>				
Allowance for HVAC Installation, including controls	18,944	GSF	\$62.50	\$1,184,000
Total D30 - Heating, Ventilation & Air Conditioning				\$1,184,000
<u>D40 Fire Protection</u>				
Allowance for Sprinkler Installation	18,944	GSF	\$9.00	\$170,496
Total D40 - Fire Protection				\$170,496
<u>D50 Electrical Lighting, Power & Communications</u>				
D5010 Electrical Service & Distribution				
Allowance for Electrical, Lighting, Power & Communications	18,944	GSF	\$79.75	\$1,510,784
Total D50 - Electrical Lighting, Power & Communications				\$1,510,784

Estimate - Scheme 2

Item Description	Quantity	Unit	Rate	Total
E Equipment & Furnishings				
<u>E10 Equipment</u>				
E1010 Commercial Equipment				
Allowance for kitchen equipment	1	LS	\$30,000.00	\$30,000
Allowance for laundry equipment	1	LS	\$17,500.00	\$17,500
Total E10 - Equipment				\$47,500
<u>E20 Furnishings</u>				
Window treatments	1	LS	\$20,000.00	\$20,000
Total E20 - Furnishings				\$20,000
F Special Construction & Demolition				
<u>F20 Selective Demolition</u>				
Demolition of existing building; including foundations	6,042	GSF	\$15.00	\$90,630
Allowance for HAZMAT abatement	6,042	GSF	\$10.00	\$60,420
HVAC demo	6,042	GSF	\$2.50	\$15,105
Plumbing demo	6,042	GSF	\$1.50	\$9,063
Fire protection demo	6,042	GSF	\$1.25	\$7,553
Electrical demolition	6,042	GSF	\$1.09	\$6,586
Total F20 - Selective Demolition				\$189,356
G Building Sitework				
<u>G10 Site Preparation</u>				
G1010 Site Clearing				
Allowance for site clearance	1	LS	\$10,000.00	\$10,000
G1020 Site Demolition and Relocations				
Demolition of existing walkways, roadways, steps, railings, walls, etc.; including hauling	27,000	SF	\$3.50	\$94,500
Allow for relocating existing fueling and tanks	1	LS	\$57,500.00	\$57,500
G1030 Site Earthwork				
Imported fill; assume ave. 8' deep	28,133	CY	\$45.00	\$1,266,000
Rough and fine grading under pavements and building	4,168	SY	\$3.00	\$12,504
Allowance for erosion and sediment control measures	1	LS	\$15,000.00	\$15,000

Estimate - Scheme 2

Item Description	Quantity	Unit	Rate	Total
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G1040 Hazardous Waste Remediation

N/A

Total G10 - Site Preparation				\$1,455,504
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G20 Site Improvements

G2010 Roadways

Allow for work to adjoining street	1	LS	\$10,000.00	\$10,000
Allow for curb cuts	1	LS	\$7,500.00	\$7,500
Asphalt roadway	14,660	SF	\$6.50	\$95,290
Concrete curb and gutter	677	LF	\$25.00	\$16,925
New concrete pavement, heavy duty	8,525	SF	\$12.75	\$108,694

G2020 Parking Lots

Parking lot driveway and parking; asphalt	12,550	SF	\$6.25	\$78,438
Concrete curb and gutter	764	LF	\$25.00	\$19,100
Parking area striping, signage and miscellaneous specialties	12,550	SF	\$0.50	\$6,275

G2030 Pedestrian Paving

Concrete walkways & patios	3,866	SF	\$11.00	\$42,526
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G2040 Site Development

Exterior signage	1	LS	\$15,000.00	\$15,000
Flag pole with halyards and pole illumination	3	EA	\$6,500.00	\$19,500
Bollards	8	EA	\$975.00	\$7,800

Enclosures

Allowance for dumpster pad and enclosure	1	EA	\$15,000.00	\$15,000
Generator pad and enclosure	1	EA	\$15,000.00	\$15,000

Retaining walls

Retaining wall 20' high to back of site along site perimeter	415	LF	\$1,724.00	\$715,460
Retaining wall, average 14' high along right side of site	280	LF	\$1,284.00	\$359,520
Railings on top of retaining walls	695	LF	\$125.00	\$86,875

Allowance for miscellaneous additional site improvements, site fixtures, etc.	1	LS	\$15,000.00	\$15,000
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G2050 Landscaping

Landscaping allowance	1	LS	\$25,000.00	\$25,000
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Total G20 - Site Improvements				\$1,658,902
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Estimate - Scheme 2

Item Description	Quantity	Unit	Rate	Total
G30 Site Mechanical Utilities				
G3010 Water Supply				
Allowance for potable water supply well with 30,000gallon storage tank	1	LS	\$150,000.00	\$150,000
Allowance for water piping and connection	1	LS	\$25,000.00	\$25,000
Allowance for above grade sprinkler tank; 15,000 gallon	1	EA	\$37,500.00	\$37,500
Allowance for associated pumps, piping and connections	1	LS	\$75,000.00	\$75,000
G3020 Sanitary Sewer				
Allowance for new septic drainfield	1	LS	\$100,000.00	\$100,000
Sanitary sewer piping and connections	1	LS	\$20,000.00	\$20,000
G3030 Storm Sewer				
Allowance for stormwater management system	1	LS	\$275,000.00	\$275,000
Total G30 - Site Mechanical Utilities				\$682,500
G40 Site Electrical Utilities				
Allowance for electrical service	1	LS	\$25,000.00	\$25,000
Emergency power, generator				<i>Included Elsewhere</i>
Ductbank, 2-5" PVC, primary, allowance	50	LF	\$79.91	\$3,996
Ductbank, 460V 3PH 4W, concrete encased 10-way,	100	LF	\$246.10	\$24,610
Wiire, #4-500, 8 Sets	3,840	LF	\$18.89	\$72,538
Site lighting allowance	1	LS	\$35,000.00	\$35,000
Total G40 - Site Electrical Utilities				\$161,143