Committee Minutes

BUILDINGS AND GROUNDS COMMITTEE

Lavery Hall – Room 330

June 3, 2019

Open Session

Board Members Present: C.T. Hill, Robert Mills, Dennis Treacy, Preston White

Virginia Tech Staff: Jennifer Altman, Mac Babb, Whit Babcock, Lori Buchanan, John Bush, David Chinn, Joe Crane, Susan Duncan, Ron Fricker, Chandra Fultz, Eliane Gall, Mark Gess, Alan Grant, Larry Gray, Ricky Johnston, Frances Keene, Chris Kiwus, Brian Kubecki, Sarah McCoy, Liza Morris, Saied Mostaghimi, April Myers, Heidi Myers, Tim Sands, Robert Sebek, Kayla Smith, Ken Smith, Steve Smith, Dwyn Taylor, Jon Clark Teglas, Jack Thompson, Anthony Watson, Sherwood Wilson

Guests: Kenneth McClevey

1. **Tour:** The Buildings and Grounds Committee toured the Virginia Tech Quarry and briefly viewed the recent renovation at Sandy Hall.

2. **Welcome**

3. **Consent Agenda:** The Committee approved and accepted the items listed on the Consent Agenda:

   a. **Approval of the Minutes from the April 1, 2019 Meeting:** The Committee reviewed and approved the minutes from the April 1, 2019 meeting.

   b. **Resolution on Reappointments to the New River Valley Emergency Communications Regional Authority:** The Committee approved two reappointments to the NRV Emergency Communications Regional Authority.

   c. **Resolution on Reappointment to the Virginia Tech/Montgomery Regional Airport Authority:** The Committee approved a reappointment to the Virginia Tech/Montgomery Regional Airport Authority.

   d. **Resolution to Increase APCo Easement at the Virginia Tech Electric Lane Substation:** The Committee approved an Easement at the Virginia Tech Electric Lane Substation.

e. **Acceptance of the Capital Project Status Report:** The Committee accepted the quarterly capital project status report.

4. **Presentation on AREC Facilities Master Plan:** The Committee received a presentation on the AREC Facilities Master Plan from Alan Grant, Saied Mostaghimi, and Chris Kiwus. The Committee members and Rector Treacy emphasized the importance of planning, funding, and completing improvements at these sites to ensure the success of the university's land grant mission and connections to rural Virginia.

5. **Annual Report of the University Building Official:** The Committee received the annual report from the University Building Official, Elaine Gall.

6. **Overview of Near-Term Capital Construction:** The Committee received an overview of Near-Term Capital Construction from Sherwood Wilson. The Committee discussed the potential challenges and mitigation strategies associated with recruiting sufficient construction firms and subcontractors to complete the amount of work projected, given the university's rural location.

7. **Resolution to Authorize Extension of Historic Preservation Easement for Smithfield Plantation:** The Committee reviewed and accepted a resolution to authorize the extension of the historic preservation easement for Smithfield Plantation.

8. **Design Preview for the Merryman Center Weight Room Renovation & Expansion:** The Committee received and approved a design preview for the Merryman Center Weight Room renovation and expansion.

9. **Design Review for the Creativity and Innovation District Living-Learning Community:** The Committee received and approved a design review for the Creativity and Innovation District Living-Learning Community.

10. **Future Agenda Items and Closing Remarks:** The Committee discussed potential topics for inclusion on future meeting agendas. The Committee requested that updates on construction firm recruitment strategies and parking and transportation services, including bus services, be provided in August or November.

Joint Open Session with the Building and Grounds Committee

Board Members Present: Greta Harris, C.T. Hill, Mehmood Kazmi, Tish Long, Robert Mills, Dennis Treacy, Horacio Valeiras, Preston White

VPI & SU Staff: Mac Babb, Callan Bartel, Bob Broyden, Allen Campbell, David Chinn, Noah Craig, Joe Crane, John Cusimano, John Dooley, Jeff Earley, Alisha Ebert, Kari Evans, Lance Franklin, Randal Fullhart, Elaine Gall, Bryan Garey, Debbie Greer, Mary Helmick, Jim Hillman, Tim Hodge, Frances Keene, Chris Kiwus, Rob Mann, Robin McCoy, Nancy Meacham, Ken Miller, Terri Mitchell, Liza Morris, Charlie Phlegar, Dwayne Pinkney, Tim Sands, Savita Sharma, Dwight Shelton, Kayla Smith, Ken Smith, Brad Sumpter, Dwyn Taylor, Jon Clark Teglas, Sherwood Wilson, Chris Wise

Guests: Kenneth McClevey

* 1. **Approval of Resolution for the Corps Leadership and Military Science Building:** The Committees reviewed for approval the Resolution for the Corps Leadership and Military Science (CLAMS) Building. In November 2015, the Board of Visitors approved a $2.1 million planning authorization for the Corps Leadership and Military Science Building project. The project is envisioned as an approximately 75,500 gross square foot, three full floor structure with a partial under grade floor for mechanical and service requirements in a basement level.

The building will be located in the northern portion of the Upper Quad, near Lane Hall, and will provide a centralized and consolidated home to the Corps of Cadets and ROTC programs currently dispersed in the north area of campus. The facility will include modern classroom, administrative, program, and academic office space including academic classroom space required for the cyber security initiative.

The total project cost for the current design is $52 million, and the project has been on the university's Six-Year Capital Outlay Plan requesting state support for a portion of the project costs to match private fund raising. The university has developed an alternative funding plan and desires authorization for the project at this time because of the uncertain timing of future state support for capital outlays.

The proposed funding plan for the project calls for $38 million of private funds and cash reserves and $14 million of debt serviced by other nongeneral fund sources including future private gift revenues, internal facility use agreements for space, and a $250 annual fee per cadet. The amount of debt and/or the fee may require an adjustment depending on the timing of private gift receipts and project outflows.

This request was for a $52 million project authorization to complete designs and construct the Corps Leadership and Military Science Building.

The Committees recommended the Resolution for the Corps Leadership and Military Science Building to the full Board for approval.

* 2. **Approval of Resolution for the New Upper Quad Residence Hall**: The Committees reviewed for approval a resolution for the New Upper Quad Residence Hall.

With the support of the university, the Corps plans to expand from 1,100 to 1,400 students. Cadets are required to live on-campus and are currently assigned to live on the Upper Quad in either Pearson Hall or New Cadet Hall. With the planned expansion of the Corps, the university has developed a solution to provide the required 300 additional beds while simultaneously replacing an underutilized and deteriorating asset.

Femoyer Hall was constructed in 1949 as a residence hall on the Upper Quad. It was later repurposed to house student support functions including academic advising. The facility has received few improvements since its original construction with no major renovations, carries a significant deferred maintenance backlog, and does not meet student expectations. The university has determined, because of Femoyer Hall's condition, that the facility be replaced rather than renovated.

The university's proposed solution calls for demolishing Femoyer Hall and constructing a new 300 bed residential facility on the site. This request was for a $33 million authorization to raze Femoyer Hall and design and construct a New Upper Quad Residence Hall.

The Committees recommended the Resolution for the New Upper Quad Residence Hall to the full Board for approval.

* 3. **Approval of Resolution for the Global Business and Analytics Complex Residence Halls**: The Committees reviewed for approval a resolution for the Global Business and Analytics Complex (GBAC) Residence Halls.

The GBAC complex will be comprised of four new facilities including the Data and Decision Sciences Building, a new Pamplin College of Business, and two residence halls. Because the state has appropriated full funding for the Data and Decision Sciences Building with an effective date of July 1, 2019, the residence halls are the natural next step towards the full development of the complex. The proposed residence halls will include living-learning communities, which will house 700 students and space for the Cranwell International Center.

The residence halls project is ready to enter into the formal design phase this summer with occupancy desired no later than summer 2023. This request was for an $84 million authorization to design and construct the Global Business and Analytics Complex Residence Halls project.

The Committees recommended the Resolution for the Global Business and Analytics Complex Residence Hall to the full Board for approval.

* 4. **Approval of Resolution to Supplement the New Gas-Fired Boiler at the Central Steam Plant:** The Committees reviewed for approval a resolution to supplement the Gas-Fired Boiler at the Central Steam Plant project.

The Board of Visitors approved the project at its April 3, 2017 meeting with a $6.8 million total project cost. The scope and budget for the project resolution was based on metrics for similar projects and internal reviews. The project is being implemented in three phases: (1) hazardous material abatement, demolition of existing decommissioned boiler and associated piping; (2) manufacture and delivery of a new boiler; and (3) installation of the new boiler and associated piping. Phase one is complete. Phase two is under contract and the new boiler is scheduled for delivery in July 2019. Phase one is $140,000 under its budget, and Phase two is $24,000 under its budget for a total savings of $164,000. The costs to accept bids for Phase three are $1.564 million over its budget. Applying the savings from Phase one and Phase two, the project requires a $1.4 million supplement to the existing $6.8 million budget for an adjusted budget of $8.2 million. The university has worked to control costs of the installation and has determined this is the lowest possible cost to have the boiler operational on schedule.

The new 100,000 pound per hour gas-fired boiler would produce 60 percent of the Plant's natural gas steam generation with a $495,000 lower annual fuel cost than the current gas assets. The additional $1.4 million would extend the payback period by approximately two years for a total payback period of 11 years.

This request was for a $1.4 million supplement to adjust the total authorization for the Gas-Fired Boiler at the Central Steam Plant project to $8.2 million.

The Committees recommended the Resolution to Supplement the New Gas-Fired Boiler at the Central Steam Plant to the full Board for approval.

There being no further business, the meeting adjourned at 11:37 a.m.

*** Requires full Board approval.**

BUILDINGS AND GROUNDS COMMITTEE
June 3, 2019
Capital Project Status Report

Project Name	Project Description	Estimated Total Project Cost	Non-General Funds	Project Teams	Contract Completion Date	Project Status
FEASIBILITY						
Global System Sciences	The Feasibility Study will investigate a facility that will support disciplinary and interdisciplinary faculty of the College of Science, College of Natural Resources and Environment, College of Agriculture and Life Sciences, Virginia-Maryland Regional College of Veterinary Medicine, and university research institutes to facilitate education and research focused on solving critical regional and global problems, including environmental, animal, and human health.	TBD	TBD	EYP TBD	March 2019	Study is complete. Deliverable has been received.
PROJECT INITIATED						
Northern VA Academic Center Redevelopment	An unsolicited PPEA conceptual proposal from a team lead by HITT was submitted to VT proposing a mixed-use style redevelopment of the existing VT campus in Falls Church. A competing proposal was submitted by a team lead by EYA for a similar type of redevelopment, and was rejected/declined after preliminiary review.	TBD	TBD	HITT	Fall 2023	A detailed proposal was submitted by HITT and is currently under review by VT.
Data & Decision Sciences	Fully funded (General Fund) program containing 120,000 GSF of student and instructional space for engineering, computer science, and statistics programs at the Virginia Tech main campus. One of four buildings from the Global Business & Analytics Complex initiative.	$79,000,000	N/A	Moseley Architects/RAMSA	Spring 2023	Construction delivery method request for the use of Construction Manager at Risk (CMaR) has been submitted to DGS. A/E proposal currently being finalized, contractor request for qualifications is being generated.
DESIGN						
Chiller Plant Phase II	This project includes the replacement and upgrade of plant equipment in the existing campus chiller plants and the expansion of the underground distribution infrastructure to link campus chiller substations and bring additional existing campus buildings online. Improvements include the replacement of two outdated chillers in the North Plant with two new upgraded larger capacity chillers totaling 6,000 tons; and the addition of two new 3,000 ton chillers in the Southwest Plant. The project also includes the replacement and upgrade of ancillary equipment with state-of-the-art, optimally sized pumping and system support equipment.	$41,286,000	$9,909,640	Affiliated Engineers, Inc. (AEI) Chapel Hill, NC Faulconer Construction	Late Fall 2021	VT has submitted an appeal to DGS for an additional 5% funding to be able to award the contract, project construction anticpated to start in June 2019.
Corps Leadership & Military Science	Three-story structure that will provide a centralized and consolidated home to the Corps of Cadets administration and ROTC programs.	TBD	TBD	Clark Nexsen TBD	TBD	Preliminary Design (50% design) documents completed. Project on hold pending resolution to move forward with full design.
Creativity & Innovation District Living-Learning Community	This project involves the provision of a new residential life building in the emerging Creativity & Innovation District. The approximately 234,000 GSF and 600 bed facility will support the growing living-learning community for this key area of campus and supports the university's Beyond Boundaries initiative.	$105,500,000	$105,500,000	VMDO Charlottesville, VA WM Jordan / Hanbury	Summer 2021	Project design finalized; early site work is underway.
Dietrick Hall Enclosure & Spirit Plaza	This project will provide a "Spirit Plaza" on the north end of Dietrick Lawn and renovations to the first floor of Dietrick Hall that will establish at least 200 additional seats of dining capacity.	$8,300,000	$8,300,000	Hanbury Norfolk, VA TBD	Fall 2020	Design contract with original A/E firm has been terminated. Contract in place with new A/E firm. Project is in design.

Project Name	Project Description	Estimated Total Project Cost	Non-General Funds	Project Teams	Contract Completion Date	Project Status
HITT Hall & the Intelligent Infrastructure Complex	Program elements envision a 28,000 GSF addition (Hitt Hall) connected to Bishop-Favrao Hall, 8,000 GSF of fusion lab and data visualization space for the Intelligent Infrastructure for Human Centered Communities Destination Area, 22,000 GSF of general assignment classroom and collaborative study space, and a 40,000 GSF Dining Facility. Project intent is to showcase technology and innovation as a key component of the Intelligent Infrastructure for Human Centered Communities Destination Area.	$68,000,000	$50,000,000	Lord Aeck Sargent (LAS) Atlanta, GA TBD	Summer 2021	Criteria/Bridging Documents that define early scope and design are being finalized. Design-Build contract procurement is underway.
Holden Hall Renovation	This project includes the renovation of an approximately 21,000 GSF portion of Holden Hall fronting the Drillfield. The remaining 21,000 GSF of the existing building will be demolished and replaced with approximately 80,000 GSF of new engineering instruction and research space for a total building size of 101,000 GSF.	$72,349,000	$17,500,000	Moseley Architects Virginia Beach, VA W.M. Jordan Co.	Fall 2021	Design completed in April. Construction starting in June/July 2019
Livestock & Poultry Research Facilities (Phase I)	This project is the first of two phases to renew existing facilities for the College of Agriculture and Life Sciences' livestock and poultry programs. This first phase includes approximately 130,000 GSF of new facilities located at existing Virginia Tech sites on the Plantation Road Corridor, at Smithfield Horse Center, at Kentland Farm, and at the Glade Road Poultry Research Center.	$22,500,000	$0	Spectrum Design, PC Roanoke, VA TBD	Early Spring 2021	Project is in design and on track. Procurement of construction contract is targeted for early fall 2019.
Merryman Center Weight Room Renovation	This project includes the renovation of portions of the first two floors of the Merryman Center and the expansion of the second floor to support Athletic Department programming.	$4,900,000	$4,900,000	Colley Architects, P.C. Blacksburg, VA TBD	Fall 2020	Project is in design and on track. Procurement of construction contract is targeted for fall 2019. The design preview for this project is included on the agenda for the June meeting.
Multi-Modal Transit Facility	The Multi-Modal Transit Facility project is a partnership with the Town of Blacksburg under which the Town will obtain funding, hold contracts, and own the building that will be located and operated on Virginia Tech land.	$44,000,000	N/A	Wendel Associates Buffalo, NY TBD	TBD	VT and Town of Blacksburg working with A/E to resolve projected $8M construction budget overrun.
Package Boiler 12	Demolition and disposal of decommissioned coal fired boiler (No. 6) and installation of a new 100 lbs./hour natural gas/oil fired packaged boiler (No. 12).	$6,800,000	$6,800,000	Affiliated Engineers, Inc. (AEI) Atlanta, GA TBD	Winter 2019	Decommissioned coal boiler has been removed. Natural gas boiler under contract is on track for summer 2019 delivery. Installation package under procurement. Targeting completion for 2019/2020 heating season.
Slusher Hall Replacement	This project envisions the demolition of Slusher Hall and construction of replacement residence hall(s) that will equal or exceed 630 beds.	TBD	TBD	Clark Nexsen TBD	Spring 2023	Criteria Documents: A/E is developing construction/demolition phasing options.
Student-Athlete Performance Center	This project includes a complete renovation and expansion of the fourth floor of the Jamerson Center, construction of balconies cantilevered from the fourth floor, and a new elevator tower. The project will provide approximately 17,000 GSF for dining, nutrition, recruiting, donor hospitality, and provide an upgraded corridor to the Cassell Coliseum concourse.	$16,680,000	$16,680,000	Hanbury Norfolk, VA TBD	Fall 2020	Construction contract procurement underway. Targeting construction start in summer 2019.

Project Name	Project Description	Estimated Total Project Cost	Non-General Funds	Project Teams	Contract Completion Date	Project Status
Student Wellness Improvements	The project provides a comprehensive solution for student wellness services through upgrades to McComas Hall and major renovations to War Memorial Hall to meet the programming needs of the Schiffert Health Center, Recreational Sports, College of Liberal Arts and Human Sciences, and the College of Agriculture and Life Sciences.	$58,000,000	$58,000,000	CannonDesign Baltimore, MD Whiting-Turner Contracting Company Richmond, VA	Summer 2021	Project is in design. Construction start is targeted for Fall/Winter 2019.
Undergraduate Science Laboratory	The project will construct a new undergraduate science laboratory facility of 102,000 GSF to accommodate the growing demand for STEM-H degrees at Virginia Tech.	$74,172,000	$0	ZGF Architects Washington, DC Skanska	Fall 2022	Project is in design and on track. Funding for construction pending approval by General Assembly.
CONSTRUCTION						
ACC Network Studio	The project will establish the necessary broadcast facilities including interior renovations to an existing control room; construction of two new controls rooms; installation of fiber, infrastructure, and equipment to support the broadcast of Virginia Tech intercollegiate athletic events on the ACC Network.	$10,000,000	$10,000,000	Multiple A/E Firms Multiple Contractors	Spring 2019	Construction completion targeted for June 2019.
Commonwealth Ballroom Improvements	The scope of work includes replacing outdated and nonfunctioning lighting systems, stage systems, ceiling tiles, and air handlers for the Commonwealth Ballroom in Squires Student Center. An acoustical dividing wall will be added to increase usage capabilities by student organizations and the campus community.	$3,246,000	$3,246,000	Dewberry Engineers Glass & Associates, Inc.	June 2019	Construction complete.
Improve Kentland Facilities (Phase II)	This project includes new construction of three buildings totaling approximately 28,900 GSF including a Metabolic Research Laboratory, an Applied Reproduction Facility, and a Bovine Extension Teaching & Research facility to serve Agency 229, Virginia Cooperative Extension, and the Virginia Agricultural Experiment Station.	$12,463,000	$0	Spectrum Design, PC Roanoke, VA MRL - Charles Perry Partners Inc APR - Snyder Assoc BETR - Charles Perry Partners Inc	Summer 2020	Project broken into three contracts; all buildings are under construction.
Lane Electric Substation Expansion	This project will expand the existing electrical sub-station to add approximately 37 percent additional power capacity to serve the campus Life Sciences and Northwest Precincts and the Corporate Research Center's proposed expansion.	$6,500,000	$6,500,000	Appalachian Electric Power and Virginia Tech Electric Service Appalachian Electric Power and Virginia Tech Electric Service	Summer 2019	Project is administered by Virginia Tech Electric Service in coordination with Appalachian Power Company and Appalachian Electric Power. Project is currently on track for completion in summer 2019.
Renovate/Renew Academic Buildings	This project will renovate three existing campus buildings - Sandy Hall, the Liberal Arts Building, and the original portion of Davidson Hall. Collectively, these renovations will increase the functionality of three underutilized building assets, address several deferred maintenance issues, and reduce critical space deficiencies. Small additions are planned for Sandy Hall and the Liberal Arts Building to meet current emergency egress code requirements. New elevators in Sandy Hall and the Liberal Arts Building will provide ADA access.	$35,029,000	$0	Glavè & Holmes Architects Richmond, VA Branch & Associates Roanoke, VA	June 2019	Construction complete.

Project Name	Project Description	Estimated Total Project Cost	Non-General Funds	Project Teams	Contract Completion Date	Project Status
Steger Hall Hokie Stone Repairs & Betterments	The scope of work includes repair of Hokie Stone facade as well as cleaning and removal of efflorescence from the stone, precast, and glass surfaces.	$0	$1,100,000	Wiss, Janney, Elstner Associates, Inc. Skanska USA Building	April 2019	Construction complete.
Undergraduate Science Laboratories Renovations	The project will repurpose multiple laboratory/teaching spaces in Derring and Hahn Halls to meet growing demand for course sections in biology, chemistry, organic chemistry, and microbiology.	$10,000,000	$10,000,000	Studio Twenty Seven Architecture Washington, DC Thor Construction, Inc. Roanoke, VA	October 2019	Construction is underway and on track for completion fall 2019.
Virginia Tech Carilion Biomedical Research Expansion	This project, executed under the Public-Private Education Facilities and Infrastructure Act of 2002 (PPEA), will construct an approximately 139,000 GSF building adjacent to the Virginia Tech - Carilion Research Institute in Roanoke. The new facility will include high intensity biomedical research capable laboratories with surgical-type suites, Bio-safety Level Three laboratories, and animal imaging facilities that require high-field magnetic resonance imaging. The remaining space will include high-intensity dry laboratory research and training spaces including computational facilities, offices, procedural training rooms, and technical training space.	$91,696,000	$40,141,970	AECOM Skanska	Spring 2020	PPEA construction is underway and on track for completion in spring 2020.
CLOSEOUT						
Athletic Facilities Improvements	This is an umbrella project for improvements to multiple athletic facilities, including Rector Field House, Baseball, and Tennis.	$37,500,000	$37,500,000	Rector: Cannon Design Baseball: Cannon Design Rector: Branch Associates Baseball: Whiting-Turner Contracting Co.	Rector - March 2018 Baseball - May 2018	Sub-projects as follows: 1) Rector Field House - Construction reached Substantial Completion in March 2018. 2) Baseball - Construction reached Substantial Completion in May 2018.
O'Shaughnessy Hall Renovation	This project includes major renovation of a 72,000 GSF student residence building into a living-learning community. The residence hall originally housed 350 students and upon completion will house 344 students. Construction Complete.	$21,500,000	$21,500,000	Moseley Architects Virginia Beach, VA WM Jordan, Roanoke, VA	August 2018	Project complete, project closeout underway.

April 1, 2019

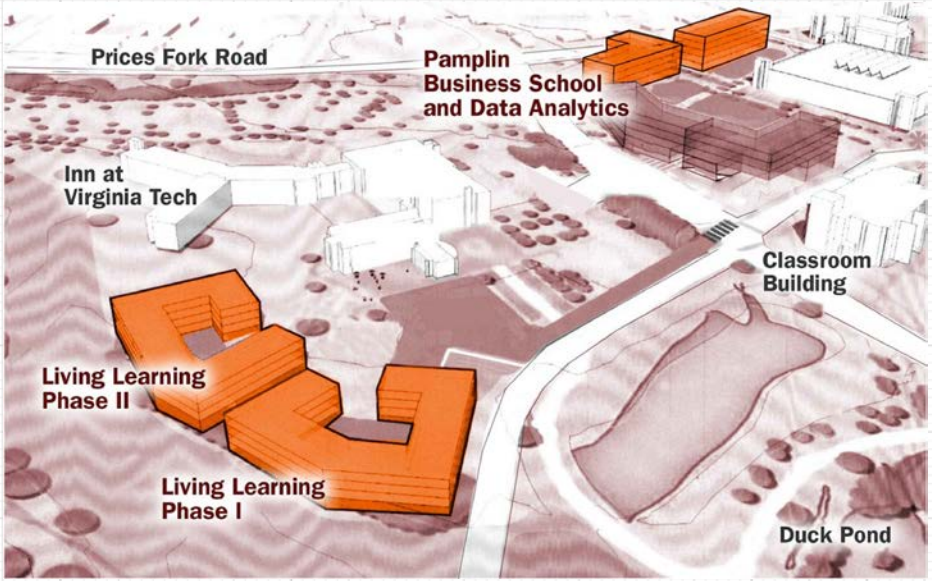
CAPITAL PROJECT STATUS REPORT

Christopher H. Kiwus, PE, PhD
Associate Vice President and Chief Facilities Officer

VIRGINIA TECH

Projects In Feasibility

- Global System Sciences



VIRGINIA TECH

Projects Initiated

- Northern Virginia Academic Center Site Redevelopment
- Data & Decision Sciences

VIRGINIA TECH

Projects In Design

- Chiller Plant (Phase II) (*Design is complete and currently out for bid*)
- Corps Leadership & Military Science
- Creativity & Innovation District Living-Learning Community
- Dietrick Hall Enclosure & Spirit Plaza
- HITT Hall & the Intelligent Infrastructure Complex
- Holden Hall Renovation
- Livestock & Poultry Research Facilities (Phase I)

VIRGINIA TECH

Projects In Design

- Merryman Center Weight Room Renovation and Improvements
- Multi-Modal Transit Facility
- Package Boiler 12
- Slusher Hall Replacement
- Student-Athlete Performance Center
- Student Wellness Improvements
- Undergraduate Science Laboratory

VIRGINIA TECH

Projects Under Construction

- ACC Network Studio
- Commonwealth Ballroom Improvements
- Improve Kentland Facilities (Phase II)
- Lane Electric Substation Expansion
- Renovate/Renew Academic Buildings
- Steger Hall Hokie Stone Repairs & Betterments
- Undergraduate Science Laboratories Renovations
- Virginia Tech Carilion Biomedical Research Expansion

VIRGINIA TECH

Closeout

- Athletic Facilities Improvements
  - Baseball Facilities
  - Rector Field House
- O'Shaughnessy Hall Renovation

VIRGINIA TECH

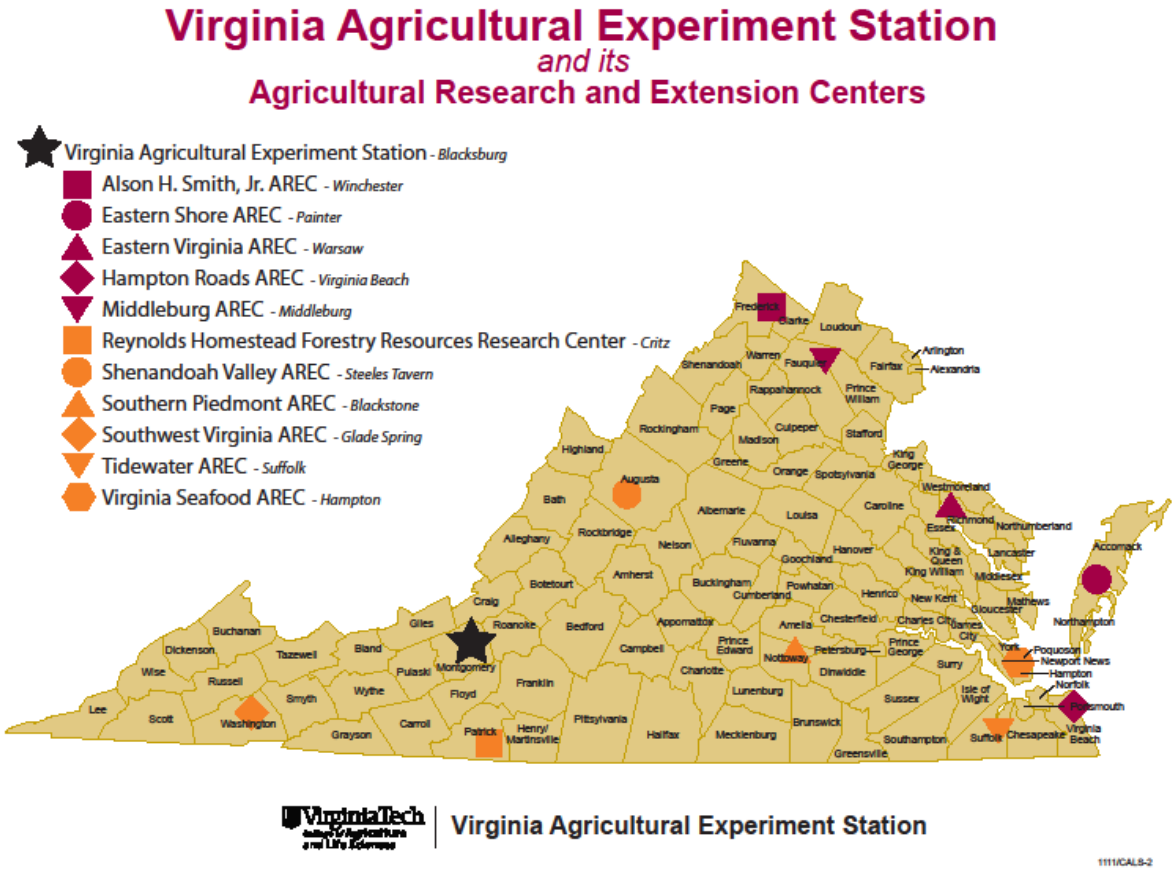
5/13/2019

COLLEGE OF AGRICULTURE AND LIFE SCIENCES VIRGINIA TECH

Strategic Facility Plan for Virginia Tech's Agricultural Research and Extension Centers

Virginia Agricultural Experiment Station

College of Agriculture and Life Sciences



COLLEGE OF AGRICULTURE AND LIFE SCIENCES VIRGINIA TECH

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INTRODUCTION

The Federal Hatch Act of 1887 created a network of state agricultural experiment stations nationwide as part of the land-grant higher education mission. This system links experiment station research to cooperative Extension programs and college academic programs. The Virginia General Assembly established the Virginia Agricultural Experiment Station (VAES) on March 1, 1886, in anticipation of the Federal Hatch Act of the 1887.

The State Agricultural Experiment Stations were originally charged with conducting research and development projects on behalf of farmers. Subsequent acts and appropriations established programs in forestry, animal health and disease, and multistate research.

Today, VAES research projects and activities encompass the work of more than 350 scientists in five colleges on the Virginia Tech campus: College of Agriculture and Life Sciences; College of Natural Resources and Environment; College of Liberal Arts and Human Sciences; College of Science; and Virginia-Maryland College of Veterinary Medicine.

The VAES research network also includes 11 field stations located throughout the state. Known as Agricultural Research and Extension Centers (AREC), these field stations and emphasize the close working relationships between the VAES and Virginia Cooperative Extension.

VAES research directly supports agriculture, the state's largest industry, accounting for one in every five jobs and providing an economic impact of approximately $55 billion annually with an additional annual contribution from the Forest Products industry of approximately $27 billion.

While VAES's mandate is to support Virginia citizens through research that would have positive economic impact, VAES's goal is to conduct research programs that will enhance the quality of life for all people. The mission of the Virginia Agricultural Experiment Station is to perform basic and applied research on agricultural, environmental, natural, and community resource issues related to the future needs of Virginia, the region, the nation, and the world.

Research is designed to provide knowledge that will enhance the quality of individual and family life and the social and economic vigor of Virginia. Researchers utilize the best techniques of qualitative and quantitative research to form the knowledge base for instruction of and application to the broader mission of the land-grant university.

Apart from serving the needs of Virginia's animal, plant, and seafood industries, VAES-supported research fosters conservation of natural resources and benefits consumers and all citizens of the state in rural, urban, and suburban communities. Discoveries resulting from VAES-supported research have facilitated economic development in the state in the form of start-up companies located in Virginia Tech's Corporate Research Center. In addition, the VAES research programs include numerous activities in the international arena.

VAES supports research faculty in a wide range of disciplines in projects located at Virginia Tech and across the commonwealth, often in collaboration with Virginia Cooperative Extension, National Institute of Food and Agriculture, and other state and federal agencies.

More detail about VAES and the ARECs can be found online at https://www.vaes.vt.edu/

AGRICULTURAL RESEARCH AND EXTENSION CENTERS

VAES faculty are located at 11 Agricultural Research and Extension Centers and within the College of Agriculture and Life Sciences, the College of Natural Resources and Environment, and the Virginia-Maryland College of Veterinary Medicine at Virginia Tech.

AREC faculty and staff, along with faculty based at the main campus, deliver research and Extension programs at these sites, which represent the commonwealth's diversity and take advantage of the unique characteristics and challenges found in each location.

The ARECs serve not only as field-research sites and field laboratories for undergraduate and graduate students, but also as program sites for producers, school groups, and the state's citizens.

FACILITY NEEDS

In 2018, a study was conducted by VAES staff and the AREC Directors and Superintendents to identify strategic facility needs relative to anticipated growth and investment in support of the Agency 229 Smart Farm Innovation Network Initiative. This Master Plan lists facilities and other needs identified through this process. Project types have been grouped into the following core facility types:

- Research and Research Support
    - Research Laboratories
    - Research Greenhouses
    - Animal Handling Facilities
    - Seed Handling and Processing Facilities
    - Pesticide Handling Facilities
    - Multi-Purpose Buildings
- Extension and Outreach – Classroom and Community spaces
- Administrative and Office (included in other core facility types)
- Housing – Residential facilities for short and medium term use by after-hours staff, graduate students, faculty and visiting scholars
- Infrastructure Systems
    - Information Technology
    - Water Supply
    - Signage
    - Roads and Parking
    - Fencing
    - Miscellaneous
- Land

RESEARCH AND RESEARCH SUPPORT

RESEARCH LABORATORIES

Many existing laboratories at the ARECs are in poor condition, and are not suitable for conducting appropriate experiments required to respond to modern agricultural issues.

Research Lab Facilities	New SF	Renov. SF	Cost/SF	Cost
Middleburg - New Analytical Lab	3,000 SF	-	$450	$1,350,000
Alson H. Smith, Jr. - Renovate plant tissue culture lab	-	1,804 SF	$250	$451,000
Eastern Shore - Basement lab renovations	-	2,270 SF	$300	$681,000
Southern Piedmont - New Lab Facility	2,500 SF	-	$450	$1,125,000
Southern Piedmont - Renovate Labs	-	2,680 SF	$250	$670,000
Reynolds Homestead - Renovate Bldg 1240 Basement	-	1,240 SF	$250	$310,000
Tidewater - New Lab Facility	5,180 SF	-	$450	$2,331,000
Hampton Roads - Renovate Bldg 1101 Basement	-	3,250 SF	$250	$812,500
Subtotal Research Labs	**10,680 SF**	**11,244 SF**		**$7,730,500**

RESEARCH GREENHOUSES

Controlled environment growth facilities are a critical component of the research program. Having state of the art plant growing facilities is necessary for researchers to not only remain current with industry partners, but also to provide the infrastructure necessary to find innovative solutions to current world problems.

Research Greenhouse Facilities	New SF	Renov. SF	Cost/SF	Cost
Eastern Shore - New Smart Greenhouse #1	3,000 SF	-	$200	$600,000
Eastern Shore - New Smart Greenhouse #2	3,000 SF	-	$200	$600,000
Hampton Roads - New Smart Greenhouse #1	3,000 SF	-	$200	$600,000
Hampton Roads - New Smart Greenhouse #2	3,000 SF	-	$200	$600,000
Hampton Roads - New Growth Chamber Facility	750 SF	-	$225	$168,750
Tidewater - New Smart Greenhouse #1	3,000 SF	-	$200	$600,000
Tidewater - New Smart Greenhouse #2	3,000 SF	-	$200	$600,000
Alson H. Smith, Jr. - New Smart Greenhouse	3,000 SF	-	$200	$600,000
Alson H. Smith, Jr. - Renovate Greenhouse 0878	-	1,660 SF	$50	$83,000
Southern Piedmont - New Smart Greenhouse	3,000 SF	-	$200	$600,000
Southern Piedmont - Renovate Greenhouse 0898	-	4,900 SF	$80	$392,000
Reynolds Homestead - Renovate Slat House	-	300 SF	$50	$15,000
Subtotal Research Greenhouse Facilities	**24,750 SF**	**6,860 SF**		**$5,458,750**

ANIMAL HANDLING FACILITIES

Several ARECs have animal-based programs as their primary areas of research and outreach. Additional facilities are necessary to replace aging structures and provide adequate areas for ongoing animal management, extension programs and data collection. These buildings would be primarily pole barns for livestock stall/bunk space and related support areas.

Animal Handling Facilities	**New SF**	**Renov. SF**	**Cost/SF**	**Cost**
Middleburg - New Animal Research Facility	7,500 SF	-	$125	$937,500
Middleburg - New Animal Teaching/Outreach Facility	7,500 SF	-	$140	$1,050,000
Southwest Virginia - Livestock expansion	5,000 SF	-	$125	$625,000
Subtotal Multi-Purpose Building	**20,000 SF**	**0 SF**		**$2,612,500**

SEED HANDLING AND PROCESSING FACILITIES

Two locations have inadequate areas for handling or processing seed materials.

Animal Handling Facilities	**New SF**	**Renov. SF**	**Cost/SF**	**Cost**
Tidewater - New Seed Handling Facility	500 SF	-	$225	$112,500
Eastern Virginia – Seed Drying Addition	200 SF	-	$300	$60,000
Subtotal Seed Handling and Processing Facilities	**700 SF**	**0 SF**		**$172,500**

PESTICIDE HANDLING FACILITIES (PHF)

Each AREC handles a variety of pesticides and other chemicals in the research and agricultural operations. Many ARECs have inadequate means by which to safely store these chemicals, clean out sprayers and tanks, and dispose of wastewater and residual products to meet the safety requirements of pesticide storage and application. Locations listed below are in need of a new PHF, similar to the one constructed at Tidewater AREC in 2017.

Pesticide Handling Facilities	**New SF**	**Renov. SF**	**Cost/SF**	**Cost**
Southern Piedmont - New PHF	970 SF	-	$270	$261,900
Shenandoah Valley - New PHF	970 SF	-	$270	$261,900
Alson H. Smith, Jr. - Renovate Bldg 0875	-	5,400 SF	$125	$675,000
Hampton Roads - New PHF	970 SF	-	$270	$261,900
Middleburg - New PHF	970 SF	-	$270	$261,900
Subtotal Pesticide Handling Facilities	**3,880 SF**	**5,400 SF**		**$1,722,600**

MULTI-PURPOSE BUILDINGS (MPB)

Due to the increasing size of agricultural equipment and the diverse nature of activities and programs at ARECs, it is necessary to have large volume shed space available that can accommodate a variety of uses. These multi-purpose buildings would consist of a clear span pre-engineered metal building with large sliding and/or roll-up doors on a concrete slab, with ancillary, climate-controlled office space for farm staff, including restroom facilities.

Multi-Purpose Buildings	New SF	Renov. SF	Cost/SF	Cost
Tidewater - New MPB	10,000 SF	-	$125	$1,250,000
Eastern Shore - New MPB	10,000 SF	-	$125	$1,250,000
Eastern Virginia - Renovate MPB	-	3,500 SF	$50	$175,000
Shenandoah Valley - New MPB	7,500 SF	-	$125	$937,500
Southern Piedmont – New Farm Support Bldgs	10,000 SF	-	$25	$250,000
Southwest Virginia - New MPB and Shop	7,500 SF	-	$140	$1,050,000
Subtotal Multi-Purpose Building	**45,000 SF**	**3,500 SF**		**$4,912,500**

EXTENSION AND OUTREACH

EDUCATION FACILITIES

One of the primary functions of each AREC is to engage with stakeholder groups and the local community through the Virginia Cooperative Extension. While many of the larger AREC stations have suitable meeting space for larger group instruction, seminars, workshops and meetings, many of the smaller ones have no ability to host such functions. New 2-story education buildings are envisioned, consisting of a classroom seating approximately 100 people on the main level, with an upper level for administrative offices and support spaces, conference room, and short-term housing units for visiting faculty, graduate students and scholars.

Education Facilities	New SF	Renov. SF	Cost/SF	Cost
Middleburg - New Education Facility	5,000 SF	-	$325	$1,625,000
Shenandoah Valley - New Education Facility	5,000 SF	-	$325	$1,625,000
Eastern Virginia - New Education Facility	5,000 SF	-	$325	$1,625,000
Eastern Virginia - Renovate Experiment Building	-	900 SF	$150	$135,000
Southwest Virginia - New Education Facility	5,000 SF	-	$325	$1,625,000
Hampton Roads - Classroom Expansion	-	2,500 SF	$325	$812,500
Subtotal Education Facilities	**20,000 SF**	**3,400 SF**		**$7,447,500**

HOUSING

RESIDENTIAL FACILITIES

Because most ARECs are situated in remote locations of the state and often in areas where it is difficult to find available housing options, there is a need to provide improved, consistent short- to mid-term housing system-wide for students, faculty or staff who would need to be on-site to conduct field research. This is particularly the case for graduate students who spend a good portion of their time at the ARECs to conduct research and outreach activities. Providing housing options allows these extended stays to be more cost effective and allow students, staff and faculty to conduct long term experimentation at the ARECs. This is in addition to the employee housing program which currently

affords some AREC staff to live on the property and provide after-hours support to the program. Some housing is currently provided in temporary FEMA trailers that are now 20+ years old and need to be removed because of their very poor conditions. New housing units could be 3-4 bedroom single-family style detached structures similar to those currently provided. Others could be a duplex style unit for separation by gender or job classification, depending on the need, with shared common areas to optimize available square footage.

Residential Facilities	New SF	Renov. SF	Cost/SF	Cost
Eastern Shore - New Tenant House #2	1,200 SF	-	$200	$240,000
Eastern Shore – New Tenant House #2	1,200 SF	-	$200	$240,000
Tidewater - New Tenant House #1	1,600 SF	-	$200	$320,000
Tidewater - New Tenant House #2	1,600 SF	-	$200	$320,000
Southern Piedmont - New Tenant House	1,600 SF	-	$200	$320,000
Eastern Virginia – New 4-bedroom Duplex	2,000 SF	-	$200	$400,000
Alson H. Smith, Jr. – New 4-bedroom Duplex	2,000 SF	-	$200	$400,000
Hampton Roads – Renovate House #1102	-	2,450 SF	$150	$367,500
Middleburg – Renovate all houses (light)	-	15,146 SF	$50	$757,300
Shenandoah Valley – Renovate 2 tenant houses	-	3,060 SF	$100	$306,000
Southern Piedmont – New 6-bedroom Duplex	3,000 SF	-	$200	$600,000
Tidewater – Renovate Duke Residence	-	4,000 SF	$100	$400,000
Subtotal Residential Facilities	**14,200 SF**	**24,656 SF**		**$4,670,800**

INFRASTRUCTURE SYSTEMS

INFORMATION TECHNOLOGY SYSTEMS

VAES and Virginia Cooperative Extension (Agency 229) are working closely with industry stakeholders to "grow our future with public-private partnerships" through the Virginia Agriculture and Natural Resources (ANR) Initiative. A critical priority of the ANR initiative is the proposed SmartFarm Innovation Network. To facilitate the development of this network of interconnected technology centers in ANR industries, the Blacksburg campus and 11 ARECs are the hubs through which agricultural technology-based innovation will flow. In support of this vision, the IT infrastructure and technology at each location must be updated. Areas of need include:

A. Bandwidth increases: 7 ARECs currently have a maximum of 200 Mbps services through Shentel. Requests are in to provide the same at the other 4 locations. The services at each AREC will need to be upgraded to 1 Gbps to be able to handle increased data transfer loads.
B. Wireless capacity upgrades and expansion: Historically the College has funded all network equipment and one wireless access point (A/P), and installation additional A/Ps have been the responsibility of the AREC, so wireless coverage has remained limited. Upgrades are needed to increase wireless coverage in existing facilities.

C. Building wiring updates. In existing buildings with data networks, the cable is primarily CAT5 that is becoming increasingly outdated. Network wiring at many of the ARECs should be updated.
D. External wireless access. In order to provide necessary wireless data access in research plots and fields, external towers should be erected at strategic locations to broadcast wifi signal to key areas. These towers should be dually equipped with real-time kinematic (RTK) positioning receivers to enhance the precision of position data derived from satellite-based positioning systems such as GPS, in support of the Smart Farm Innovation Network Initiative.
E. Audio/Video Upgrades. Along with providing current audio/video equipment in conference rooms and classrooms, web and video conferencing is a critical tool for effective global communication and collaboration in today's connected environment. Each AREC needs updated equipment to be able to participate effectively with the university's conferencing tools.

[See table on next page]

AREC Summary of IT infrastructure Upgrades

	Fixed – One Time Costs							Annual Costs			
Information Technology Systems	Router upgrades[1]	Re-wiring Existing Building(s)[2]	Interior Wi-Fi Upgrades[3]	RTK Base System[4]	Exterior Wi-Fi Network[5]	A/V Upgrades	**Total One Time Costs**	Current Internet Service Cost	Internet Service Upgrade	RTK Subscription	Annual IT cost
Alson H. Smith	$5,000	$102,670	$17,600	$0	$34,000	$25,000	**$211,300**	$21,600	$27,000	$0	**$48,600**
Eastern Shore	$5,000	$70,430	$17,600	$25,000	$40,000	$25,000	**$212,100**	$12,732	$27,000	$2,000	**$41,732**
Eastern Virginia	$5,000	$55,750	$6,800	$25,000	$24,000	$9,000	**$154,600**	$600	$27,000	$2,000	**$29,600**
Hampton Roads	$5,000	$189,160	$10,400	$0	$16,000	$20,000	**$267,600**	$1,668	$27,000	$0	**$28,668**
Middleburg	$5,000	$81,840	$17,600	$0	$116,000	$9,000	**$256,500**	$21,720	$27,000	$0	**$48,720**
Reynolds Homestead	$5,000	$21,860	$6,800	$25,000	$280,000	$9,000	**$376,700**	$0	$27,000	$2,000	**$29,000**
Shenandoah Valley	$5,000	$25,320	$6,800	$25,000	$220,000	$9,000	**$320,200**	$21,600	$27,000	$2,000	**$50,600**
Southern Piedmont	$5,000	$94,440	$17,600	$25,000	$136,000	$30,000	**$337,100**	$14,580	$27,000	$2,000	**$43,580**
Southwest Virginia	$5,000	$38,460	$6,800	$25,000	$64,000	$9,000	**$177,300**	$0	$27,000	$2,000	**$29,000**
Tidewater	$5,000	$169,060	$17,600	$25,000	$100,000	$30,000	**$375,700**	$20,388	$27,000	$2,000	**$49,388**
Virginia Seafood	$5,000	$0	$6,800	$0	$0	$20,000	**$58,800**	$1,668	$27,000	$0	**$28,668**
Subtotal:	$55,000	$848,990	$132,400	$175,000	$1,030,000	$195,000	**$2,436,390**	$116,556	$297,000	$14,000	**$427,556**
Rounded:	$55,000	$850,000	$132,000	$175,000	$1,030,000	$195,000	**$2,437,000**	$117,000	$297,000	$14,000	**$428,000**

[1] Required to increase from current 200 Mbps to 1 Gbps at each location.
[2] Based on $5.00/SF re-wiring cost.
[3] Includes installation of additional wireless access points and a 24-port PoE Switch
[4] Real-Time Kinematic (RTK) System provides enhanced GPS accuracy.
[5] Expands wifi capability into research plots and fields at approximately $400/acre.

WATER SUPPLY

A primary need for regular and reliable irrigation and water supply exists at many ARECs. Listed below are projects where improvements are needed to support the continued provision of the water for AREC needs.

Water Supply	New SF	Renov. SF	Cost/SF	Cost
Alson H. Smith - Rehab Pump Station	-	290 SF	$75	$21,750
Hampton Roads - Rehab Pump Station	-	220 SF	$150	$33,000
Southern Piedmont - Pump Station Backup Generator	150 SF	-	$150	$22,500
Eastern Virginia – new irrigation water supply and well				[TBD]
Subtotal Water Supply	**150 SF**	**510 SF**		**$77,250**

SIGNAGE AND WAYFINDING

Every AREC has at least one primary entrance sign, and most have secondary or additional signage throughout the property. The majority were installed 15+ years ago, reflecting older university branding, and many have deteriorated and are in need of replacement. The Office of University Planning has developed a new standard exterior sign design with the current branding. The University's sign vendor has provided a quote of approximately $3,200 for a double-sided sign, or $2,600 for single-sided.

AREC Primary Signage Upgrades

AREC	SIGN 1 Location	SIGN 1 Single or double sided?	SIGN 2 Location	SIGN 2 Single or double sided?	Add'l Travel Cost	Demo & Custom Installation Allowance	Cost	Existing Sign Notes
Alson H. Smith	At Main Entrance	Single	In front of Building	Single	$0	$2,000	**$7,200**	Monument style
Eastern Shore	At Main Entrance	Single	In front of Building	Single	$0	$1,000	**$6,200**	
Eastern Virginia	At Main Entrance	Double	In front of Building	Single	$0	$1,500	**$7,300**	Stone planter
Hampton Roads	At Main Entrance	Double	In front of Building	Single	$0	$1,500	**$7,300**	Stone planter
Middleburg	At Main Entrance	Double	At Second Entrance?	Double	$0	$1,000	**$7,400**	Landscaping
Reynolds Homestead	At Main Entrance	Single	At AREC Bldg	Single	$100	$1,000	**$6,300**	Timber planter
Shenandoah Valley	At Main Entrance	Double	At Sheep Eval Station?	Double	$0	$1,000	**$7,400**	Landscaping
Southern Piedmont	At Main Entrance	Double	In front of Building	Single	$0	$2,000	**$7,800**	Brick Box
Southwest Virginia	At Main Entrance	Double	In front of Building	Single	$200	$1,000	**$7,000**	
Tidewater	At Main Building	Double	Hare Road Entrance?	Double	$0	$1,500	**$7,900**	Landscaping
Virginia Seafood	At Main Building	Double	S. King St?	Single	$0	$0	**$5,800**	
Subtotal Signage							**$77,600**	

ROADS AND PARKING

Current parking facilities at most ARECs are aging and in need of repair. Parking capacity is typically limited to staff, with little additional space for parking of guests. Access drives and farm roads require ongoing maintenance since their vehicular infrastructure is not supported by VDOT or parking services revenue, as it is on campus. Parking capacity should be expanded to provide adequate paved parking at each AREC for the full roster of faculty, staff and students that may be working during peak times. Additional overflow parking should be identified and provided for larger group events, such as field days, occurring occasionally throughout the year. Further, accessible parking should be readily available in all parking areas, and an accessible route to main buildings clearly identified.

Roads and Parking	**Cost**
Alson H. Smith – Repair Parking lot	$56,000
Tidewater – Repair Parking lot	$56,000
Southern Piedmont – Repair Parking lot and roads	$25,000
Middleburg – Repair gravel roads	[TBD]
Eastern Virginia – Repair gravel roads	[TBD]
Subtotal Roads and Parking	**[TBD]**

FENCING

Certain research plots, fields and pastures areas of the ARECs require fencing, either for security purposes or wildlife control. Existing fencing is aging and in need of replacement. Other areas require new fencing.

Fencing	**Cost**
Middleburg – Fencing repair	$100,000
Hampton Roads – Fencing repair	[TBD]
Southwest Virginia – Fencing repair	[TBD]
[TBD]	[TBD]
Subtotal Fencing	**[TBD]**

SAFETY AND SECURITY

Security enhancements should be seriously considered at each location due to the presence of undergraduate and graduate students at these sites. Strategically placed video cameras could serve as a valuable deterrent, as well as important surveillance data in the event of an incident. Blue light phones or other emergency notification devices should be installed in key locations and connected to local authorities for urgent response. A survey of exterior lighting should be conducted for each station to determine if night-time lighting levels are adequate or need to be increased for after-hours safety.

ACCESSIBILITY IMPROVEMENTS

In addition to accessibility improvements from parking areas to the buildings, a full accessibility evaluation should be conducted for all primary public facilities. Specifically, accessible restroom facilities are needed at the following ARECs:

- Alson H. Smith
- Eastern Shore
- Eastern Virginia
- Middleburg
- Shenandoah Valley
- Southwest Virginia
- Tidewater

LANDSCAPING

Since many of the ARECs serve as the gateways to Virginia Tech for the local communities and stakeholders, having attractive landscaping around the primary public buildings helps present an inviting and vibrant image of the stations. In coordination with local horticulturalists, the site landscaping should be reviewed, maintained, and enhanced regularly, with a focus on highlight the type of horticultural activities that might be occurring at the station.

FURNITURE

Furniture and furnishings in common areas, classrooms, and offices should be replaced periodically to represent a current and modern work environment.

LAND

LAND NEEDS

Additional acreage is needed at the following ARECs for continued research and growth opportunities. Land must be tillable, and adjacent to the current operations. Many of our ARECs are leasing a significant portion of their land needs from local landlords. Unfortunately due to competition for land development and encroachment of urban areas the risk of losing such lease contracts is high.

Land Needs	**Acres**	**Cost/Ac.**	**Cost**
Eastern Shore – Land Needs	100+	$9,000	$900,000
Eastern Virginia – Land Needs	100+	$9,000	$900,000
Tidewater – Land Needs	150+	$9,000	$1,350,000
Subtotal Land Needs	**350 Ac.**		**$3,150,000**

SUMMARY

The items listed above represent an overall strategy to bring all ARECs up to current standards, as well as provide room for growth into new areas of study. New facilities will be flexible and open to the fullest extent possible for maximum re-configurability to also meet future needs of the ARECs. While the plans detailed above represent significant expansion of physical space, the personnel, programs and equipment that will occupy these spaces are more dynamic in nature and will need to be planned for and balanced in the overall strategic plan.

The facility needs outlined herein will create a modern, state-of-the-art network of research and extension centers to raise the profile, accessibility and capacity of the AREC system to continue and enhance the valuable work that has been going on for decades. AREC leaders, faculty and staff are by nature extremely resourceful – adept at maximizing the usefulness and efficiency of resources available to them. Upgrading of facilities at the ARECs will greatly enhance the programs of the 229 colleges and provide significant visibility to the university.

CAPITAL PROJECT SUMMARY

Core Facility Type	# Projects	New Construction	Renovation	Cost (estimated)	Cost (rounded)
Research/Support	35	97,510	27,004	$21,559,350	**$21,560,000**
Extension/Outreach	6	27,500	2,500	$8,362,500	**$8,363,000**
Infrastructure	25	150	510	$2,902,750	**$2,903,000**
Admin/Office	2	-	900	$198,750	**$199,000**
Housing	12	14,200	24,656	$4,670,800	**$4,671,000**
Land	3	350 Acres		$3,150,000	**$3,150,000**
Grand Total	**83**	**139,360 SF**	**55,570 SF**	**$40,844,150**	**$40,846,000**

MAINTENANCE RESERVE PROJECT SUMMARY

MR Project Type	# Projects	Cost
Moisture Penetration	17	$1,824,000
MEP Systems	12	$1,444,000
Structure	7	$391,000
Other	14	$1,575,000
Grand Total	**50**	**$5,234,000**

STRATEGIES TO ADDRESS NEEDS

The College of Agriculture and Life Sciences works annually with ARECs to budget for annual operating costs. Additionally, critical needs requests are considered for funding during this process. Addressing facilities needs is typically a high priority list for the ARECs, and the College works to fund as many of these needs as possible, typically in a cost sharing arrangement. To the degree possible, funding of critical needs to address facility and infrastructure-related concerns will continue to be a priority.

MAINTENANCE RESERVE

The Department of Facilities Services at Virginia Tech has generously supported the need for ongoing maintenance and repair work at the ARECs using Maintenance Reserve funding. For the last 10+ years, an allotment has been set aside each year to fund $250,000 worth of projects at the ARECs. This investment has been vital to keeping the physical plant of the AREC system operational. During 2018, a long term, prioritized plan was developed in conjunction with the leaders of the ARECs. The plan identified 50 individual projects system-wide that would need to be addressed system-wide, 36 of which are considered "critical system" repairs, at an approximate total cost of $5.23 million. A detailed listing of maintenance reserve project requests are included in Appendix B.

Some of the work within this facility master plan could be eligible for maintenance reserve funding. However, at an average spend rate of $250,000/year, the total amount of deferred maintenance needs will likely continue to grow. It would be beneficial to reevaluate the annual commitment to maintenance reserve spending on the ARECs since the current level has been relatively flat since 2011 and is not meeting the current maintenance needs.

PRIVATE GIFTS

In conjunction with the College of Agriculture and Life Science's Advancement Office, VAES is always working to maintain strong ties with industry partners, stakeholders and alumni. These partners provide vital support in many ways, including financial gifts. As instances arise for sharing the AREC system facility master plan with these individuals and groups, interest in private giving will likely develop to address some needs. Attention should be given to developing these opportunities.

CAPITAL OUTLAY FUNDING

The majority of the needs described in this facility master plan would likely need to be funded through a general fund appropriation for a capital outlay project by the Commonwealth of Virginia. The project scope would be approximately 140,000 square feet of new construction and 56,000 square feet of renovation work, for an estimated cost of $37.7 million (excluding land acquisition needs). The details of this estimate are included in Appendix C. Potential strategies for phasing the work by project type, or location, or in conjunction with other CALS and Agency 229 projects could be explored.

APPENDICES

APPENDIX A: EXISTING FACILITIES AND CONDITION ASSESSMENT INFORMATION

APPENDIX B: COMPREHENSIVE MAINTENANCE RESERVE PLAN

APPENDIX C: SYSTEM-WIDE CAPITAL OUTLAY PROJECT

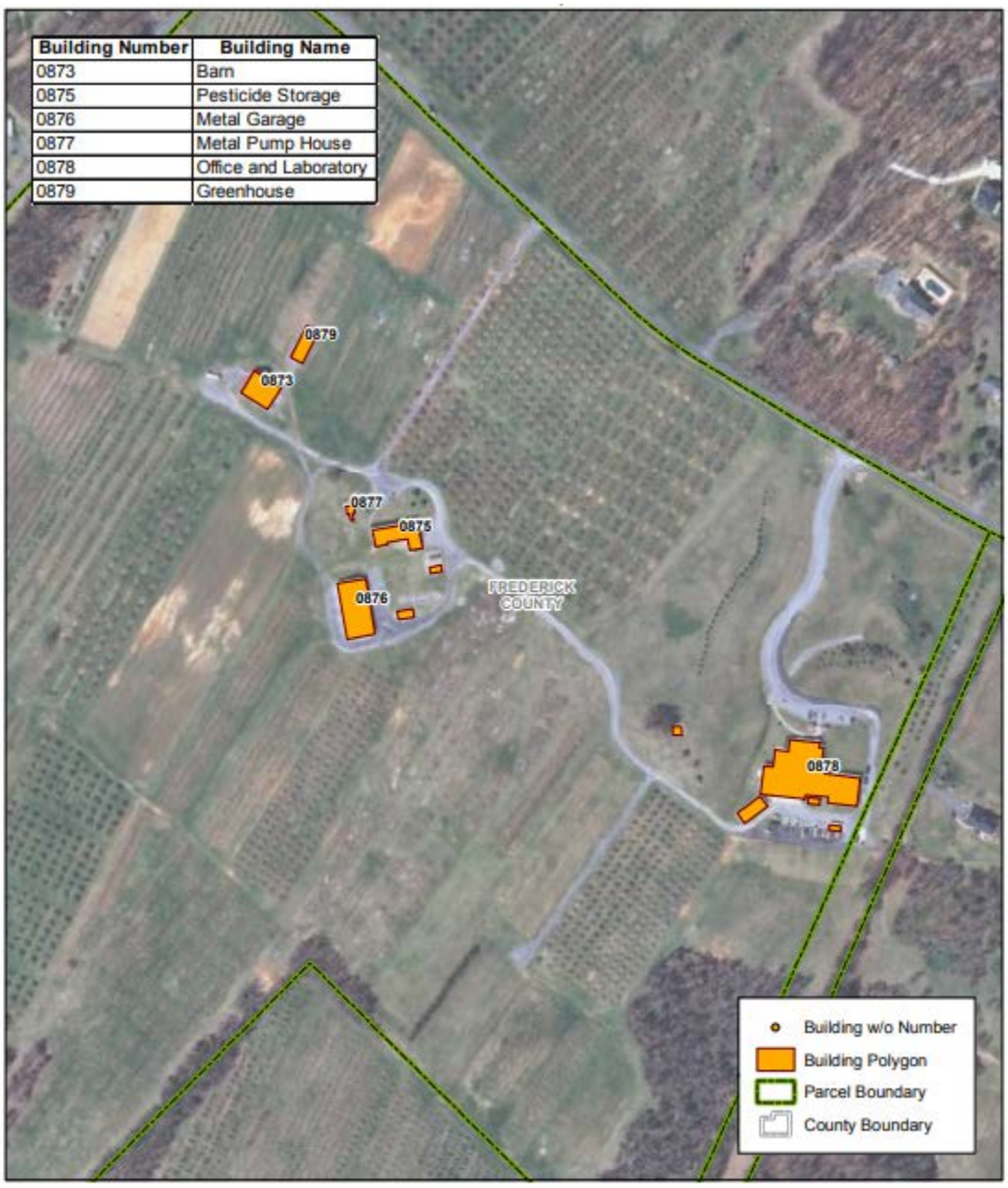
APPENDIX D: AREC FACT SHEETS

APPENDIX A

EXISTING FACILITIES AND CONDITION ASSESSMENT INFORMATION

Alson H. Smith Jr. AREC

Property is primarily used by the College of Agriculture and Life Sciences for research and educational programs. The primary focus is on perennial tree fruits (apples, peaches and cherries), cultural studies, and variety/rootstock evaluation.



A. Summary Information

Ownership	Bldgs.	GSF	Acreage	Median Age	Avg. FCI	Historic Bldgs.
Owned (all)	6	42,210	119	25	0.16	No

B. Detailed Building Information

Bldg. No.	Name	GSF	Year Built	FCI
879	Greenhouse	2,400	2007	0
876	Metal Garage	7,697	1994	0.02
873	Barn	5,890	1951	0.05
878	Office And Laboratory	20,534	1994	0.16
875	Pesticide Storage Facility	5,400	1989	0.26
877	Metal Pump House	289	1994	0.50
Total GSF		42,210		
Median Age			25	
Average FCI				0.16

C. REM Information

All property is VT-owned (119 acres).

D. Space Requests (Current and Past)

Date Created	Space Type	Amount	Status
10/30/2018	Indoor equine	22,000 SF	VTF/REM

E. Open Work Orders (Including Maintenance Reserve)

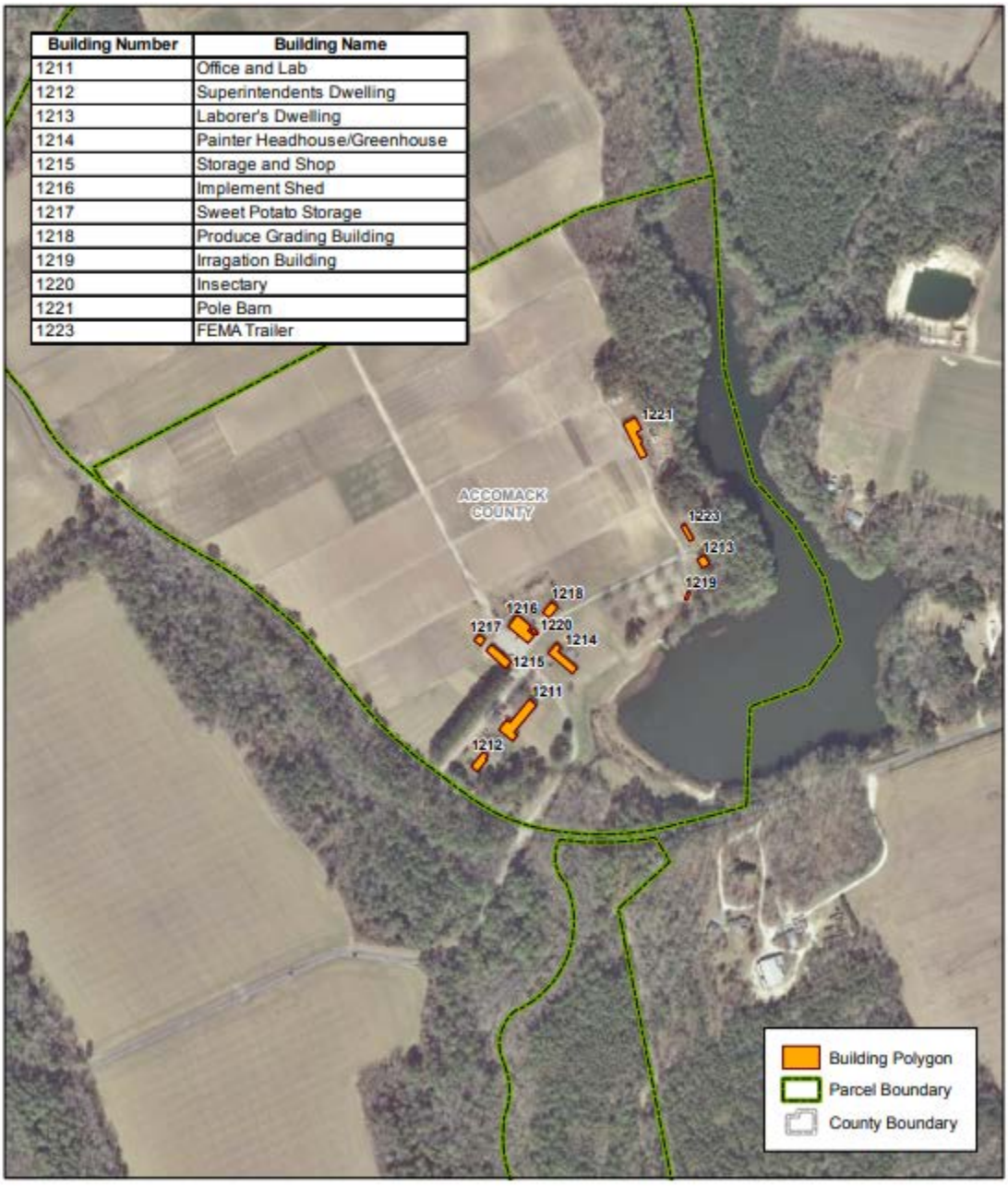
N/A

F. Maintenance Reserve Expenditures

Project Title	Bldg. No.	Budget	Expenses to Date	FY Start	Fund Closed
Replace Main Bldg Roof	878	$12,000	$11,704	2010	Oct-12
Replace Main Bldg HVAC Controls	878	$97,430	$98,009	2011	Jul-13
Replace Emergency Power	878	N/A	N/A	2015	Mar-17
		$109,430	$109,713		

Eastern Shore AREC

Property is primarily used by the College of Agriculture and Life Sciences for research and educational programs. The primary focus is on experimental vegetable and field crops.



A. Summary Information

Ownership	Bldgs.	Total GSF	Acreage	Median Age	Avg. FCI	Historic Bldgs.
Owned (all)*	12	47,371	226	57	0.20	No

* Except FEMA trailer(s)

B. Detailed Building Information

Bldg. No.	Name	GSF	Year Built	FCI
1212	Superintendent'S Dwelling	1,310	1959	0.02
1221	Pole Barn	4,852	1990	0.03
1216	Implement Shed	7,597	1961	0.12
1219	Irrigation Building	127	1964	0.19
1218	Produce Grading Building	1,610	1980	0.20
1214	Headhouse / Greenhouse	4,544	1961	0.22
1217	Sweet Potato Storage	900	1977	0.26
1211	Office And Lab	14,086	1959	0.27
1215	Storage And Shop	3,000	1959	0.34
1213	Laborer's Dwelling	937	1956	0.35
1223	Fema Trailer	908	2000	N/A
1222	Equipment Storage Building	7,500	2017	N/A
Total GSF		47,371		
Median Age			57	
Average FCI				0.20

C. REM Information

All property (land and buildings) is Virginia Tech-owned.

D. Space Requests (Current and Past)

N/A

E. Open Work Orders (Including Maintenance Reserve)

Bldg. No.	Description
1214	G1229 - DC - MR - ES AREC - REGLAZE GREENHOUSE

F. Maintenance Reserve Expenditures

Project Title	Bldg. No.	Budget	Expenses to Date	FY Start	Fund Closed
Replace Min Building Boilers	1211	$173,900	$71,230	2010	Oct-12
Tenant House 1213 Repairs	1213	$39,000	$38,208	2012	Jul-13
Replace A/C	1211	N/A	N/A	2015	Mar-17
Replace Min Bldg. Windows	1211	$414,676	$405,490	2015	Jul-18
Drainage / Foundation Repair	1211	$31,878	$30,716	2015	Jul-18
Greenhouse Repairs	1214	$323,514	$2,300	2018	Active
		$ 982,968	$ 547,944		

Eastern Virginia AREC

Properties are primarily used by the College of Agriculture and Life Sciences for research and educational programs. The primary focus is on research on soybeans, wheat, barley and other crops.

A. Summary Information

Ownership	Bldgs.	GSF	Acreage	Median Age	Avg. FCI	Historic Bldgs.
All bldgs., 55/232 acres	6	17,800	232	37	0.09	No

B. Detailed Building Information

Bldg. No.	Name	GSF	Year Built	FCI
886	Butler Building	900	1965	0
887	Pesticide Storage Building	250	2011	0
883	Storage Building	5,500	2000	0.04
884	Shop Building	5,500	2000	0.04
881	Main Office And Laboratory	3,276	1951	0.19
880	Experiment Building And Machine Shed	2,374	1960	0.30
Total GSF		17,800		
Median Age			37	
Average FCI				0.09

C. REM Information

55 of 232 acres owned; all buildings owned

Lease Initiated	Lessor	Lease Term	Lease Termination	Lease Cost (Annual)
2015-18	Private Individuals (6)	1-40 years	2019-2056	$61,120

D. Space Requests (Current and Past)

N/A

E. Open Work Orders (Including Maintenance Reserve)

N/A

F. Maintenance Reserve Expenditures

Project Title	Bldg. No.	Budget	Expenses to Date	FY Start	Fund Closed
Main Office Insulation	881	$133,800	$115,605	2011	Jul-13

Hampton Roads AREC

Property is primarily used by the College of Agriculture and Life Sciences for research and educational programs. The primary focus is on field grown woody ornamentals, container-grown plants, plant improvement research, plant-irrigation relationships, grass research, wood and bedding plant diseases, and ambrosia beetle collection and exotic pest surveys.

Building Number	Building Name
1101	OFFICE AND LAB
1102	DIRECTOR'S RESIDENCE
1104	HEADHOUSE / GREENHOUSE
1105	HEADHOUSE / GREENHOUSE
1106	STORAGE BUILDING
1107	GARAGE AND APARTMENT
1108	GARAGE AND SHOP
1109	BOILER HOUSE
1110	IMPLEMENT SHED
1111	QUONSET HUT
1112	PUMP HOUSE
1113	GREENHOUSE NUMBER 1
1114	GREENHOUSE NUMBER 2
1116	TENANT HOUSE
1117	HIGH TUNNEL GREENHOUSE

A. Summary Information

Ownership	Bldgs.	Total GSF	Acreage	Median Age	Avg. FCI	Historic Bldgs.
All bldgs. 11/70 acres	16	65,620	70	58	0.15	No

B. Detailed Building Information

Bldg. No	Name	GSF	Year Built	FCI
1114	Greenhouse Number 2	2,476	2002	0.00
1115	Tunnel	3,168	2012	0.00
1116	Tenant House	1,920	2013	0.00
1117	High Tunnel Greenhouse	4,588	2015	0.00
1110	Implement Shed	7,360	1955	0.05
1106	Storage Building	3,000	1951	0.12
1102	Director'S Residence	2,450	1907	0.12
1101	Office And Lab	19,117	1950	0.13
1113	Greenhouse Number 1	2,970	2005	0.16
1107	Garage And Apartment	2,480	1948	0.19
1105	Headhouse / Greenhouse	4,400	1968	0.19
1109	Boiler House	1,200	1948	0.22
1104	Headhouse / Greenhouse	6,500	1911	0.24
1111	Quonset Hut	800	1970	0.25
1112	Pump House	216	1970	0.37
1108	Garage And Shop	2,975	1948	0.41
Total GSF		65,620		
Median Age			58	
Average FCI				0.15

C. REM Information

11 of 70 acres owned (all buildings owned except for FEMA trailers).

Lease Initiated	Lessor	Lease Term	Lease Termination	Lease Cost (Annual)
1920	So. Produce Co.	N/A	N/A	N/A

D. Space Requests (Current and Past)

Date Created	Space Type	Amount	Status
9/7/2018	Office, classroom	2,342 SF	Closed

E. Open Work Orders (Including Maintenance Reserve)

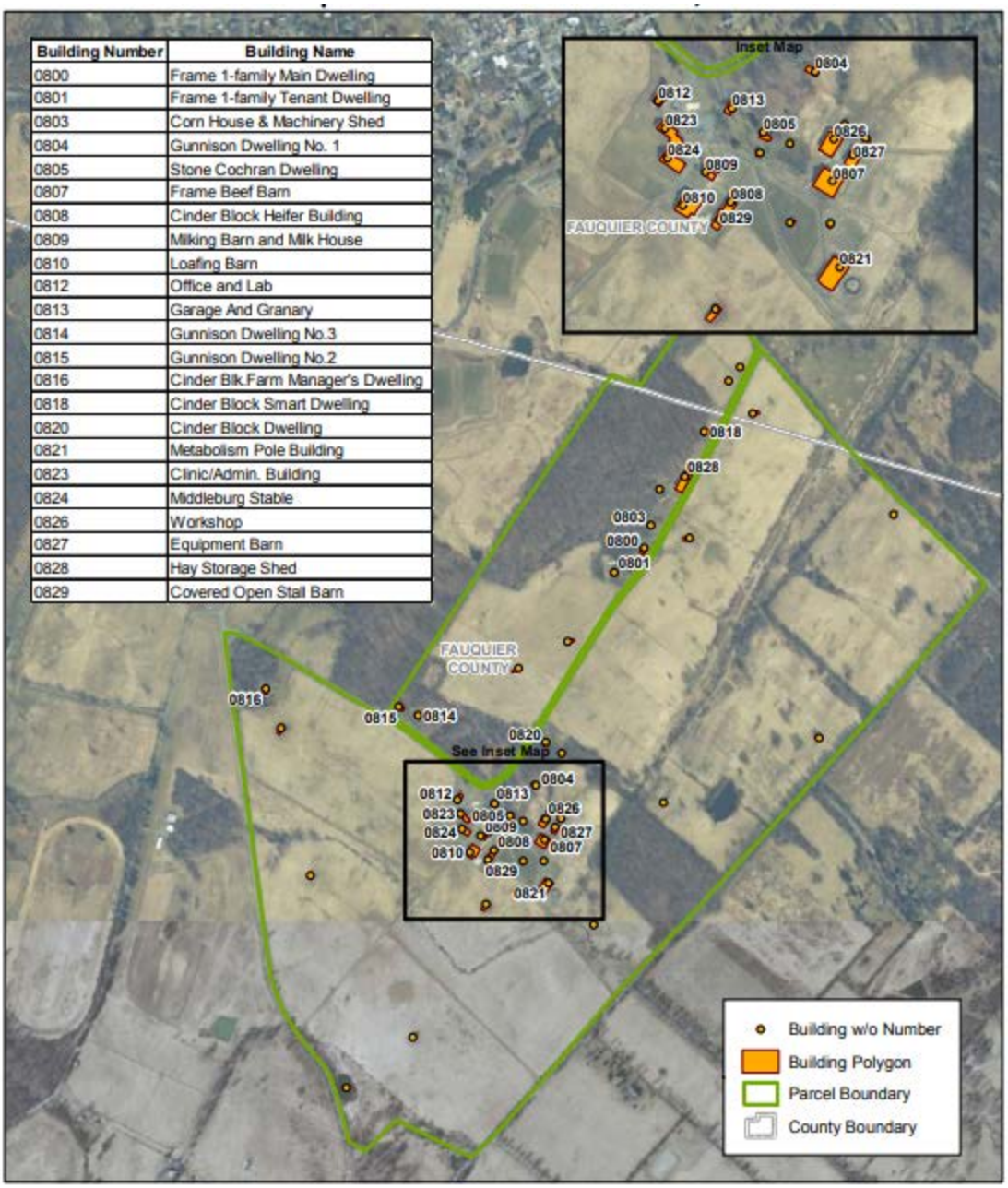
N/A

F. Maintenance Reserve Expenditures

Project Title	Bldg. No.	Budget	Expenses to Date	FY Start	Fund Closed
Tenant House 1103 Repairs	1103	$99,400	$60,135	2010	Oct-12
Tenant House 1102 Repairs	1102	$99,400	$35,280	2010	Oct-12
Tenant House 1102 Repairs	1102	$136,000	$100,979	2012	Jul-13
Steam Line Repairs	1101	$52,528	$38,287	2013	Dec-14
Replace Roof/Glass	1105	$171,959	$169,885	2014	Dec-14
Replace Main Bldg. Roof	1101	$138,300	$117,615	2015	Jun-17
Replace Heat Exchanger	1101	$41,857	$57,574	2015	Jan-19
		$739,444	$579,755		

Middleburg AREC

Property is primarily used by the College of Agriculture and Life Sciences for research and educational programs. The primary focus is on the improvement and well-being of horses.



A. Summary Information

Ownership	Bldgs.	GSF	Acreage	Median Age	Avg. FCI	Historic Bldgs.
Owned (all)	44	97,066	226	27	0.08	No

B. Detailed Building Information

Bldg. No.	Name	GSF	Year Built	FCI
828	Hay Storage Shed	8,050	2002	0
829	Covered Open Stall Barn	1,320	2004	0
0799A	Shed 1	1,024	1992	0
0799B	Shed 2	1,024	1992	0
0799C	Shed 3	1,024	1992	0
0799D	Shed 4	1,024	1992	0
0799E	Shed 5	144	1992	0
0799F	Shed 6	216	2003	0
0799G	Shed 7	216	2003	0
0799H	Shed 8	1,024	2004	0
0799J	Shed 9	1,024	2000	0
0799K	Shed 10	192	2001	0
0799L	Shed 11	192	2001	0
0799M	Shed 12	1,024	2001	0
0799N	Shed 13	1,024	2001	0
0799P	Shed 14	1,024	2004	0
0799Q	Shed 15	1,024	2004	0
0799R	Shed 16	400	2009	0
0799S	Shed 17	400	2009	0
0799T	Shed 18	400	2009	0
0799U	Shed 19	288	2016	0
0799V	Shed 20	288	2016	0
0799W	Shed 21	288	2016	0
827	Equipment Barn	2,400	2002	0
810	Loafing Barn	10,931	1952	0.02
826	Workshop	3,600	2002	0.04
808	Cinder Block Heifer Building And Calf Barn	4,775	1949	0.05

Bldg. No.	Name	GSF	Year Built	FCI
803	Corn House And Machinery Shed	1,225	1949	0.06
804	Gunnison Dwelling Number 1	2,360	1940	0.07
818	Cinder Block Smart Dwelling	1,264	1940	0.08
816	Cinder Block Farm Manager'S Dwelling	2,346	1930	0.09
813	Garage And Granary [Fertilizer Storage]	1,499	1949	0.09
824	Stable	3,527	1992	0.14
815	Gunnison Dwelling Number 2	2,164	1940	0.16
800	Frame 1-Family Main Dwelling	3,495	1940	0.19
814	Gunnison Dwelling Number 3	1,970	1940	0.20
812	Office And Lab	6,081	1940	0.23
809	Milking Barn And Milk House	3,772	1952	0.24
821	Metabolism Pole Building	6,072	1964	0.27
820	Cinder Block Dwelling	1,565	1930	0.28
823	Clinic / Administration Building	3,627	1992	0.34
807	Frame Beef Barn	7,392	1950	0.67
801	Frame 1-Family Tenant Dwelling	1,532	1940	N/A
805	Stone Cochran Dwelling	2,835	1820	N/A
Total GSF		97,066		
Median Age			27	
Average FCI				0.08

C. REM Information

All property is Virginia Tech-owned (419 acres)

D. Space Requests (Current and Past)

N/A

E. Open Work Orders (Including Maintenance Reserve)

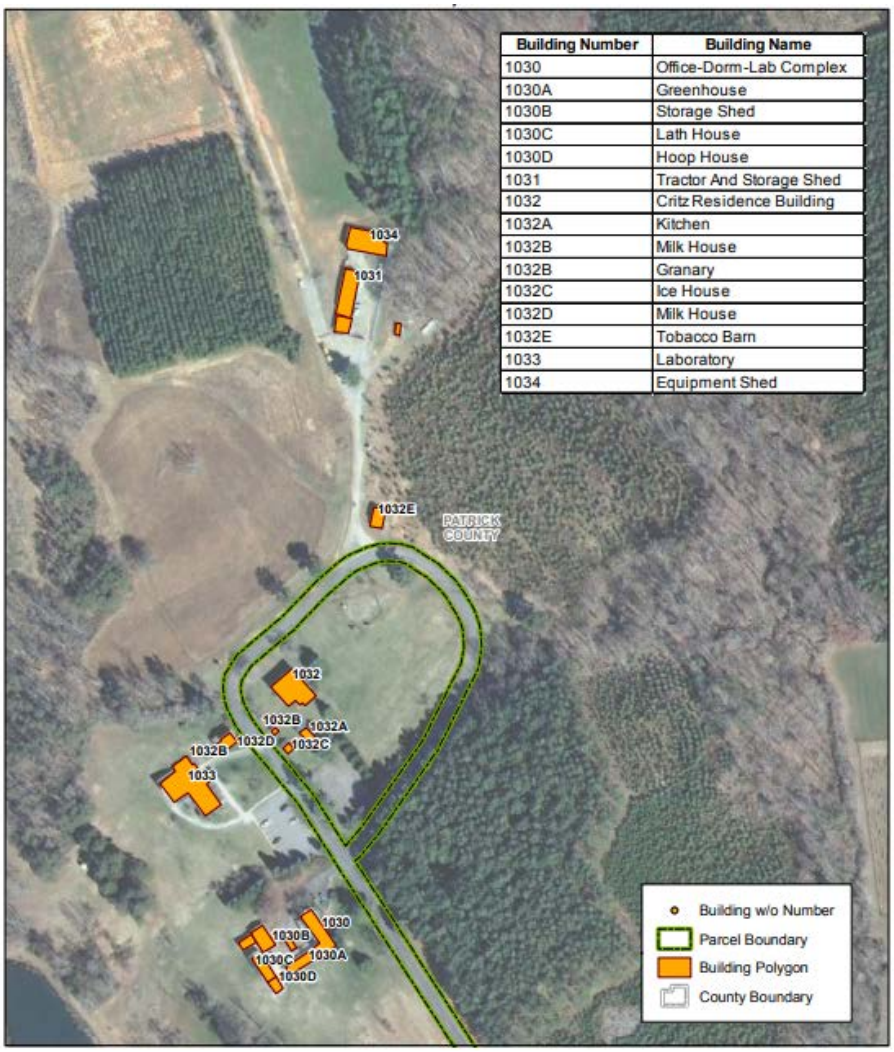
N/A

F. Maintenance Reserve Expenditures

Project Title	Bldg. No.	Budget	Expenses to Date	FY Start	Fund Closed
Loafing Barn Roof	810	$69,600	$29,958	2010	Oct-12
Treadmill Building Roof	821	$73,000	$72,958	2010	Oct-12
Admin Bldg. Roof Replacement	823	$63,000	$25,955	2010	Oct-12
Office & Lab Roof	812	$72,000	$45,238	2010	Oct-12
Heifer & Calf Barn Roof	808	$63,300	$24,958	2010	Oct-12
Milking Barn & Milking House Roof	809	$50,900	$14,958	2010	Oct-12
Beef Barn Roof	807	$50,900	$14,958	2010	Oct-12
Tenant Houses 818 & 820 Repairs	818	$76,766	$75,394	2010	Oct-12
Tenant House 816 Electrical	816	$60,610	$58,399	2010	Oct-12
Tenant House 815 Electrical	815	$66,128	$63,828	2010	Oct-12
Tenant Houses 814 & 800 Roofs	814	$62,292	$64,793	2010	Oct-12
Tenant House 804 Roof, Floor, Doors	804	$71,644	$73,807	2010	Oct-12
Tenant House 800 Repairs	800	$214,247	$186,377	2012	Dec-14
Tenant House 820 Repairs	820	$85,845	$84,190	2012	Jul-13
Roof & Garage Repairs	812	$106,349	$82,590	2018	Active
Middleburg AREC Gen HVAC sys repair	823, 812	$35,000	$19,586	2019	Active
		$1,221,581	$937,949		

Reynold's Homestead Forest Resources Research Center (Critz, VA)

Reynold's Homestead is primarily occupied by the College of Natural Resources and Environment and the Office of Outreach and International Affairs. The primary focus is forestry research and management, and as a campus center for cultural and educational outreach.



A. Summary Information

Ownership	Bldgs.	GSF	Acreage	Median Age	Avg. FCI	Historic Bldgs.
Leased (All)	15	20,939	773	44	N/A	5

B. Detailed Building Information

Building No.	Building Name	Building GSF	Year Built	FCI**
1030	Office-Dorm-Lab Complex	4,372	1975	N/A
1030A	Greenhouse	960	1975	N/A
1030B	Storage Shed	360	1992	N/A
1030C	Lath House	640	1975	N/A
1030D	Hoop House	614	2012	N/A
1030E	Greenhouse (not on map)	1,853	2014	N/A
1031	Tractor and Storage Shed	650	1969	N/A
1032	Residence (RJR birthplace)	300	1843	N/A
1032A	Kitchen*	300	1843	N/A
1032B	Granary*	400	1843	N/A
1032C	Ice House*	300	1843	N/A
1032D	Milk House*	80	1843	N/A
1032E	Tobacco Barn	289	2010	N/A
1033	Learning Center Laboratory	8,021	1978	N/A
1034	Equipment Shed	1,800	2007	N/A
Total GSF		20,939		
Median Age			44	
Average FCI				N/A

C. REM Information

Lease Initiated	Lessor	Lease Term	Lease Termination	Lease Cost
6/1/2016	VT Foundation	10 years	5/31/2026	$1

D. Space Requests (Current and Past)

Date Created	Space Type	Amount	Status
2/7/2017	Outreach	3,500 SF	Closed

E. Open Work Orders

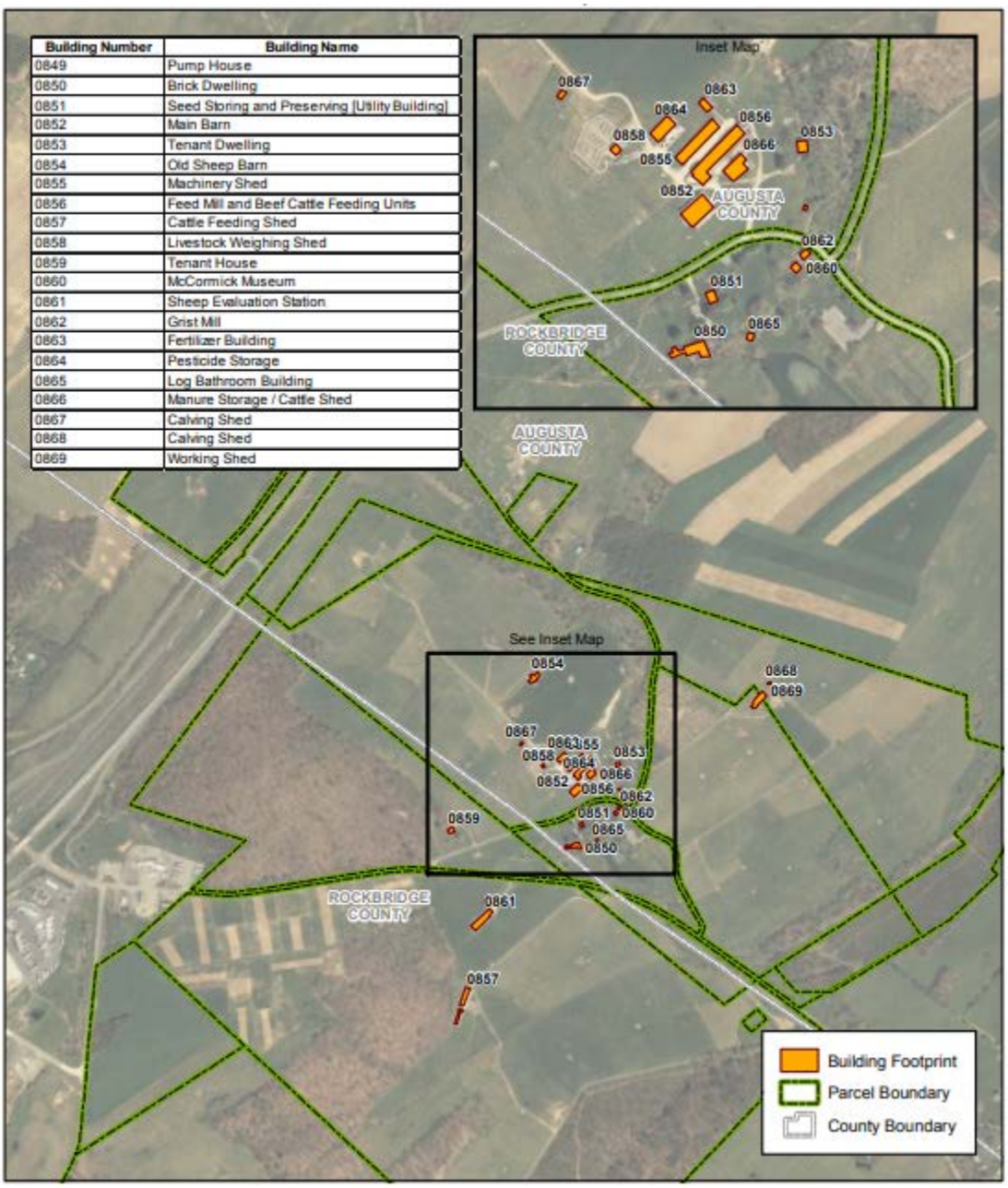
Bldg.	DESCRIPTION
1030	MR - REYNOLDS HOMESTEAD BLDG 1030 - REPLACE CABINETS AND OTHER MISC REPAIRS
1030	PERFORM FACILITY CONDITION ASSESSMENT - MAIN BUILDING ALONG WITH ALL OTHER ADJACENT ASSETS
1030E	RE-WIRING GREENHOUSE
1031	WORK ORDER FOR INSTALLING ROOFING SHINGLES ON 2 OUTBUILDINGS
1032	REYNOLDS HOMESTEAD RESIDENCE [RJR'S BIRTHPLACE] - REPAIR FRONT PORCH ROOF.
1032	INSTALLATION OF RAILINGS FOR THE SIDE PORCH OF THE HISTORIC HOME
1032	GENERATOR PROJECT FOR THE REYNOLDS HOMESTEAD CEC AND HISTORIC HOME
1032	REYNOLDS HOMESTEAD EXTERIOR REPAIRS (BLDG. 1032) BUDGET $35,000
1033	MR - REPLACE HVAC UNITS SERVING BLDG

F. Maintenance Reserve Expenditures

Project Title	Bldg. No.	Budget	Expenses to Date	FY Start	Fund Closed
Reynolds Bldg. 1030 & 1033 Ext. Repair	1030, 1033	$91,000	$139,319	2011	Dec-14
Reynolds Bldg. 1032 Exterior Repair	1032	$35,000	$26,468	2017	Active
Reynolds Bldg. 1030 HVAC Repairs	1030	$42,737	$25,979	2018	Active
RH Bldg 1033 HVAC repairs	1033	$55,000	$0	2019	Active
Total		$223,737	$191,766		

Shenandoah Valley AREC

Properties are primarily used by the College of Agriculture and Life Sciences for research and educational programs. The primary focus is on pasture and crops, and ram evaluations.



A. Summary Information

Ownership	Bldgs.	GSF	Acreage	Median Age	Avg. FCI	Historic Bldgs.
All bldgs., 632/967 acres	21	43,139	967	61	0.13	Yes (5)

B. Detailed Building Information

Bldg. No.	Name	GSF	Year Built	FCI
852	Main Barn*	4,080	1890	0
858	Livestock Weighing Shed	390	1958	0
862	Grist Mill*	982	1795	0
866	Manure Storage / Cattle Shed	2,600	2003	0
867	Calving Shed	288	2004	0
868	Calving Shed	288	2004	0
869	Working Shed	640	2004	0
860	McCormick Museum*	1,511	1795	0.02
856	Feed Mill And Beef Cattle Feeding Units	6,150	1963	0.03
853	Tenant Dwelling	1,792	1915	0.04
855	Machinery Shed	4,160	1958	0.06
849	Pump House	236	1985	0.07
865	Log Bathroom Building*	326	1905	0.07
850	Brick Dwelling*	1,800	1821	0.09
851	Seed Storing And Preserving [Utility Building]	748	1900	0.11
859	New Tenant House	1,260	1966	0.12
861	Sheep Evaluation Station	5,400	1975	0.14
864	Pesticide Storage	2,304	1978	0.27
863	Fertilizer Building	600	1890	0.30
857	Cattle Feeding Shed	4,320	1966	0.66
854	Old Sheep Barn	3,264	1958	0.81
Total GSF		43,139		
Median Age			61	
Average FCI				0.13

C. REM Information

All buildings are VT-owned; 632 of 967 acres owned.

Lease Initiated	Lessor	Lease Term	Lease Termination	Lease Cost (Annual)
2012-2018	VTF (2), private (2)	10 years, 3-5 years	2020-28, 2022	$53,091, $4,095

D. Space Requests (Current and Past)

N/A

E. Open Work Orders (Including Maintenance Reserve)

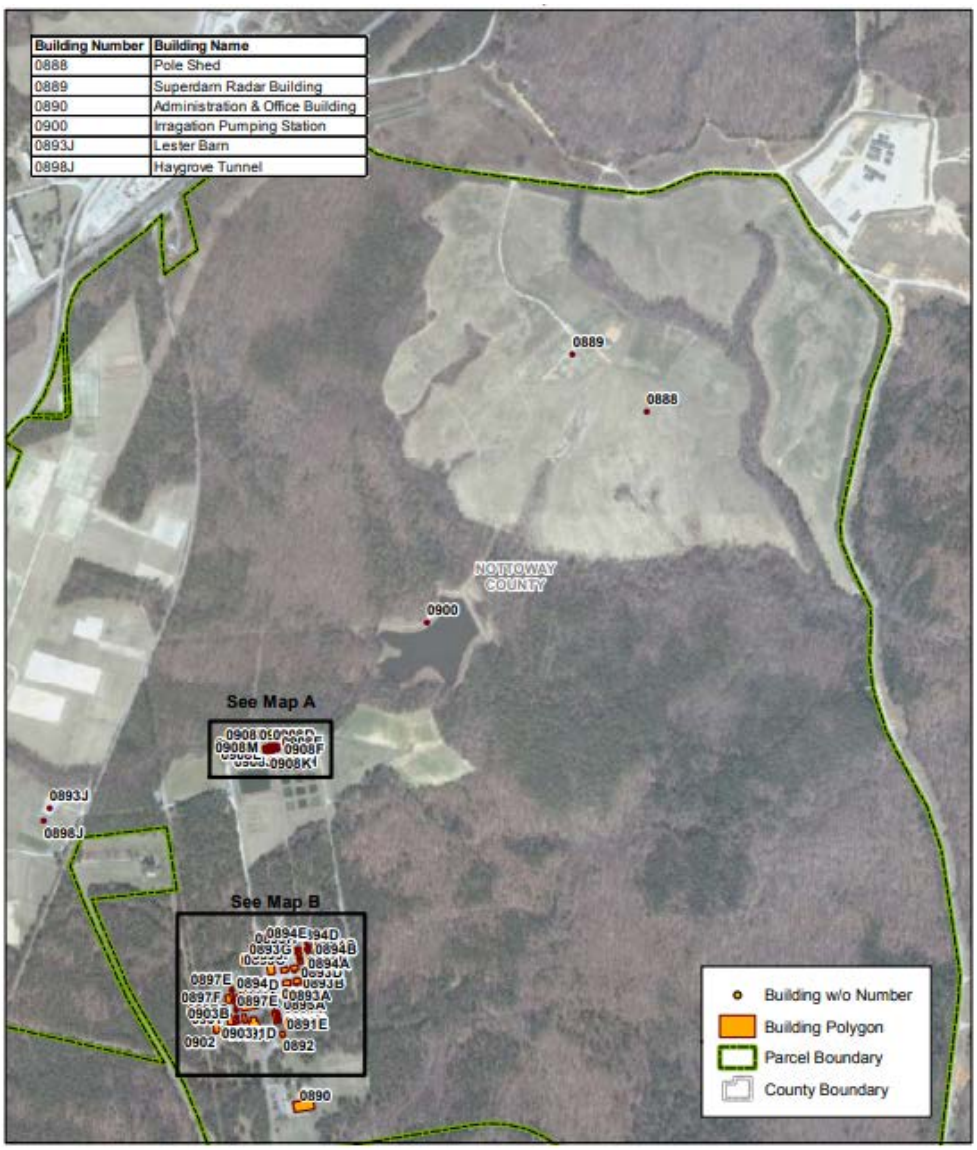
Property	Description
850	PERFORM FACILITY CONDITION ASSESSMENT SURVEY
857	G1438 - RS - MR - SHEN VALLEY AREC CATTLE FEED SHED REPAIRS (857)

F. Maintenance Reserve Expenditures

Project Title	Bldg. No.	Budget	Expenses to Date	FY Start	Fund Closed
Manor House Roof	850	$74,800	$3,889	2010	Oct-12
Tenant House 853 Repairs	853	$68,000	$54,958	2012	Jul-13
Tenant House 859 Repairs	859	$68,000	$55,590	2012	Jul-13
Repair Brick Dwelling Electrical	850	$42,743	$41,209	2012	Apr-16
Electrical Repairs	850	$94,000	$71,130	2017	Jul-18
SV AREC Cattle Feed Shed Repairs	857	$500	$0	2018	Active
Shenandoah Valley Total		$ 348,043	$ 226,776		

Southern Piedmont AREC (Blackstone, VA)

The center is dedicated to research and extension programs for sustainable production of tobacco, forage crops, beef cattle, and grains.



A. Summary Information

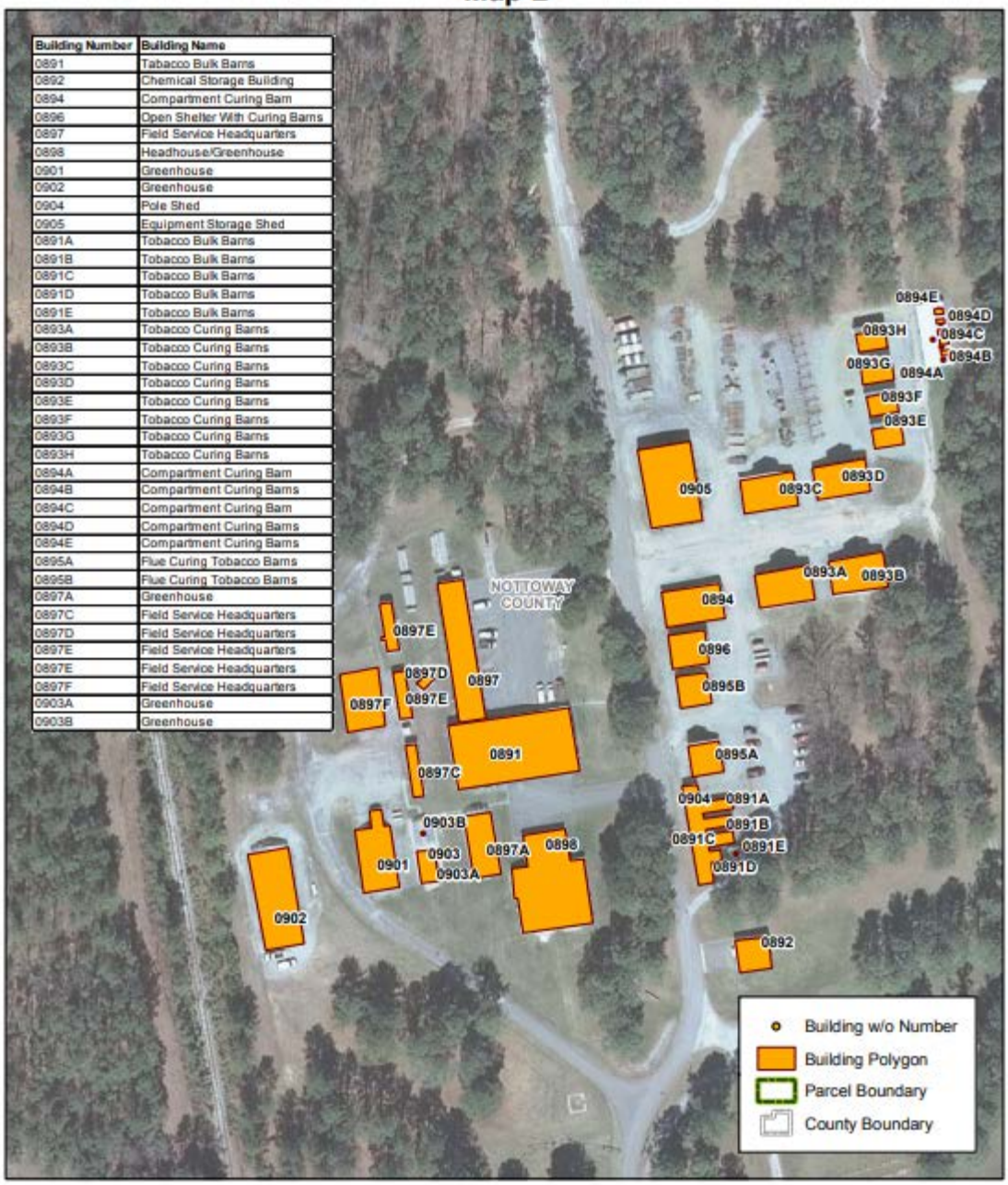
Ownership	Bldgs.	Total GSF	Acreage	Median Age	Avg. FCI	Historic Bldgs.
Owned (All)	32	121,937	1,181	19	0.19	No

Map A

Building Number	Building Name
0908A	Temp. Tobacco Curing Barn A
0908B	Temp. Tobacco Curing Barn B
0908C	Temp. Tobacco Curing Barn C
0908D	Temp. Tobacco Curing Barn D
0908E	Temp. Tobacco Curing Barn E
0908F	Temp. Tobacco Curing Barn F
0908G	Temp. Tobacco Curing Barn G
0908H	Temp. Tobacco Curing Barn H
0908J	Temp. Tobacco Curing Barn J
0908K	Temp. Tobacco Curing Barn K
0908L	Temp. Tobacco Curing Barn L
0908M	Temp. Tobacco Curing Barn M

Map B

Building Number	Building Name
0891	Tabacco Bulk Barns
0892	Chemical Storage Building
0894	Compartment Curing Barn
0896	Open Shelter With Curing Barns
0897	Field Service Headquarters
0898	Headhouse/Greenhouse
0901	Greenhouse
0902	Greenhouse
0904	Pole Shed
0905	Equipment Storage Shed
0891A	Tobacco Bulk Barns
0891B	Tobacco Bulk Barns
0891C	Tobacco Bulk Barns
0891D	Tobacco Bulk Barns
0891E	Tobacco Bulk Barns
0893A	Tobacco Curing Barns
0893B	Tobacco Curing Barns
0893C	Tobacco Curing Barns
0893D	Tobacco Curing Barns
0893E	Tobacco Curing Barns
0893F	Tobacco Curing Barns
0893G	Tobacco Curing Barns
0893H	Tobacco Curing Barns
0894A	Compartment Curing Barn
0894B	Compartment Curing Barns
0894C	Compartment Curing Barn
0894D	Compartment Curing Barns
0894E	Compartment Curing Barns
0895A	Flue Curing Tobacco Barns
0895B	Flue Curing Tobacco Barns
0897A	Greenhouse
0897C	Field Service Headquarters
0897D	Field Service Headquarters
0897E	Field Service Headquarters
0897E	Field Service Headquarters
0897F	Field Service Headquarters
0903A	Greenhouse
0903B	Greenhouse



B. Detailed Building Information

Building No.	Building Name	GSF	Year Built	FCI
0894G	Tytun Tobacco Bulk Barn	168	2013	0.00
0894H	Tytun Tobacco Bulk Barn	168	2013	0.00
0894J	Tytun Tobacco Bulk Barn	168	2014	0.00
0902A	Greenhouse	3,456	2011	0.00
0903A	Greenhouse	432	2005	0.00
0909A	Rolling Tunnel Greenhouse A	2,943	2015	0.00
0909B	Rolling Tunnel Greenhouse B	2,943	2015	0.00
0909C	Rolling Tunnel Greenhouse C	2,943	2015	0.00
0909D	Rolling Tunnel Greenhouse D	2,943	2015	0.00
0897A	Greenhouse	1,680	2012	0.03
0898J	Haygrove Tunnel	24,480	2006	0.03
0903B	Greenhouse	432	2006	0.07
0897F	Shade House	1,728	1974	0.11
0908A	Dark Tobacco Curing Barn A	144	2008	0.14
0908D	Dark Tobacco Curing Barn D	144	2008	0.17
0908B	Dark Tobacco Curing Barn B	144	2008	0.17
0908F	Dark Tobacco Curing Barn F	144	2008	0.17
0908G	Dark Tobacco Curing Barn G	144	2008	0.17
0908H	Dark Tobacco Curing Barn H	144	2008	0.17
0908J	Dark Tobacco Curing Barn J	144	2008	0.17
0908K	Dark Tobacco Curing Barn K	144	2008	0.17
0908L	Dark Tobacco Curing Barn L	144	2008	0.17
0908M	Dark Tobacco Curing Barn M	144	2008	0.17
0908E	Dark Tobacco Curing Barn E	144	2008	0.23
0908C	Dark Tobacco Curing Barn C	144	2008	0.23
0895A	Flue-Curing Tobacco Barn	512	1974	0.26
0895B	Flue-Curing Tobacco Barn	512	1974	0.31
0897D	Storage Shed	150	1974	0.51
0906B	Temporary Storage	152	1975	0.64
0906A	Temporary Storage	152	1975	0.79
0897E	Storage Buildings	900	1974	0.93
0897C	Temporary Lab	450	1974	0.93
Total GSF		121,937		
Median Age			19	
Average FCI				0.19

C. REM Information

All property is Virginia Tech-owned (1,181 acres). The Virginia Tech Foundation, Inc. is currently negotiating with the land owner of approximately 12 acres of land, partially improved with a large (approximately 10,000 sf) metal building with storage space, 3 office, 3 single stall bathrooms, kitchen area, and machine/work shop adaptability, at 2407 Cox Road, across from the SPAREC, to purchase that real property and lease it to Virginia Tech for the SPAREC's use.)

D. Space Requests (Current and Past)

Date Created	Space Type	Amount	Status
1/28/2019	Shop, storage, processing	10,000 SF	Approved by ESC, with REM

E. Open Work Orders (Including Maintenance Reserve)

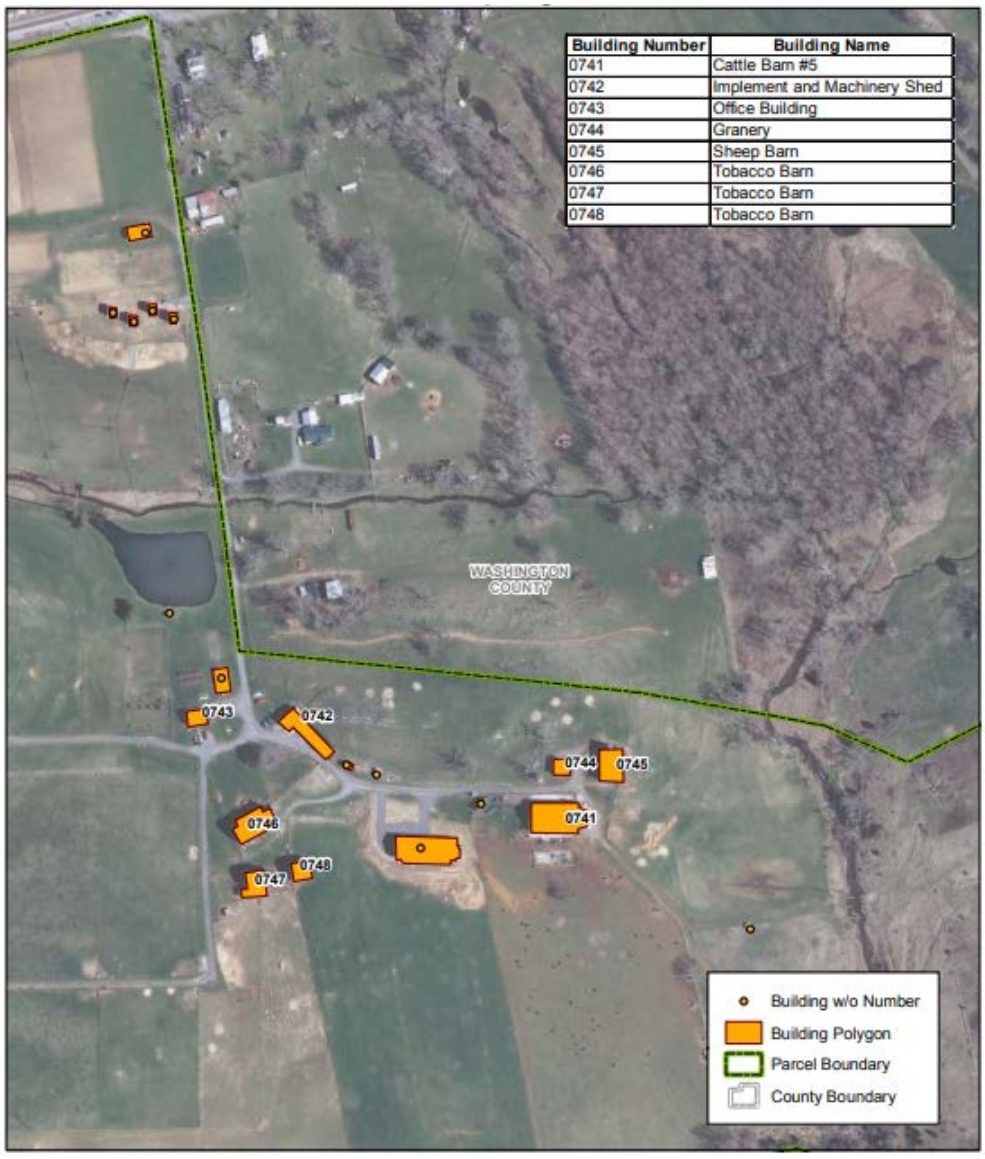
Property	Description
0893D	REPAIR SNOW DAMAGED BUILDING
0893C	REPAIR SNOW DAMAGED BUILDING
890	MR - ELECTRICAL & PLUMBING REPAIRS TO BATHROOMS AND KITCHEN

F. Maintenance Reserve Expenditures

Project Title	Bldg. No.	Budget	Expenses to Date	FY Start	Fund Closed
Elec & Pl Repairs Kitchen/Bath	890	$150,000	$36,736	2018	Active
Repair/Replace Lab HVAC	890	$80,927	$61,279	2017	Jul-18
Replace Main Bldg. Roof	890	$51,911	$51,446	2015	Mar-18
Repair Admin. Bldg. Electrical	890	$66,490	$59,564	2014	Dec-14
Irrigation System Repair & Controllers	900	$61,212	$70,469	2013	Apr-16
Replace Headhouse Boiler	898	$108,200	$103,256	2011	Jul-13
Backflow Prevention	890	$25,300	$25,768	2010	Oct-12
Southern Piedmont Total		$544,040	$408,519		

Southwest Virginia AREC

Property is primarily used by the College of Agriculture and Life Sciences for research and educational programs. The primary focus is on research of various forage based nutrition systems using beef cattle, research on breeding, genetics, parasite resistance and management of sheep, rotational grazing and hay production, and research programs led by the Virginia Department of Forestry on hardwoods and Christmas trees.



A. Summary Information

Ownership	Bldgs.	GSF	Acreage	Median Age	Avg. FCI	Historic Bldgs.
Owned (all)	18	35,622	208	43	0.06	No

B. Detailed Building Information

Bldg. No.	Name	GSF	Year Built	FCI
749	Granary	150	1954	0.00
752	Scale Shed	560	1998	0.00
0753A	Tobacco Barn A	224	2010	0.00
0753B	Tobacco Barn B	224	2010	0.00
0753C	Tobacco Barn C	224	2010	0.00
0753D	Tobacco Barn D	224	2010	0.00
747	Tobacco Barn Number 2	2,016	1953	0.01
754	Sheep Barn	5,000	2010	0.01
741	Cattle Barn Number 5	5,760	1954	0.02
743	Office Building	1,932	1959	0.05
746	Tobacco Barn Number 1	3,446	1954	0.06
750	Tobacco Storage Shed	1,560	1993	0.07
748	Tobacco Barn Number 3	1,296	1953	0.08
742	Implement And Machinery Shed	3,264	1954	0.09
744	Granary	1,096	1959	0.52
745	Cattle / Sheep Barn	2,146	1952	N/A
751	Greenhouse	1,500	1997	N/A
0741A	Sheep Barn	5,000	2011	N/A
Total GSF		35,622		
Median Age			43	
Average FCI				0.06

C. REM Information

All property is VT-owned.

D. Space Requests (Current and Past)

N/A

E. Open Work Orders (Including Maintenance Reserve)

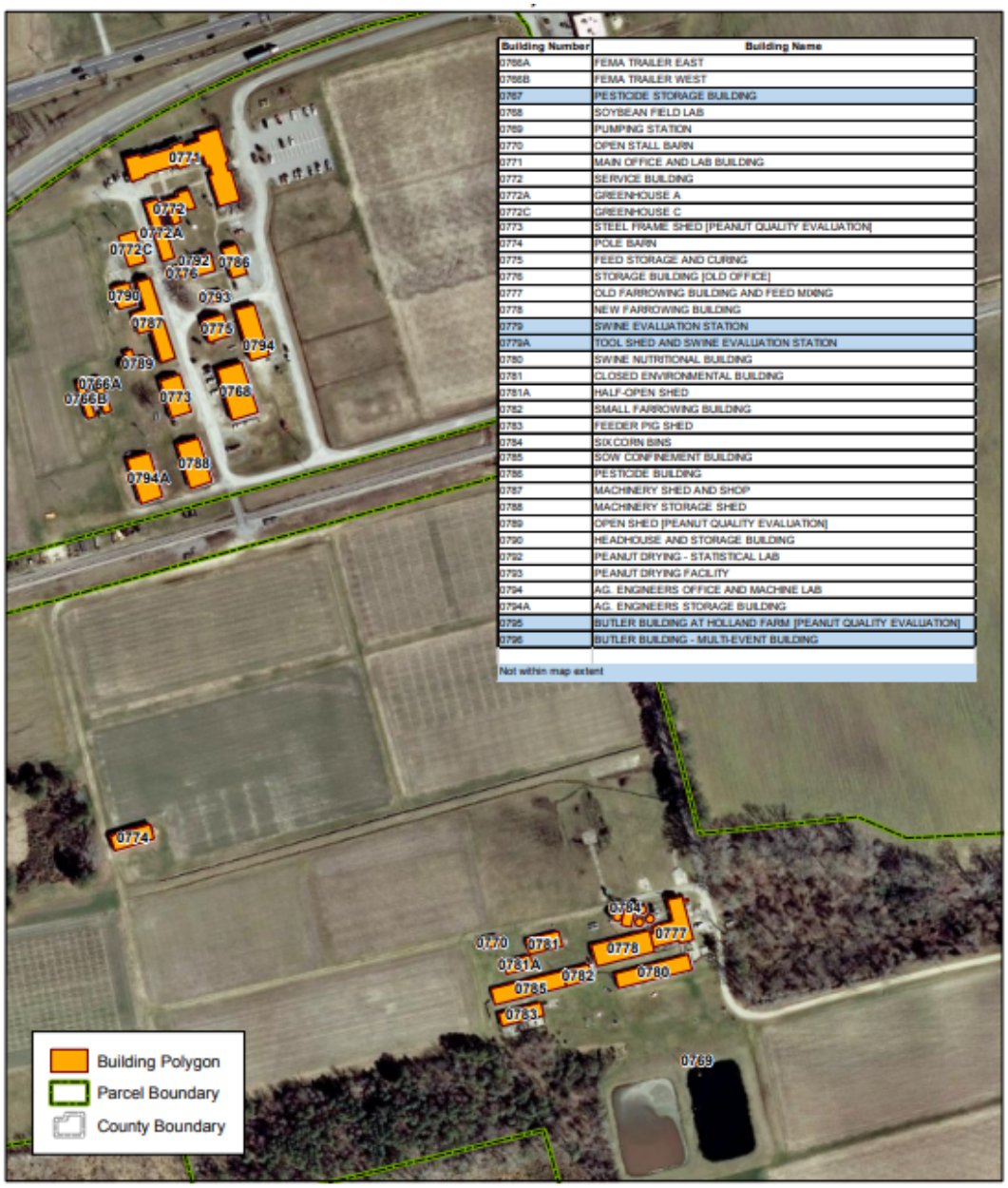
N/A

F. Maintenance Reserve Expenditures

Project Title	Bldg. No.	Budget	Expenses to	FY Start	Fund
Tobacco Barn 3-Several Barn Roofs	748	$44,850	$40,214	2010	Oct-12
Main Office Repairs	743	$30,000	$0	2011	Apr-16
Glade Spring-Foundation Repairs	N/A	$107,000	$65,813	2018	Active
		$181,850	$106,028		

Tidewater AREC

Properties are primarily used by the College of Agriculture and Life Sciences for research and educational programs. The primary focus is on cotton, peanut, soybean, corn, wheat and alternate crops, and swine research and management.



A. Summary Information

Ownership	Bldgs.	Total GSF	Acreage	Median Age	Avg. FCI	Historic Bldgs.
All blgs.*, 130/182 acres	36	92,188	182	52	0.27	No

* Except FEMA trailers

B. Detailed Building Information

Bldg. No.	Building Name	GSF	Year Built	FCI
0772C	Greenhouse C	1,152	2016	0
783	Feeder Pig Shed	3,520	1961	0.03
788	Machinery Storage Shed	2,960	1971	0.03
796	Butler Building - Multi-Event Building	4,704	1993	0.03
769	Pumping Station	192	2004	0.04
0794A	Ag. Engineers Storage Building	3,680	N/A	0.06
793	Peanut Drying Facility	722	1970	0.09
782	Small Farrowing Building	1,248	1972	0.09
785	Sow Confinement Building	3,216	1961	0.12
773	Steel Frame Shed [Peanut Quality Evaluation]	3,680	1970	0.12
777	Old Farrowing Building And Feed Mixing	3,120	1948	0.14
779	Swine Evaluation Station	4,150	1967	0.14
770	Open Stall Barn	432	1998	0.16
768	Soybean Field Lab	4,950	1993	0.17
792	Peanut Drying - Statistical Lab	1,400	N/A	0.19
780	Swine Nutritional Building	3,834	1962	0.20
778	New Farrowing Building	4,144	1962	0.22
771	Main Office And Lab Building	12,036	1989	0.23
772	Service Building	3,593	1949	0.23
795	Butler Building At Holland Farm [Peanut Quality Ev	3,724	1982	0.24
775	Feed Storage And Curing	1,780	1964	0.28
0779A	Tool Shed And Swine Evaluation Station	1,000	1967	0.28
790	Headhouse And Storage Building	1,280	N/A	0.30
781	Closed Environmental Building	1,152	1961	0.33
0781A	Half-Open Shed	1,224	1970	0.37
787	Machinery Shed And Shop	4,509	1953	0.40
774	Pole Barn	2,340	1963	0.40
794	Ag. Engineers Office And Machine Lab	4,450	1979	0.43
786	Pesticide Building	1,800	1966	0.57
0772A	Greenhouse A	1,796	1966	0.65
789	Open Shed [Peanut Quality Evaluation]	1,152	1961	0.68
784	Six Corn Bins	131	1961	0.74
776	Storage Building [Old Office]	336	1961	0.79
767	Pesticide Storage Building	965	2016	N/A
0766A	Fema Trailer East	908	2000	N/A
0766B	Fema Trailer West	908	2000	N/A
Total GSF		92,188		
Median Age			52	
Average FCI				0.27

C. REM Information

130 of 182 acres owned (all buildings owned except for FEMA trailers).

Lease Initiated	Lessor	Lease Term	Lease Termination	Lease Cost (Term)
7/1/2018	VT Foundation	5 Years	6/30/2023	$780

D. Space Requests (Current and Past)

Date Created	Space Type	Amount	Status
2/7/2017	Outreach	3,500 SF	Closed

E. Open Work Orders (Including Maintenance Reserve)

Bldg. No.	Description
771	G1491 - DC - MR - TW AREC - REPAIR HVAC BLDG. 771
794	G1550-DC MR - TW AREC BLDG 794 - REPLACE LEAKING METAL ROOF
795	G1551-DC MR - TW AREC BLDG. 795 - REPLACE LEAKING METAL ROOF

F. Maintenance Reserve Expenditures

Project Title	Bldg. No.	Budget	Expenses to Date	FY Start	Fund Closed
Replace Pole Barn Roof	774	$122,142.00	$ 109,681.46	2011	Jul-13
Replace Boiler	771	145,600.00	121,178.67	2011	Dec-14
Replace Boiler	771	45,513.00	45,344.83	2018	Active
TW AREC Gen HVAC sys repairs	771-3	35,000.00	10,528.13	2019	Active
Tidewater AREC Metal Roof Rplcmt	795	45,000.00	-	2019	Active
		$393,255.00	$ 286,733.09		

Virginia Seafood AREC

Property is primarily used by the College of Agriculture and Life Sciences for research and educational programs. The primary focus is on seafood safety, seafood quality, and business and marketing support for commercial and aquaculture industries.

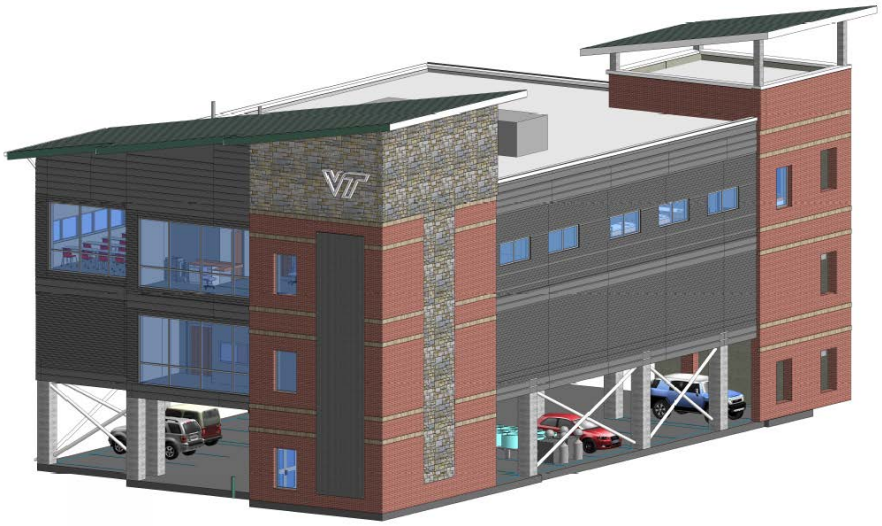
A. Summary Information

Ownership	Bldgs.	GSF	Acreage	Median Age	Avg. FCI	Historic Bldgs.
Leased	1	9,477	N/A	N/A	N/A	No

Square footage likely of existing building (to be demolished); original conversations suggested up to 15,000 square feet.

B. Detailed Building Information

Detailed building program not available at this time. Preliminary rendering of replacement facility shown below.



C. REM Information

Lease Initiated	Lessor	Lease Term	Lease Termination	Lease Cost (Annual)
7/1/2017	VT Foundation	2 Years	6/30/2019	$70,500

D. Space Requests (Current and Past)

Date Created	Space Type	Amount	Status
4/22/2017	Various	15,000 SF	In-design

E. Open Work Orders (Including Maintenance Reserve)

N/A

F. Maintenance Reserve Expenditures

N/A

APPENDIX B

COMPREHENSIVE MAINTENANCE RESERVE PLAN

AREC MAINTENANCE RESERVE PROJECTS

Building Number(s)	Building Name	Subproject Title / Description	System Type	Priority	Cost Estimate
Alson H. Smith, Jr AREC					
	Infrastructure	Repair paving and parking	Other	1	$56,000
873	Barn	Repair siding	Moisture Penetration	2	$25,000
878	Main Building	Replace flooring	Other	3	$40,000
878	Main Building	Replace windows	Moisture Penetration	3	$101,000
875	Pesticide Storage building	Repair plumbing, HVAC, restrooms	MEP Systems	4	$169,000
878	Main Building	Repair chilled water system	MEP Systems	4	$338,000
Alson H. Smith, Jr Total					**$729,000**
Eastern Shore AREC					
1211	Main Building	Replace Tile Flooring/Asbestos	Other	1	$30,000
1211	Main Building	Restroom repairs	Other	2	$81,000
1214, 1219	Greenhouse, Irrigation Building	Structural repairs to headhouse, pumphouse, dock	Structure	3	$39,000
Eastern Shore Total					$150,000
Eastern Virginia AREC					
880, 881	Experiment Bldg, Main Bldg	Repair Exp. Bldg; Flooding in Main Bldg.	Moisture Penetration	1	$50,000
[TBD]	Equipment Building	Repair lighting	MEP Systems	3	$37,000
Eastern Virginia Total					**$87,000**

Building Number(s)	Building Name	Subproject Title / Description	System Type	Priority	Cost Estimate
Hampton Roads AREC					
1101, 1106, 1107, 1108, 1112	Multiple Buildings	Replace roofs	Moisture Penetration	1	$290,000
1112	Pump House	Repairs to Bulkhead near primary pumphouse	Structure	3	$17,000
1102	Director's Residence	Repair basement and drainage	Moisture Penetration	4	$30,000
1101	Main Office and Lab	Replace flooring	Other	5	$103,000
Hampton Roads Total					$440,000
Middleburg AREC					
799, 807, 812, 809, 810, 823, 824	Multiple Buildings	Repair roof, siding, structure	Moisture Penetration	2	$158,000
812	Annex-812	Repair interior systems	MEP Systems	3	$290,000
803	Corn House and Machinery Shed	Repair structure	Structure	4	$25,000
827	Equipment Barn	Replace overhead doors	Moisture Penetration	4	$35,000
-	Fencing Renovations	Repair perimteter fencing	Other	4	$100,000
Middleburg Total					$608,000
Reynolds Homestead FRRC					
1030	Main Building	Replace roof, windows, doors	Moisture Penetration	1	$26,000
Reynolds Homestead Total					$26,000

Building Number(s)	Building Name	Subproject Title / Description	System Type	Priority	Cost Estimate
Shenandoah Valley AREC					
854	Sheep Barn--854	Replace roof and rotten posts	Moisture Penetration	2	$76,000
861, 849	Sheep Eval Station, Pump House	Replace roofs	Moisture Penetration	1	$98,000
864	Pesticide Storage	Replace roof	Moisture Penetration	1	$40,000
850	Administration	Repair foundation	Structure	4	$25,000
Shenandoah Valley Total					$239,000
Southern Piedmont AREC					
897	Packhouse	Repair pavement	Other	3	$25,000
0893A, B, C, D	Tobacco Curing Barns	Repair strucuture; Replace siding	Moisture Penetration	3	$92,000
890, 897	Main building and Packhouse	Flooring Replacement	Other	4	$93,000
897C, D, E	Storage Buldings	Repair/replace buildings	Structure	4	$122,000
904, 895A, 895B	Multiple Buildings	Repair structure	Structure	5	$66,000
893E, F, G, H	Conditioned Barns	Repair siding and doors	Moisture Penetration	5	$108,000
0908A-M	Temp. Curing Barns	Repair/replace barn due to heavy research use	Other	5	$38,000
Southern Piedmont Total					$544,000

Building Number(s)	Building Name	Subproject Title / Description	System Type	Priority	Cost Estimate
Southwest Virginia AREC					
746, 747, 741, 742	Multiple Buildings	Repair roof, siding and door damage	Moisture Penetration	1	$349,000
741, 752	Cattle Barn #5, Scale Shed	Repair electrical and plumbing systems	MEP Systems	3	$28,000
748	Tobacco Barn No. 3	Repair structure and siding (or demolish)	Moisture Penetration	4	$41,000
Southwest Virginia Total					$418,000
Tidewater AREC					
771-Batten	Batten Hall	Basement waterproofing; ADA entrance	Moisture Penetration	1	$256,000
771, 780	Main Office and Lab, Swine Nutr. Bldg	Replace flooring	Other	1	$101,000
771	Main Building	Repair main parking lot	Other	1	$56,000
772	Service Building	Repair electrical system	MEP Systems	1	$52,000
772, 790, 786	Multiple Buildings	Replace windows, doors, insulation	Moisture Penetration	2	$49,000
776, 789	Storage Bldg, Shed	Repair deterioration	Structure	2	$97,000
792, 768	Entomology Bldg, Soybean Field Lab	Repair AC system and insulation	MEP Systems	2	$38,000
771-Batten	Batten Hall	Repair electrical system	MEP Systems	3	$282,000
771-Batten	Batten Hall	Repair restrooms	Other	3	$60,000
775	Storage	Repair electrical system and exterior siding	MEP Systems	3	$27,000
778, 782	Farrowing Bldgs	Repair plumbing, heating and ventilation	MEP Systems	3	$84,000
779	Swine Evaluation Station	Repair manure drainage system	MEP Systems	3	$47,000
781	Closed Environmental Bldg	Repair building	Other	3	$49,000

Building Number(s)	Building Name	Subproject Title / Description	System Type	Priority	Cost Estimate
794	Ag Engr Office & Machine Lab	Repair heating and electrical systems	MEP Systems	3	$52,000
0772A	Greenhouse A	Repair building	Other	3	$743,000
Tidewater Total					$1,993,000

Grand Total	$5,234,000

APPENDIX C

SYSTEM-WIDE CAPITAL OUTLAY PROJECT

AREC SYSTEM FACILITY IMPROVEMENTS PLAN

AREC Projects, By Priority	Category	New Construction	Renovation	Cost	Notes
Alson H. Smith, Jr. AREC					
Priority 1					
Renovate Pesticide Bldg 0875	Research/Support	-	5,400 SF	$675,000	Ventilation upgrade, plumbing repairs, restroom repairs
Priority 2					
New 4-bedroom Duplex	Housing	2,000 SF	-	$400,000	Graduate student/visiting scientist
New Smart Greenhouse	Research/Support	3,000 SF	-	$600,000	State of the Art with advanced HVAC and controls
Rehab Pump Station	Infrastructure	-	290 SF	$21,750	Plumbing repairs due to corrosive environment
Renovate Greenhouse 0878	Research/Support	-	1,660 SF	$83,000	Part. Bldg 0878 - Upgrade ventilation and cooling
Renovate plant tissue culture lab	Research/Support	-	1,804 SF	$451,000	Bldg 0878, Rooms 113-117: casework, plumbing, electrical
Update IT Systems	Infrastructure	-	-	$211,300	
Update Primary Signage	Infrastructure	-	-	$7,200	Update 2 signs
Alson H. Smith, Jr. AREC Subtotal		**5,000 SF**	**9,154 SF**	**$2,449,250**	
Eastern Shore AREC					
Priority 1					
New Tenant House #1	Housing	1,200 SF	-	$240,000	New 3-bedroom house
Priority 2					
Additional Research Fields	Land	-	-	$900,000	50-100 acres
Basement lab renovations	Research/Support	-	2,270 SF	$681,000	Rooms 107, 118, 3, 4, 5, 7, 10, 11
New MPB	Research/Support	10,000 SF	-	$1,250,000	PEMB with bathroom, office, HVAC
New Smart Greenhouse #1	Research/Support	3,000 SF	-	$600,000	State of the Art with advanced HVAC and controls.
New Smart Greenhouse #2	Research/Support	3,000 SF	-	$600,000	State of the Art with advanced HVAC and controls
New Tenant House #2	Housing	1,200 SF	-	$240,000	New 3-bedroom house
Update IT Systems	Infrastructure	-	-	$212,100	
Update Primary Signage	Infrastructure	-	-	$6,200	Update 2 signs
Eastern Shore AREC Subtotal		**18,400 SF**	**2,270 SF**	**$4,729,300**	

AREC SYSTEM FACILITY IMPROVEMENTS PLAN

AREC Projects, By Priority	Category	New Construction	Renovation	Cost	Notes
Eastern Virginia AREC					
Priority 1					
Renovate Experiment Building	Admin/Office	-	900 SF	$135,000	Full Renovation of Bldg 0880
Seed Drying Addtion	Research/Support	200 SF	-	$60,000	Addition to Bldg 0884
Priority 2					
Additional Research Fields	Land	-	-	$900,000	50-100 acres
New 4-bedroom Duplex	Housing	2,000 SF	-	$400,000	
New Education Facility	Extension/Outreach	5,000 SF	-	$1,625,000	2-story building with large classroom on main level (100+ seats); offices, conference room, short-term housing on upper level
Renovate MPB	Research/Support	-	3,500 SF	$175,000	Electrical upgrade, roof
Update IT Systems	Infrastructure	-	-	$154,600	
Update Primary Signage	Infrastructure	-	-	$7,300	Update 2 signs
Eastern Virginia AREC Subtotal		**7,200 SF**	**4,400 SF**	**$3,456,900**	
Hampton Roads AREC					
Priority 1					
Classroom Expansion	Extension/Outreach	-	2,500 SF	$812,500	Expand existing classroom for 150-250 seats
Priority 2					
New Growth Chamber Facility	Research/Support	750 SF	-	$168,750	Walk-in Phytotron
New PHF	Research/Support	970 SF	-	$261,900	Similar to Bldg 0767 at TAREC
New Smart Greenhouse #1	Research/Support	3,000 SF	-	$600,000	State of the Art with advanced HVAC and controls
New Smart Greenhouse #2	Research/Support	3,000 SF	-	$600,000	State of the Art with advanced HVAC and controls
Rehab Pump Station	Infrastructure	-	220 SF	$33,000	Repair bulkhead and reconstruct building
Renovate Bldg 1101 Basement	Research/Support	-	3,250 SF	$812,500	Mitigate flooding, replace equipment
Renovate House #1102	Housing	-	2,450 SF	$367,500	
Update IT Systems	Infrastructure	-	-	$267,600	
Update Primary Signage	Infrastructure	-	-	$7,300	Update 2 signs
Hampton Roads AREC Subtotal		**7,720 SF**	**8,420 SF**	**$3,931,050**	

AREC SYSTEM FACILITY IMPROVEMENTS PLAN

AREC Projects, By Priority	Category	New Construction	Renovation	Cost	Notes
Middleburg AREC					
Priority 1					
New Animal Teaching/Outreach Facility	Extension/Outreach	7,500 SF	-	$1,050,000	Pole barn with additional enclosed bathroom, office, HVAC and educational space; Demo 0821
Priority 2					
Light renovation, all houses	Housing	-	15,146 SF	$757,300	
New Analytical Lab	Research/Support	3,000 SF	-	$1,350,000	Analytical Lab to support on-site research
New Animal Research Facility	Research/Support	7,500 SF	-	$937,500	Pole Barn with livestock shed spaces
New Education Facility	Extension/Outreach	5,000 SF	-	$1,625,000	2-story building with large classroom on main level (100+ seats); offices, conference room, short-term housing on upper level
New PHF	Research/Support	970 SF	-	$261,900	Similar to Bldg 0767 at TAREC
Update IT Systems	Infrastructure	-	-	$256,500	
Update Primary Signage	Infrastructure	-	-	$7,400	Update 2 signs
Middleburg AREC Subtotal		**23,970 SF**	**15,146 SF**	**$6,245,600**	
Reynolds Homestead FRRC					
Priority 1					
Renovate Bldg 1240 Basement	Research/Support	-	1,240 SF	$310,000	Renovate lab, offices, workshop, meeting area
Priority 2					
Renovate Slat House	Research/Support	-	300 SF	$15,000	Condition upgrade for bldg 1030C
Update IT Systems	Infrastructure	-	-	$376,700	
Update Primary Signage	Infrastructure	-	-	$6,300	Update 2 signs
Reynolds Homestead FRRC Subtotal			**1,540 SF**	**$708,000**	

AREC SYSTEM FACILITY IMPROVEMENTS PLAN

AREC Projects, By Priority	Category	New Construction	Renovation	Cost	Notes
Southern Piedemont AREC					
Priority 1					
New Lab Facility	Research/Support	2,500 SF	-	$1,125,000	2 new labs, plant growth room, cold room, dark room, seed storage
Priority 2					
New 6-Bedroom Duplex	Housing	3,000 SF	-	$600,000	
New Farm Support Buildings	Research/Support	10,000 SF	-	$250,000	2 pole sheds (equipment and hay) and 3 feed bins
New PHF	Research/Support	970 SF	-	$261,900	Similar to Bldg 0767 at TAREC
New Smart Greenhouse	Research/Support	3,000 SF	-	$600,000	State of the Art with advanced HVAC and controls
New Tenant House	Housing	1,600 SF	-	$320,000	New 4-bedroom house
Pump Station Backup Generator	Infrastructure	150 SF	-	$22,500	Add Emergency Generator
Renovate Greenhouse 0898	Research/Support	-	4,900 SF	$392,000	Bldg 0898 - Major upgrade - heating/cooling, irrigation, lighting, chemical application
Renovate Labs	Research/Support	-	2,680 SF	$670,000	Repair/replace fume hood in 4 labs, add emergency generator
Update IT Systems	Infrastructure	-	-	$337,100	
Update Primary Signage	Infrastructure	-	-	$7,800	Update 2 signs
Southern Piedemont AREC Subtotal		**21,220 SF**	**7,580 SF**	**$4,586,300**	
Shenandoah Valley AREC					
Priority 1					
New MPB	Research/Support	7,500 SF	-	$937,500	PEMB with bathroom, office, HVAC
Priority 2					
New Education Facility	Extension/Outreach	5,000 SF	-	$1,625,000	2-story building with large classroom on main level (100+ seats); offices, conference room, short-term housing on upper level
New PHF	Research/Support	970 SF	-	$261,900	Similar to Bldg 0767 at TAREC
Renovate 2 tenant houses	Housing	-	3,060 SF	$306,000	
Update IT Systems	Infrastructure	-	-	$320,200	
Update Primary Signage	Infrastructure	-	-	$7,400	Update 2 signs
Shenandoah Valley AREC Subtotal		**13,470 SF**	**3,060 SF**	**$3,458,000**	

AREC SYSTEM FACILITY IMPROVEMENTS PLAN

AREC Projects, By Priority	Category	New Construction	Renovation	Cost	Notes
Southwest Virginia AREC					
Priority 1					
Livestock expansion	Research/Support	5,000 SF	-	$625,000	Additional livestock shed space at Cattle Barn 0741 and Sheep Barn 0745 (2,500 SF ea.)
Priority 2					
New Education Facility	Extension/Outreach	5,000 SF	-	$1,625,000	2-story building with large classroom on main level (100+ seats); offices, conference room, short-term housing on upper level
New MPB and Shop	Research/Support	7,500 SF	-	$1,050,000	PEMB with bathroom, office, HVAC, workshop. Demo 0742.
Update IT Systems	Infrastructure	-	-	$177,300	
Update Primary Signage	Infrastructure	-	-	$7,000	Update 2 signs
Southwest Virginia AREC Subtotal		**17,500 SF**		**$3,484,300**	
Tidewater AREC					
Priority 1					
New MPB	Research/Support	10,000 SF	-	$1,250,000	PEMB with bathroom, office, HVAC
New Smart Greenhouse #1	Research/Support	3,000 SF	-	$600,000	State of the Art with advanced HVAC and controls
Priority 2					
Additional Research Fields	Land	-	-	$1,350,000	150 acres
New Lab Facility	Research/Support	5,180 SF	-	$2,331,000	New Lab Facility to replace Batten Hall
New Seed Handling Facility	Research/Support	500 SF	-	$112,500	Need long term seed and soil storage with walk in coolers
New Smart Greenhouse #2	Research/Support	3,000 SF	-	$600,000	State of the Art with advanced HVAC and controls
New Tenant House #1	Housing	1,600 SF	-	$320,000	New 4-bedroom house
New Tenant House #2	Housing	1,600 SF	-	$320,000	New 4-bedroom house
Renovate Duke Residence	Housing	-	4,000 SF	$400,000	
Update IT Systems	Infrastructure	-	-	$375,700	
Update Primary Signage	Infrastructure	-	-	$7,900	Update 2 signs
Tidewater AREC Subtotal		**24,880 SF**	**4,000 SF**	**$7,667,100**	

AREC SYSTEM FACILITY IMPROVEMENTS PLAN

AREC Projects, By Priority	Category	New Construction	Renovation	Cost	Notes
Virginia Seafood AREC					
Priority 2					
New Building FF&E	Admin/Office	-	-	$63,750	Generator, Classroom and Conf Room
Update IT Systems	Infrastructure	-	-	$58,800	
Update Primary Signage	Infrastructure	-	-	$5,800	Update 2 signs
Virginia Seafood AREC Subtotal				**$128,350**	
Grand Total		**139,360 SF**	**55,570 SF**	**$40,844,150**	

APPENDIX D

AREC FACT SHEETS

ALSON H. SMITH JR.
Agricultural Research and Extension Center

Sherif Sherif (center, in blue) at an in-orchard meeting in Washington, Virginia, showcases how the pollen tube-growth model can be used for crop load management under organic systems.

The AREC's grape pathology lab is developing a web-based decision support system for grape pest management called GrapeIPM.org. This mobile-ready system allows grape growers and other users to access this information from anywhere. A user can set up multiple vineyards and blocks to input site-specific information, including fungicide inventory, spray plan/records, disease observations, and more.

This system helps growers make decisions on their pesticide application by providing: guidance in pre-season fungicide application-planning based on the AREC's pesticide database; reminders of in-season actions; a personal fungicide inventory for planning; recordkeeping on fungicide application and other viticulture-related information; printouts for EPA reports and for Worker Protection Standard postings; and, daily weather and disease-risk information based on user input and nearby weather stations. In order to keep our objectives simple, we are currently focusing on disease management. Over the next several years, the system will be expanded to include other pesticide uses. The development of GrapeIPM.org has been supported by the Virginia Wine Board and the USDA NIFA Extension Implementation Program and was officially released to growers in 2018.

PARTNER WITH US

595 Laurel Grove Road
Winchester, Virginia
(540) 869-2560
https://www.arec.vaes.vt.edu/arec/alson-h-smith

"We recently detected the samurai wasp in northern Virginia. The wasp is an effective biocontrol agent for the brown marmorated stink bug, an invasive agricultural pest. We hope to reduce stink bug populations by releasing samurai wasps widely in Virginia."

CHRIS BERGH
PROFESSOR OF ENTOMOLOGY

"Dr. Wolf and his team's technical contributions to the Virginia Vineyards Association meetings have been invaluable. The team also provided me with instructional materials to teach aspiring agricultural high-school students the basics of vineyard management. Some of those students are now working in local vineyards."

FRANCOISE SEILLIER-MOISEIWITSCH
PROPRIETOR
REVELATION VINEYARDS

ALSON H. SMITH JR. AREC AT A GLANCE

DISCIPLINES

- Entomology
- Pathology
- Pomology
- Viticulture

INNOVATIVE TECHNOLOGIES

- Membrane-based grapevine virus sampling kit
- Molecular tools to detect and identify major grape pathogens
- High Resolution Melting (HRM) analysis
- Marker Assisted Breeding (MAB) of apple
- CRISPR/Cas9-mediated gene editing of apple
- Weather-based prediction models for managing crop load in apple

FACILITIES

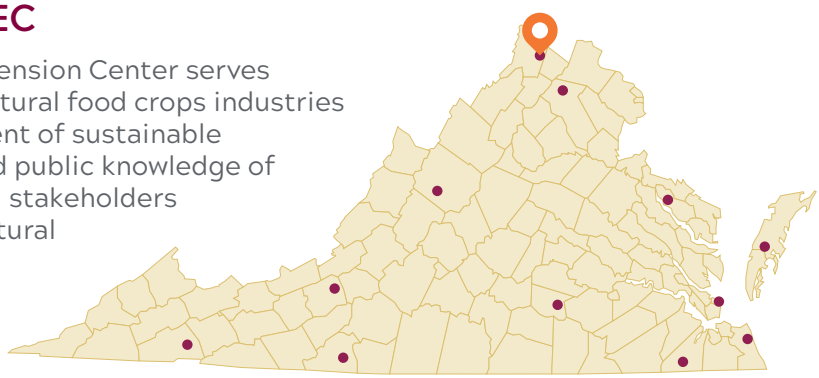
- 124 acres on the farm with over 40 field plots
- 6 modern labs
- 24,500 square foot complex
- 100 (78) person auditorium

INDUSTRY PARTNERS

- Virginia Agribusiness Council
- Wine Industry
- Apple Industry
- Virginia Department of Agriculture and Consumer Services

ABOUT THE ALSON H. SMITH JR. AREC

The Alson H. Smith Jr. Agricultural Research and Extension Center serves Virginia's commercial fruit and value-added horticultural food crops industries through research, educational programs, development of sustainable production systems and technologies, and increased public knowledge of horticultural opportunities and benefits. Our central stakeholders are current and future fruit producers, allied agricultural industries, producer associations, students, and research and Extension colleagues.



A COLLABORATIVE NETWORK

The ARECs are a network of 11 centers strategically located throughout the state that emphasize close working relationships between Virginia Agricultural Experiment Station, Virginia Cooperative Extension, and the industries the work with. The mission of the system is to engage in innovative, leading-edge research to discover new scientific knowledge and create and disseminate science-based applications that ensure the wise use of agricultural, natural, and community resources while enhancing quality of life.

VIRGINIA AGRICULTURAL EXPERIMENT STATION
VIRGINIA TECH

Virginia Cooperative Extension
Virginia Tech • Virginia State University

VT/0219/AREC-258

EASTERN SHORE
Agricultural Research and Extension Center

Steve Rideout instructs former graduate student Stephanie Pollard on tomato fruit diseases and quality

Graduate student research at the Eastern Shore AREC greatly impacts our stakeholders, growers and industry on a local, national and global level. Currently, students are working on eliminating foodborne human pathogens in packinghouses, conversion of chicken litter ash into comparable phosphorus fertilizer sources and decreasing weed pressure using new, innovative modes of action.

Students participate in monthly seminars, guide AREC tours and assist in all outreach activities. They work hand in hand with faculty, staff, fellow students and hourly employees in all aspects of their research. These interactions ensure that students are prepared to become the next generation of teachers, researchers and innovators.

"The ability to make an impact at a local community level is the preferred facet of my position. I am proud of our outreach efforts focusing on education, training and awareness that have widely broadened our community's knowledge of research, agriculture and integrated pest management."

HÉLÈNE B. DOUGHTY
RESEARCH SPECIALIST SR.

"The Eastern Shore AREC is my most valuable resource for receiving accurate and timely information to ensure my farming operation remains competitive and relevant in today's market."

STEVE STURGIS
OWNER OF TRI-S FARMS, INC.

PARTNER WITH US

33446 Research Drive, Painter, VA 23420
(807) 807-6585
www.arec.vaes.vt.edu/arec/eastern-shore

EASTERN SHORE AREC AT A GLANCE

DISCIPLINES

- Integrated Pest Management
- Foodborne Illness Research & Prevention
- Weed Management Technologies
- Vegetable Disease Epidemiology
- Soil & Nutrient Management

INNOVATIVE TECHNOLOGIES

- Molecular Identification of Plant & Human Pathogens
- Drones to monitor and assess plant health
- Advanced pollinator habitats - struggling help

FACILITIES

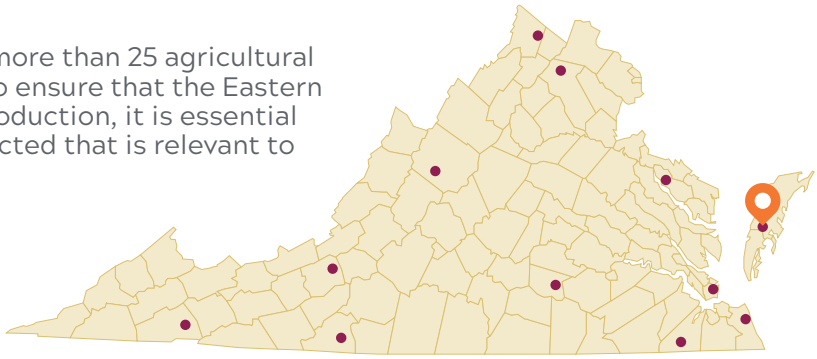
- 220-acre farm
- 3 Biosafety Level 2 Laboratories
- 7500 sq. ft. Modern Equipment Building
- Onsite Student Housing

INDUSTRY PARTNERS

- Commercial Tomato Producers and Packers
- Potato, Vegetable and Soybean Associations
- Virginia Master Gardeners, DEQ and Environmental Programs.

ABOUT THE EASTERN SHORE AREC

Established in 1956, the Eastern Shore AREC grows more than 25 agricultural crops annually for research and Extension studies. To ensure that the Eastern Shore remains a leader in commercial agriculture production, it is essential that new, state-of-the-art applied research is conducted that is relevant to local large and small-scale farming operations.



A COLLABORATIVE NETWORK

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VIRGINIA AGRICULTURAL EXPERIMENT STATION
VIRGINIA TECH

Virginia Cooperative Extension
Virginia Tech • Virginia State University

VT/0219/AREC-255

EASTERN VIRGINIA
Agricultural Research and Extension Center

Joseph Oakes (right), superintendent of the Eastern Virginia AREC, and Trent Jones, VCE agent in Northumberland County, fly a drone over a small grain nursery to collect images for rating scab – Fusarium head blight – in wheat and barley plots.

A current AREC research project involves using drone technology to assess Fusarium head blight (FHB) progression in wheat and barley.

Field assessment methodologies for evaluating FHB in small grains are very time- and resource-intensive. Therefore, breeders are limited to a single date to assess incidence and severity of the disease. In years of high disease pressure, it becomes increasingly difficult to adequately distinguish resistant, moderately-resistant, and susceptible lines. Having the ability to optically assess FHB with a drone can lead to more objective data and better disease resistance classification by calculating disease progress curves over several assessment times throughout the growing season. This will more accurately depict disease resistance and variety/fungicide efficacy than approaches that offer a single snapshot in time.

The project, led by Joseph Oakes, superintendent of the Eastern Virginia AREC, is conducted in collaboration with Carl Griffey, small grain breeder in the Virginia Tech School of Plant and Environmental Sciences, and Josh Fitzgerald, small grains post-doctoral research associate located at the Eastern Virginia AREC.

“Our goal with this project is to take advantage of drone imagery in order to more efficiently assess disease progression,” Oakes said. “If successful, we will be able to more accurately characterize disease resistance in new wheat and barley breeding lines and bring better disease resistant lines to growers.”

PARTNER WITH US

2229 Menokin Road Warsaw, Virginia 22572
(804) 333-3485
www.arec.vaes.vt.edu/arec/eastern-virginia
@VT_EVAREC

“The Virginia Tech small grain scab breeding program is committed to developing high yielding FHB-resistant wheat and barley lines for producers in the Mid-Atlantic region. Each year, we select progeny from scab crosses and evaluate FHB traits in thousands of plots under mist irrigation.”

JOSH FITZGERALD
POSTDOCTORAL
RESEARCH ASSOCIATE

“My company, Montague Farms, Inc., licenses soybean varieties developed by the Virginia Tech soybean breeding program primarily at the Eastern Virginia AREC for food-grade soybean exports to the Far East and elsewhere. Most recently, one of these varieties was used in a tofu recipe that won the Japanese National Tofu Contest.”

BRYAN TALIAFERRO
VICE PRESIDENT
MONTAGUE FARMS
CENTER CROSS, VA

EASTERN VIRGINIA AREC AT A GLANCE

DISCIPLINES

- Small grain breeding and variety testing
- Soybean breeding and variety testing
- Disease and pest management
- Fertility management

INNOVATIVE TECHNOLOGIES

- Drones to assist in nutrient management and assess disease progression
- Weather station with real-time weather data

FACILITIES

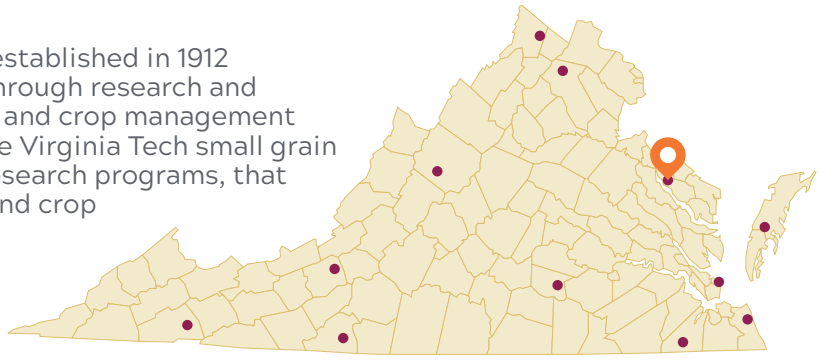
- 215 acres of crop land (53 acres owned by Virginia Tech, 162 acres leased)
- Modern seed lab and shop space

INDUSTRY PARTNERS

- Small grain and soybean industries
- Small grain and soybean commodity boards

ABOUT THE EASTERN VIRGINIA AREC

The Eastern Virginia AREC in Warsaw, Virginia, was established in 1912 and serves Virginia's grain and soybean industries through research and educational programs leading to improved varieties and crop management practices. Our research objectives are to support the Virginia Tech small grain and soybean breeding programs, along with other research programs, that contribute to economically and environmentally sound crop production in Virginia and across the nation.



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VIRGINIA TECH

Virginia Cooperative Extension
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VT/119/AREC-247

HAMPTON ROADS
Agricultural Research and Extension Center

Jayesh Samtani is investigating soil solarization and anaerobic soil disinfestation as alternative pest management strategies to methyl bromide fumigation in annual plasticulture strawberry production. He hosts field days at the AREC to demonstrate these techniques to growers.

The Hampton Roads AREC addresses water management, pest control, and production practices for horticultural crops and landscapes.

A plant pathologist addresses nursery diseases and tactics to reduce disease inoculum in recycled irrigation water. One horticulturist maximizes irrigation and fertilizer efficiency in container nursery production, while another utilizes rain gardens and other sustainable techniques to demonstrate water management in landscape settings.

Modeling and managing urban stormwater for cities and watersheds in Virginia is a top priority for the AREC's water engineer. An entomologist addresses new insect pests that target nursery crops, while a weed scientist conducts research to control troublesome weed species in ornamentals, turfgrass, and fruit production. The evaluation of new strawberry and blackberry varieties for the region, along with alternatives to methyl bromide fumigation, are under the purview of the AREC's small fruit specialist.

Faculty members work closely with the Virginia Nursery and Landscape Association, the Virginia Turfgrass Council, and the Virginia Strawberry Growers Association, among others. Master Gardener volunteers help maintain the arboretum, butterfly garden, and 10 other demonstration gardens which are open to the public.

PARTNER WITH US

1444 Diamond Springs Road Virginia Beach, VA 23455
(757) 363-3900
www.arec.vaes.vt.edu/arec/hampton-roads

"I collaborate across U.S. and international institutions and agencies in concert with state and national stakeholders to identify system-based basic and applied research that will lead improved resource efficiency and profitability in specialty crop production, namely ornamentals. This information is translated and disseminated to scientific colleagues and industry stakeholders though on-farm evaluations, webinars, podcasts, social media, and traditional Extension products."

JIM OWEN
ASSOCIATE PROFESSOR
OF PLANT AND
ENVIRONMENTAL SCIENCE

"David Sample developed a complex stormwater model of the Kellam site and several others throughout the city. He was instrumental in improving our understanding of runoff water quality and treatment in the City of Virginia Beach."

GREG JOHNSON
FORMER STORMWATER
PLANNING DIVISION
DIRECTOR
CITY OF VIRGINIA BEACH

HAMPTON ROADS AREC AT A GLANCE

DISCIPLINES
- Nursery crops
- Pest management
- Small fruit production
- Stormwater management
- Turfgrass maintenance

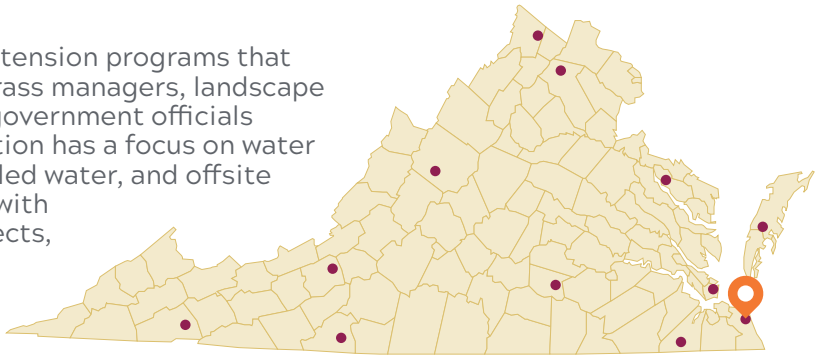
INNOVATIVE TECHNOLOGIES
- Anaerobic soil disinfestation
- Digital image analysis
- Solar-heated greenhouse
- Stormwater modeling
- Use of drones

FACILITIES
- 7 laboratories
- 7 greenhouses
- 3 classrooms
- Container and field research areas

INDUSTRY PARTNERS
- Nursery industry
- Lawn care
- Landscape industry
- Strawberry producers
- City governments

ABOUT THE HAMPTON ROADS AREC

The Hampton Roads AREC conducts research and extension programs that benefit container and field nursery producers, turfgrass managers, landscape maintenance firms, small fruit producers, and local government officials addressing urban stormwater management. The station has a focus on water use, including irrigation efficiency, diseases in recycled water, and offsite movement of nutrients. Faculty members also work with horticultural crops, addressing disease, invasive insects, and weed pests.



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VIRGINIA TECH

Virginia Cooperative Extension
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VT/0219/AREC-252

MIDDLEBURG
Agricultural Research and Extension Center

Robin White, an assistant professor of animal and poultry sciences, shows a young rider how biosensors can be used to determine fitness in horses.

Working with industry partners, scientists at the MARE Center are engaged in the development of novel forages and nutritional strategies that improve the metabolic health and performance of horses.

The One Horse approach integrates exercise, diet, and disease prevention into a tailored program for individual athletes while maintaining a keen eye toward the health and sustainability of the land. Our work at the nexus of stewardship, nutrition, and health allows us to offer unique educational programs for both stakeholders and students.

Current research funded through a joint NSF-USDA venture seeks to couple technology with biological sensing to help inform decision making.

“MARE is an ideal setting to test these novel tools because of its rural location that is in close proximity to the technology district,” Robin White, an assistant professor of animal and poultry sciences.

“An advantage of the MARE Center is our ability to translate laboratory results directly into real-world settings. As an established equine facility, the center is a collaborative hub for transdisciplinary teams in animal science, engineering, and computing technologies.”

SALLY JOHNSON
PAUL MELLON DISTINGUISHED CHAIR OF AGRICULTURE

The MARE Center provides excellent outdoor classroom areas allowing us to partner with LSWCD and USDA-NRCS for field days and workshops. Students of all ages engage in hands-on planting of native trees, shrubs and grasses to create vegetative buffers along stream corridors.

PARTNER WITH US

5527 Sullivans Mill Road, Middleburg VA 20117
(540) 687-3521
www.arec.vaes.vt.edu/arec/middleburg/
MARECenter

MIDDLEBURG AREC AT A GLANCE

DISCIPLINES
- Equine nutrition and exercise physiology
- Equine health and disease
- Animal behavior and psychology
- Ecosystem management
- Biodevice design

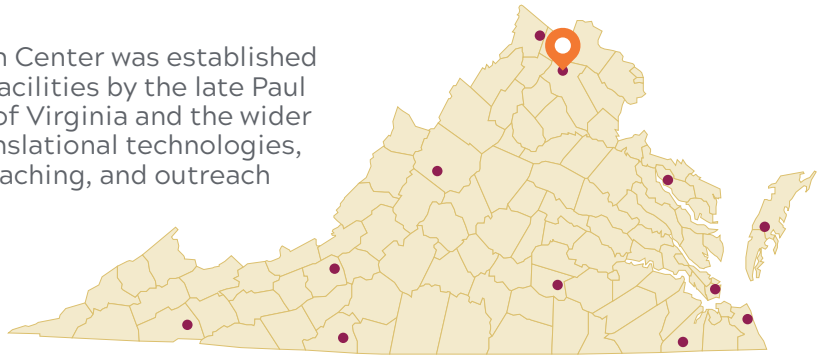
INNOVATIVE TECHNOLOGIES
- Smart apps for nutrition and exercise decisions
- The best management practices living laboratory
- Pasture grasses for water and carbon sequestration

FACILITIES
- 420 acres
- Exercise and nutrition barns
- Nature trail and conservation area
- Office building and conference room

INDUSTRY PARTNERS
- Equine nutritionists
- Conservation groups
- Grassland and forage specialists

ABOUT THE MIDDLEBURG AREC

The Middleburg Agricultural Research and Extension Center was established in 1949 through the generous donation of land and facilities by the late Paul Mellon. Our mission is to provide the stakeholders of Virginia and the wider equestrian community with innovative research, translational technologies, and state-of-the-art education through research, teaching, and outreach efforts.



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VIRGINIA TECH

Virginia Cooperative Extension
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REYNOLDS HOMESTEAD

Forest Resources Research Center

Superintendent Kyle Peer, along with AREC staff, works with Virginia Tech faculty, industrial affiliates, government agencies, and neighboring institutions to conduct forestry research to further our understanding of tree ecophysiology in an effort to increase production in pine plantations throughout the southeastern U.S. and abroad.

A primary research focus of the Reynolds Homestead FRRC AREC is conducting ecophysiological and silvicultural studies in an effort to understand better how trees grow in order to optimize productivity and sustainability in southern pine and hardwood plantations. Much of this work is done in conjunction with the Forest Productivity Cooperative on the Regionwide 20 study site that was established on the Homestead in 2009.

Partners in the cooperative include the four host universities - Virginia Tech, North Carolina State University, University of Concepcion in Chile, and Lavras University in Brazil - as well as the forest industry, timber management investment organizations, forestry consultants, governmental agencies, private landowners, and others interested in intensive plantation management. Members own or manage over 24 million acres (10 million hectares) of pine and broadleaved plantations in the southeastern U.S. and Latin America. The Regionwide 20 study is examining why loblolly pine (the primary commercial tree species in the southeastern U.S.) grows much faster in South America. If we can develop an understanding of the mechanisms that make this rapid growth possible, we may be able to improve our management of loblolly in the southeastern U.S. The result could be a step change in our understanding rather than the typical incremental gains we obtain from our research.

PARTNER WITH US

407 Homestead Lane Critz, Virginia 24082
(276) 694-4135
www.arec.vaes.vt.edu/arec/reynolds-homestead

"Genomics and biotechnology together with field trials and greenhouse studies at the FRRC allow us to connect genes to traits important for sustainable wood production and forest health. More than 20 undergraduate, graduate, and post-doctoral researchers have worked on these studies over the past 13 years."

AMY BRUNNER
ASSOCIATE PROFESSOR
FOREST RESOURCES
AND ENVIRONMENTAL
CONSERVATION

"The woody plant screen at the AREC has evolved into a critically important tool for evaluating plant responses under controlled environmental conditions. The system design and studies at this site have been reviewed by experts in our company from around the globe and have led to important discoveries in product development."

PAT BURCH
SENIOR RESEARCH
FIELD SCIENTIST
CORTEVA AGRISCIENCE

REYNOLDS HOMESTEAD AT A GLANCE

DISCIPLINES
- Silviculture
- Forest genetics
- Forestry BMP's
- Christmas trees

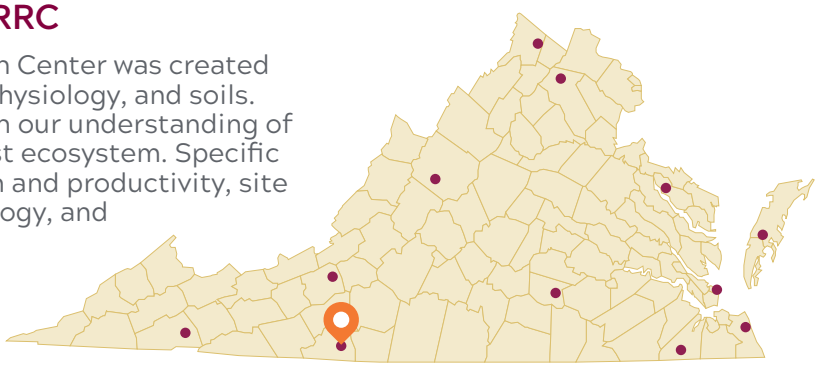
INNOVATIVE TECHNOLOGIES
- Plant canopy analyzer
- Aces system for root gas exchanges analysis
- Tree genomics

FACILITIES
- 780 contiguous acres
- 2 greenhouses, slat house, coolers, cold frame, and tractor sheds
- Lab space, offices, student, and superintendent housing

INDUSTRY PARTNERS
- Forest productivity coop
- Forestry herbicide industry
- Tree farmer associations

ABOUT THE REYNOLDS HOMESTEAD FRRC

The Reynolds Homestead Forest Resources Research Center was created in 1969 to study forest biology, including genetics, physiology, and soils. The AREC was founded to serve a void that existed in our understanding of the biological and physical relationships of the forest ecosystem. Specific projects include harvesting to increase forest health and productivity, site preparation, forest fertilization, loblolly pine physiology, and forest herbicide testing.



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SHENANDOAH VALLEY

Agricultural Research and Extension Center, McCormick Farm

David Fiske (right), superintendent (2000-2018), discussing summer stockpiling at the biennial Field Day 2017

"Ten years ago, the SVAREC managed its pastures like most farms - making hay from excess growth in spring, allowing grazing through the summer and fall, and then feeding hay all winter. Each winter, animals were fed hay for 150 days. The resulting situation, one shared by beef producers across the country, was a crippling feed bill."

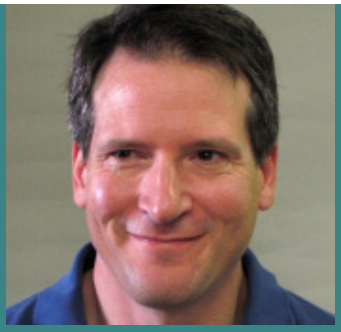
Research at McCormick Farm, led by Superintendent David Fiske, explored a better way. Rather than making hay from excess spring growth only to carry it back to the field six months later, Fiske stockpiled a portion of the pasture acres and allowed grass to accumulate in the field. This summer stockpile would not be grazed all season; Fiske called it "storing feed in the field, rather than in the barn." This summer stockpile would then be rationed out in small sections for grazing in late summer and fall. This provided valuable pasture during a time of year often characterized by drought and allowed the remainder of the farm's pastures to rest and accumulate fall growth for grazing in winter.

The resulting winter grazing from the summer stockpile system reduced the farm's hay feeding to just 85 days on average for the next ten years. The innovative concept of summer stockpiling has been shared through Extension programs and articles, and dozens of farmers have adopted the practice in Virginia and other states throughout the Southeast.

"The research on summer stockpiling was inexpensive, and its effect was a practical solution born of necessity. It is a good reminder of the roots and purpose of the Agricultural Experiment station," said **Matt Booher, Extension agent, Augusta County**.

PARTNER WITH US

128 McCormick Farm Circle, Raphine, VA 24472
(540) 377-2255
www.arec.vaes.vt.edu/arec/shenandoah-valley



"I have conducted forage research related to livestock at the SVAREC for over 10 years. In that time, I have had four master's degree students, one doctoral student and a post-doctoral associate who conducted research at the station. The staff and facilities were a big factor in helping my students complete their work successfully. All of my former students are currently working in the forage-livestock industry in different capacities."

BENJAMIN TRACY
ASSOCIATE DIRECTOR OF UNDERGRADUATE PROGRAMS
SCHOOL OF PLANT AND ENVIRONMENTAL SCIENCES

"Working collaboratively with the SVAREC, we've established a native warm season grass stand which we are incorporating into our rotational grazing management. Their help, and the relationships we've made, have been extremely beneficial to us and our farm."

REBECKA SZARZYNSKI
OWNER/OPERATOR OF MOUNTAIN GLEN FARM

SHENANDOAH VALLEY AREC, McCORMICK FARM AT A GLANCE

DISCIPLINES

- Forestry and silvopasture
- Pasture systems research
- Ram performance testing
- Beef cattle production

INNOVATIVE TECHNOLOGIES

- Calan feeding system
- Portable solar-powered Calan gate feeding system
- Novel fescue systems
- Temple Grandin cattle handling facility
- Weather station with real-time weather data

FACILITIES

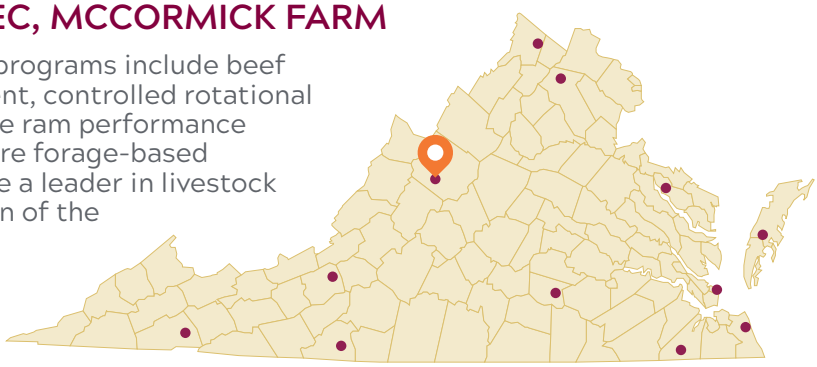
- Over 900 acres of owned and leased land
- Three barns (bank barn, feeding barn, sheep barn)
- A two-acre National Historic Landmark Memorial Plot, including a Grist Mill and Museum

INDUSTRY PARTNERS

- Forage industry
- Beef cattle Industry
- Sheep industry

ABOUT THE SHENANDOAH VALLEY AREC, MCCORMICK FARM

The Shenandoah Valley AREC and McCormick Farm programs include beef cattle, breeding, reproduction, nutrition, management, controlled rotational grazing, and forage systems. Sheep programs include ram performance testing. The goal of the work is to help develop a more forage-based sustainable agricultural industry in Virginia and to be a leader in livestock and forage-based research in the mid-Atlantic region of the United States.



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VIRGINIA TECH

Virginia Cooperative Extension
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SOUTHERN PIEDMONT
Agricultural Research and Extension Center

David Reed discusses management strategies with Ralph Tuck to optimize greenhouse tobacco transplant production.

The tobacco research and Extension programs at the SPAREC have long operated in a collaborative manner between agronomy, plant pathology, and entomology. The adoption of greenhouse transplant production is one example of a concerted multi-disciplinary approach to provide tobacco growers with research-based management guidance to assist with successful production. A tobacco crop starts with transplants to help ensure that growers are able to reliably produce transplants for their crop. Research into fertilization programs has reduced the incidence of plant loss due to fertilizer salts. Seed performance trials and evaluation of soil media trials have improved plant stands. Seedling clipping research has formed the basis of our recommended clipping procedure to ensure high quality transplants. Ongoing research efforts are addressing diseases that can injure or kill seedlings. The overall goal of the greenhouse tobacco transplant production program conducted by David Reed, tobacco agronomist, and Chuck Johnson, tobacco plant pathologist, is to develop the management strategies necessary to maximize the number of usable transplants produced.

Tobacco transplants were traditionally grown in outdoor plant beds. Research and Extension efforts addressing greenhouse tobacco transplant production have assisted growers with little to no experience with greenhouse production to substantially reduce the labor required for growing tobacco seedlings. This work has also shortened the time required for transplanting the crop and provided for more uniform growth of the crop in the field.

PARTNER WITH US
2375 Darvills Road Blackstone, VA 23824
(434) 292-5331
www.arec.vaes.vt.edu/arec/southern-piedmont
VTSPAREC

"Working with graduate students is one of the best parts of being a faculty member. Students are the next generation of leaders in agricultural science."

CHUCK JOHNSON
PROFESSOR OF PLANT PATHOLOGY

"My experience with reseeding a 22-acre field with novel endophyte fescue on the farm last fall was all positive with the help of Gabe Pent, Taylor Clarke, Lindy Tucker and others. I learned a lot about how to control weeds in a new stand of grass and plan to use this practice again in the future."

CALVIN HONEYCUTT
PRODUCER

SOUTHERN PIEDMONT AREC AT A GLANCE

DISCIPLINES
- Tobacco agronomy
- Tobacco curing technology and efficiency
- Tobacco disease management
- Ruminant livestock
- Forage production and management
- Small fruit disease management

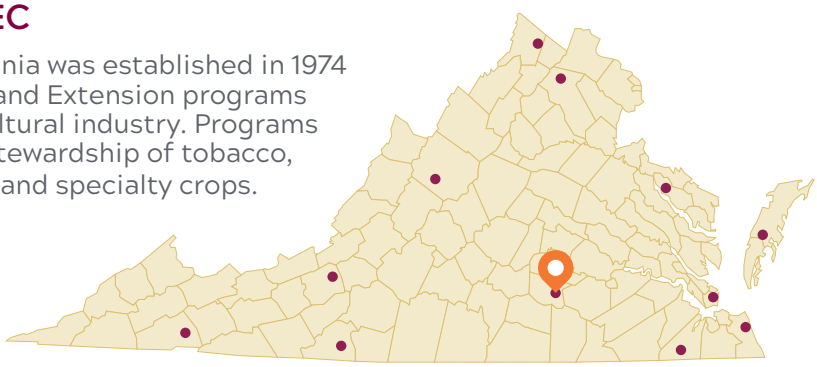
INNOVATIVE TECHNOLOGIES
- Tobacco curing, monitoring, and automation
- Sucker control application technologies
- Drones to assess crop development
- Silvopasture

FACILITIES
- 1,180-acre farm with 130 acres of crop research plots, 120 acres of research grazing, and a 40-acre silvopasture area
- Specialized tobacco curing facilities
- Extensive greenhouse facilities and high tunnels
- 150-person auditorium

INDUSTRY PARTNERS
- Tobacco industry and growers
- Agrichemical industry
- Forage and livestock industry
- Virginia Farm Bureau, SWCD, NRCS, VDACS

ABOUT THE SOUTHERN PIEDMONT AREC

The Southern Piedmont AREC near Blackstone, Virginia was established in 1974 and conducts strong commodity-oriented research and Extension programs to provide information and technology to the agricultural industry. Programs enhance the economic viability and environmental stewardship of tobacco, forage crops, beef cattle, small fruit, and other field and specialty crops.



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VIRGINIA TECH

Virginia Cooperative Extension
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VT/0219/AREC-254

SOUTHWEST VIRGINIA
Agricultural Research and Extension Center

Lee Wright (right) explains how to evaluate sheep for signs of anemia. Symptoms are typically caused by an infestation of barber pole worms and can be extremely devastating to the performance of a sheep flock.

Internal parasites are the primary production challenge for sheep producers in Virginia and the surrounding region. Genetic selection for parasite resistance is becoming a critical control mechanism as other strategies have become less effective. Therefore, properly designed and implemented genetic evaluation protocols for parasite resistance are needed.

In response to these needs, a forage-based ram evaluation program, the first to be conducted nationally, was initiated at the Southwest AREC in 2012. Interest in the program has attracted producers from 16 states who have contributed 722 rams. Rams from these flocks are evaluated over the grazing season for growth performance and parasite resistance with researchers applying protocols based on previous research conducted at the center. At the conclusion of each test, AREC staff host an educational field day during which top-performing rams are offered for sale to the public.

The program has successfully demonstrated methods for collection of on-farm data necessary to select for the economically-relevant traits of growth and parasite resistance. Sources of variation in parasite resistance have been documented and serve as benchmarks for on-farm application by producers. They are also included in national genetic evaluation programs for the sheep industry. A subset of 248 tested rams have sold at auction, averaging $1,129 per ram. The rams have gone to 15 states. The estimated value-added per ram was $700 over typical market value. Results have been shared through Extension publications, to the popular press, and to the scientific community.

PARTNER WITH US

12326 VPI Farm Rd., Glade Spring, VA 24340
(276) 944-2200
www.arec.vaes.vt.edu/arec/southwest-virginia

"The corn silage testing program at the Southwest AREC includes a regional and a state test. A prominent seedsman in Virginia stated that he relies on the regional test to determine which hybrids he will market in our region."

PHIL BLEVINS
SENIOR EXTENSION AGENT
WASHINGTON COUNTY

"The Coalfield Beef Cattle Association has partnered with the Southwest AREC on several successful projects focused on beef cattle production. Our members have achieved tremendous benefits both educationally and financially by incorporating Virginia Beef Quality Assurance practices learned at the AREC into our stocker calf backgrounding programs."

MEMBERS OF CBCA & VA CATTLEMAN'S ASSOCIATION

SOUTHWEST VIRGINIA AREC AT A GLANCE

DISCIPLINES

- Beef cattle production and heifer development
- Sheep production management
- Genetics and parasite resistance evaluations
- Forage production and livestock nutrition
- Corn grain and corn silage variety trials
- Christmas tree production
- Pasture management

INNOVATIVE TECHNOLOGIES

- Sheep genetic evaluation software
- Electronic animal ID data collection
- Apps for data collection and management
- Apps to map land use
- Weather station with real-time weather data

FACILITIES

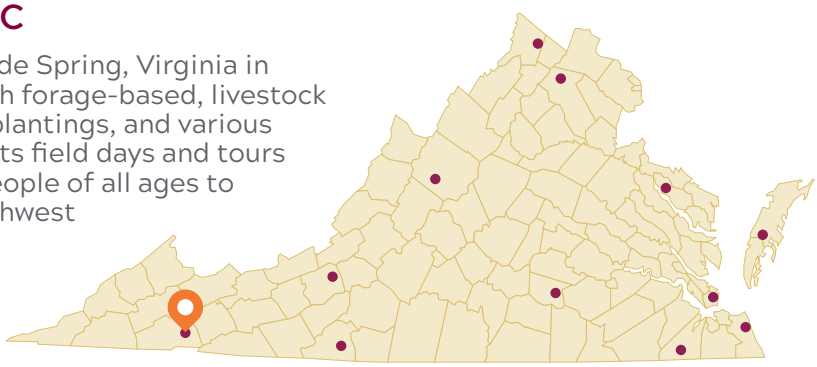
- 210 acres
- 4 barns, 3 equipment/hay storage facilities
- Multi-purpose ram test barn and educational facility
- Beef cattle handling facility
- Permanent and portable sheep handling facilities

INDUSTRY PARTNERS

- Beef cattle industry
- Sheep industry
- Seed industry
- Chemical companies

ABOUT THE SOUTHWEST VIRGINIA AREC

The Southwest Virginia AREC was established in Glade Spring, Virginia in 1947 and primarily serves the commonwealth through forage-based, livestock production systems research. Corn trials, pine tree plantings, and various specialty crops are also produced. The AREC conducts field days and tours for producers and the general public to introduce people of all ages to our programs and to the world of agriculture in Southwest Virginia.



A COLLABORATIVE NETWORK

The ARECs are a network of 11 centers strategically located throughout the state that emphasize close working relationships between Virginia Agricultural Experiment Station, Virginia Cooperative Extension, and the industries the work with. The mission of the system is to engage in innovative, leading-edge research to discover new scientific knowledge and create and disseminate science-based applications that ensure the wise use of agricultural, natural, and community resources while enhancing quality of life.

VIRGINIA AGRICULTURAL EXPERIMENT STATION
VIRGINIA TECH

Virginia Cooperative Extension
Virginia Tech • Virginia State University

VT/0219/AREC-248

TIDEWATER
Agricultural Research and Extension Center

Maria Balota works with John Crumpler, a local farmer and member of the National Peanut Board, to identify the most productive peanut varieties with increased yield, disease-resistance, and high oleic fatty acid content for the region.

An ongoing project at the Tidewater AREC includes testing of the Virginia-type peanut elite lines in the pipeline for release in Virginia and the Carolinas. This is a joint effort between the AREC and North Carolina State University to provide growers in the Virginia-Carolina region with improved varieties.

This multi-state project, called Peanut Variety and Quality Evaluation, allows direct input from the entire peanut industry, including growers, shellers, and processors, to the development of varieties tailored for Virginia and the Carolinas. In this way, successful peanuts such as Bailey and Sugg have exceeded, by millions of dollars, the value of other cultivars since their release in 2008. The project, led by Maria Balota, is conducted across three states in collaboration with Jeff Dunne, a peanut breeder at North Carolina State University, and Daniel Anco, Clemson University's peanut specialist.

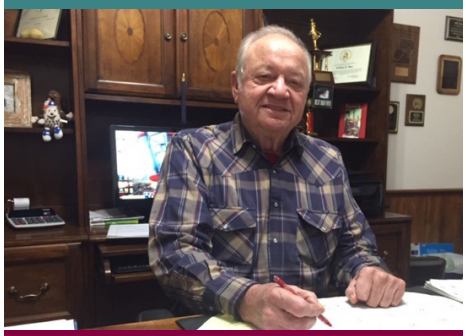
"Our most recent releases, Emery and Bailey II, not only have the high-yield potential and disease-resistance of Bailey, they also have oil composition with a slow oxidation rate, which means less rancidity and longer shelf-life," said Balota. "Furthermore, in the future, we hope to bring the peanut industry cultivars with improved tolerance to temperature and rainfall extremes by employing crop physiology and drone technology research for high-throughput selection of the best-performing breeding lines under these conditions".

PARTNER WITH US

6321 Holland Road, Suffolk, Virginia 23437
(757) 657-6450
www.arec.vaes.vt.edu/arec/tidewater

"Service to the agricultural industry, specifically Virginia row crop producers, guides my work at the Tidewater AREC. I feel strongly that preparing the upcoming generation of diverse, talented, and enthusiastic scientists ensures that our producers have the information they need to grow high-yielding, environmentally-sustainable crops into our future and our children's future."

SALLY TAYLOR
ASSISTANT PROFESSOR AND
EXTENSION SPECIALIST
ROW CROP ENTOMOLOGY



"The Tidewater AREC is an integral part of Virginia's agriculture. Without this team of researchers, Virginia farmers would be at a loss for new information and updates. I hosted the Virginia Ag Expo at my farm in Dinwiddie County in 2008 and 2016. Due to the intense participation of experts from the AREC, both of these events were a success, providing updates to our growers across the state."

BILLY BAIN
GROWER
DINWIDDIE, VIRGINIA

TIDEWATER AREC AT A GLANCE

DISCIPLINES

- Cotton, peanut, and soybean agronomy
- Plant pathology of vegetables and row crops
- Row crop entomology
- Plant physiology
- Swine reproductive physiology and management
- Plant parasitic nematode management

INNOVATIVE TECHNOLOGIES

- Drones for precision spraying and to assess plant stress
- Variable rate and micro-irrigation for row crops
- Teralytic soil probes to measure soil parameters real time

FACILITIES

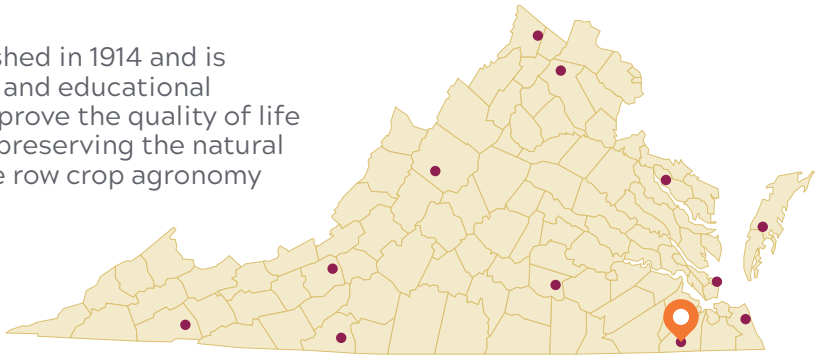
- 465-acre farm
- 228-person auditorium
- 34 buildings, including a new pesticide storage and disposal facility

INDUSTRY PARTNERS

- Peanut, cotton, corn, soybean, and small grain associations
- Swine industry
- Agricultural chemical, seed, and fertilizer industries

ABOUT THE TIDEWATER AREC

The Tidewater AREC in Suffolk, Virginia, was established in 1914 and is committed to developing and delivering technology and educational programs that support profitable agriculture and improve the quality of life in the Tidewater area and the commonwealth, while preserving the natural resources. Research and Extension programs include row crop agronomy and pest management, as well as swine production.



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VIRGINIA TECH

Virginia Cooperative Extension
Virginia Tech • Virginia State University

VT/0219/AREC-250

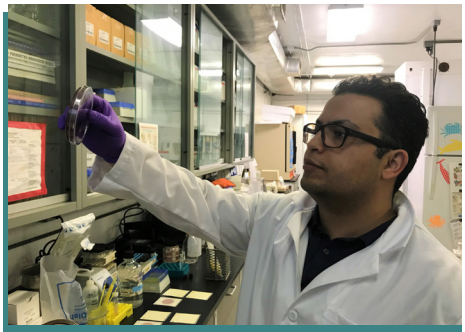
VIRGINIA SEAFOOD
Agricultural Research and Extension Center

Naser Bayoumy works to improve hatchery live feeds production in support of a growing aquaculture industry. (Photo courtesy of Virginia Sea Grant).

The VSAREC is actively engaged with industry and research partners to address a variety of stakeholder needs. A major pillar of our program is ensuring seafood safety and product quality. We engage in product testing, sanitation, technical assistance, validation of processes, value-added product development, and employee training in an effort to help our stakeholders ensure the quality and safety of their products.

In addition to food and seafood safety, the VSAREC is also involved in aquaculture research and development. Recognized as a center of excellence for live feeds and hatchery production technologies, the VSAREC is venturing further into the microbiology of aquaculture production systems. The aquaculture program is highly adjustable and responsive to stakeholder needs, with the capacity to operate freshwater, brackish, and saltwater systems.

VSAREC programming also covers the areas of economics, business development, and marketing. Current research activities include assessing the regulatory challenges faced by U.S. aquaculture producers at the farm level.



"VSAREC Extension and research activities assist our seafood industry at the local, national, and international levels. Our program is focused on using cutting-edge technologies for rapid detection of bacteria and mitigating foodborne illnesses."

REZA OVISSIPOUR
ASSISTANT PROFESSOR
EXTENSION SPECIALIST
FOOD AND SEAFOOD SAFETY

"Virginia Tech is vital to our business. From sanitation practices to validation tests and employee training, they do it all. We are so fortunate to have them as next door neighbors."

CASEY GRAHAM
VICE-PRESIDENT OF
GRAHAM AND ROLLINS, INC.

PARTNER WITH US
102 S King Street Hampton, VA 23669
(757) 727-4861
www.arec.vaes.vt.edu/arec/virginia-seafood

VIRGINIA SEAFOOD AREC AT A GLANCE

DISCIPLINES
- Food and seafood safety
- Microbiology
- Process validation
- Engineering
- Green energy
- Aquaculture
- Economics
- Business and marketing

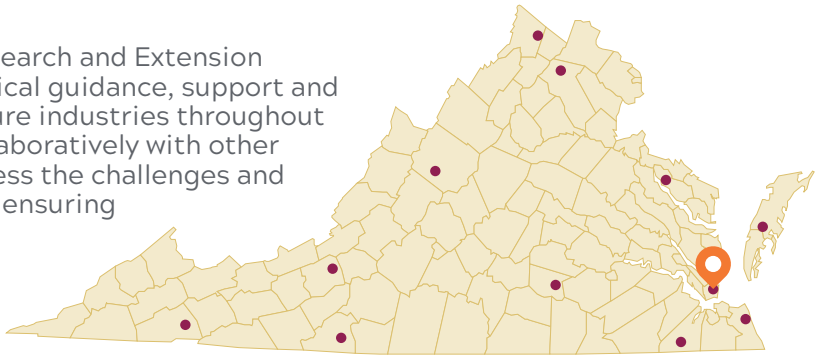
INNOVATIVE TECHNOLOGIES
- Process validation
- Vibrational spectroscopy
- Nano-bubble and electrolyzed water

FACILITIES
- Microbiology lab
- Recirculating aquaculture systems
- Aquatic habitat systems
- Classroom for teaching and training

INDUSTRY PARTNERS
- Aquaculture
- Seafood processors
- Seafood distributors
- Seafood retailers
- Seafood end-users and consumers

ABOUT THE VIRGINIA SEAFOOD AREC

The mission of the Virginia Seafood Agricultural Research and Extension Center is to provide education, scientific, and technical guidance, support and leadership to the commercial seafood and aquaculture industries throughout Virginia and the United States. Our faculty work collaboratively with other researchers, Extension agents, and industry to address the challenges and needs of our seafood and aquaculture stakeholders; ensuring safe and wholesome seafood for all of us to enjoy.



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VIRGINIA AGRICULTURAL EXPERIMENT STATION
VIRGINIA TECH

Virginia Cooperative Extension
Virginia Tech • Virginia State University

VT/0219/AREC-251

Agricultural Research and Extension Centers Facilities Master Plan

ALAN GRANT
SAIED MOSTAGHIMI
CHRIS KIWUS

JUNE 3, 2019

VIRGINIA TECH™

MAKING A POSITIVE IMPACT ACROSS VIRGINIA

Virginia Agricultural Experiment Station
and its
Agricultural Research and Extension Centers

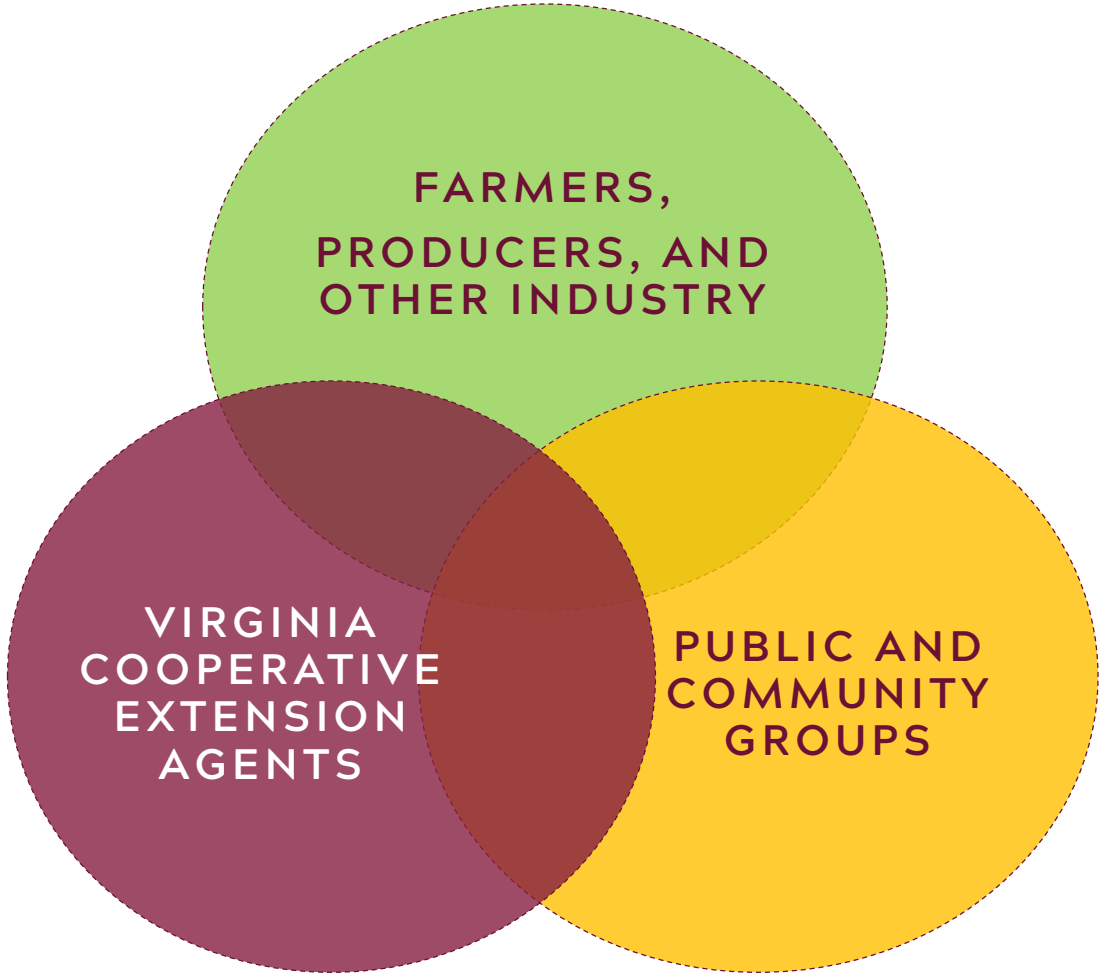
- Virginia Agricultural Experiment Station - *Blacksburg*
- Alson H. Smith, Jr. AREC - *Winchester*
- Eastern Shore AREC - *Painter*
- Eastern Virginia AREC - *Warsaw*
- Hampton Roads AREC - *Virginia Beach*
- Middleburg AREC - *Middleburg*
- Reynolds Homestead Forestry Resources Research Center - *Critz*
- Shenandoah Valley AREC - *Steeles Tavern*
- Southern Piedmont AREC - *Blackstone*
- Southwest Virginia AREC - *Glade Spring*
- Tidewater AREC - *Suffolk*
- Virginia Seafood AREC - *Hampton*

- *Number of T/TT faculty: 23*
  Non-T/TT faculty: 19
- *Number of Staff: 79*
  28% by soft funds
- *207 buildings at AECs*

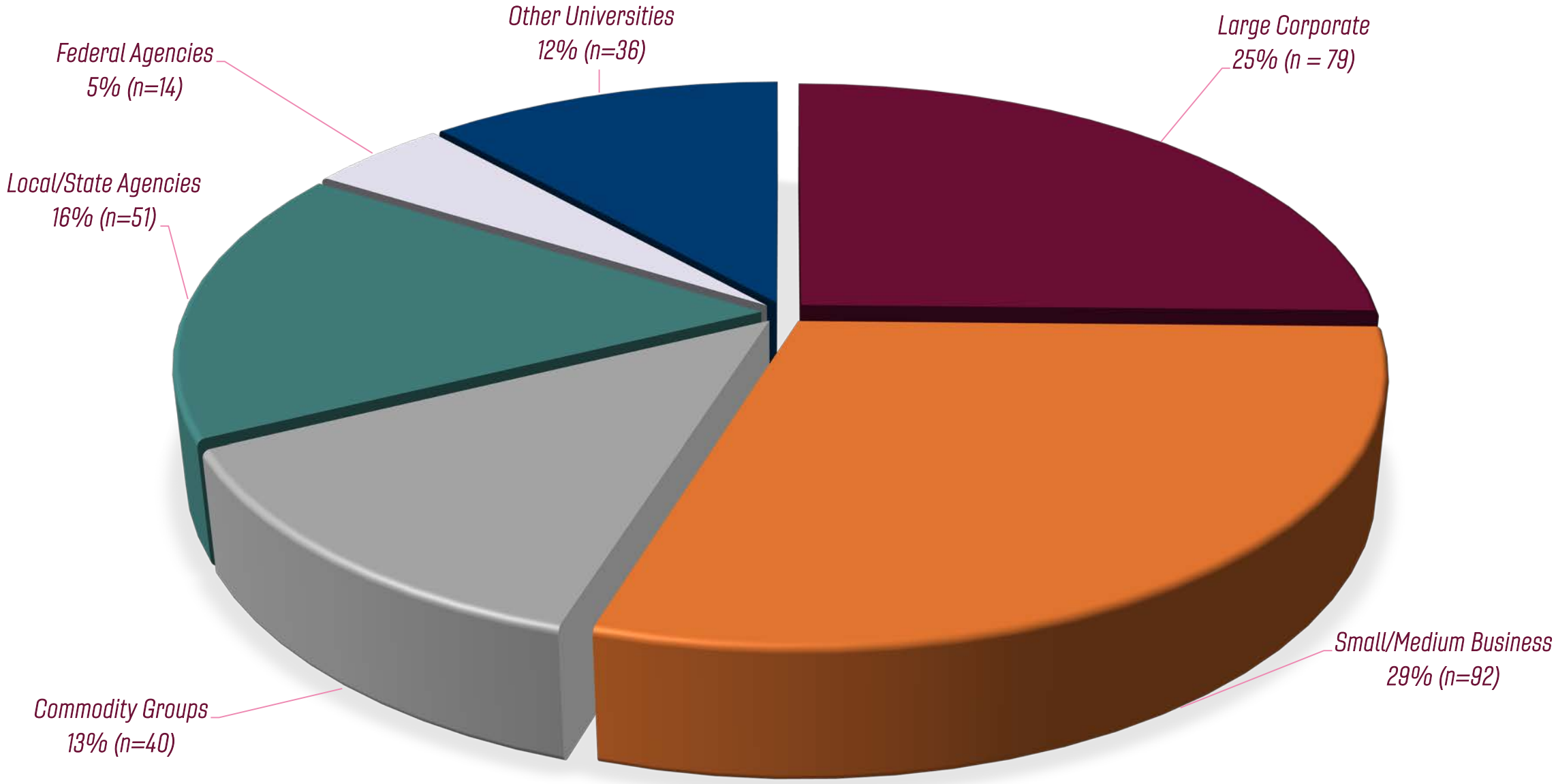
VirginiaTech College of Agriculture and Life Sciences | **Virginia Agricultural Experiment Station**

1111/CALS-2

ARECs connect VT to the Virginia Communities



ARECS ANNUALLY ENGAGE WITH OVER 300 STAKEHOLDER GROUPS (2018; N=312)

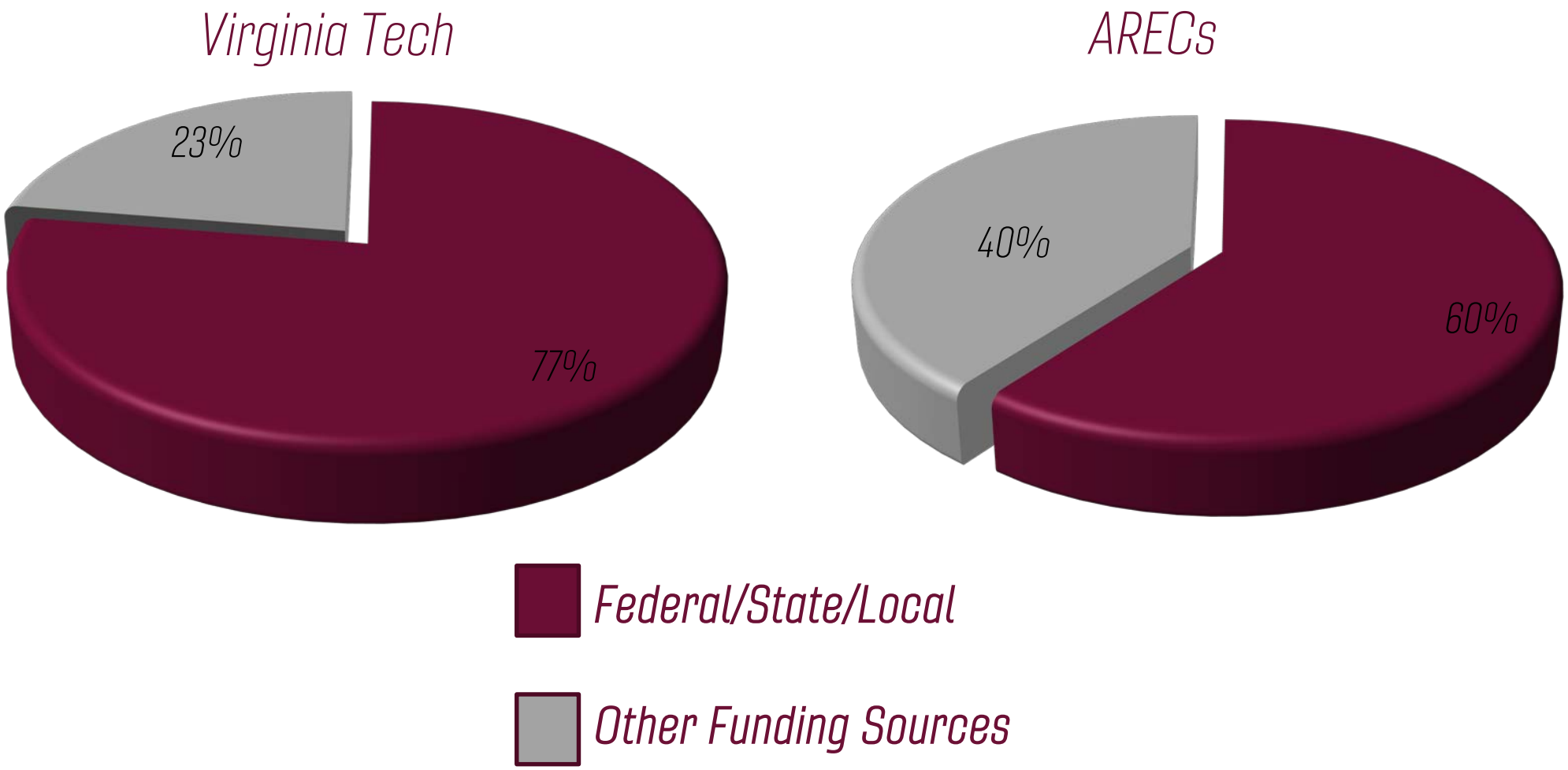



In 2018, the VT ARECs reached over 12,600 visitors from all parts of the Commonwealth and across the U.S. at 173 events
38 Community Events
17 Field Days
17 K-12 Educational Events
18 Planned Tours
18 Undergraduate Experiential Learning and academic course activities
33 VCE Training Events
19 Advisory, Council and other meetings
23 graduate students on site and 10 on-line graduate students

In 2018, ARECs were supported by 147 different funding sources

- **7 federal programs:** USDA NIFA, APHIS, SARE, NRCS, ARS, others
- **13 local /state:** cities, counties, VDACS, Chesapeake Bay Fdtn, VA Ag Council, VA Farm Bureau, VA Tobacco Commission
- **46 Corporate entities:** Altria, BASF, Bayer, Corteva/Dow, FMC, Koch, Merck Animal Health, Monsanto, Philip Morris International, Smithfield Foods, Syngenta, Valent
- **18 Small/Medium businesses:** seed companies, equipment companies, energy companies, banks
- **11 Commodity groups:** Associations, Boards, Foundations
- **52 In-Kind Contributions:** corporate, small businesses, local/state agencies, commodity groups, farmers/producers

Private Industry Funding

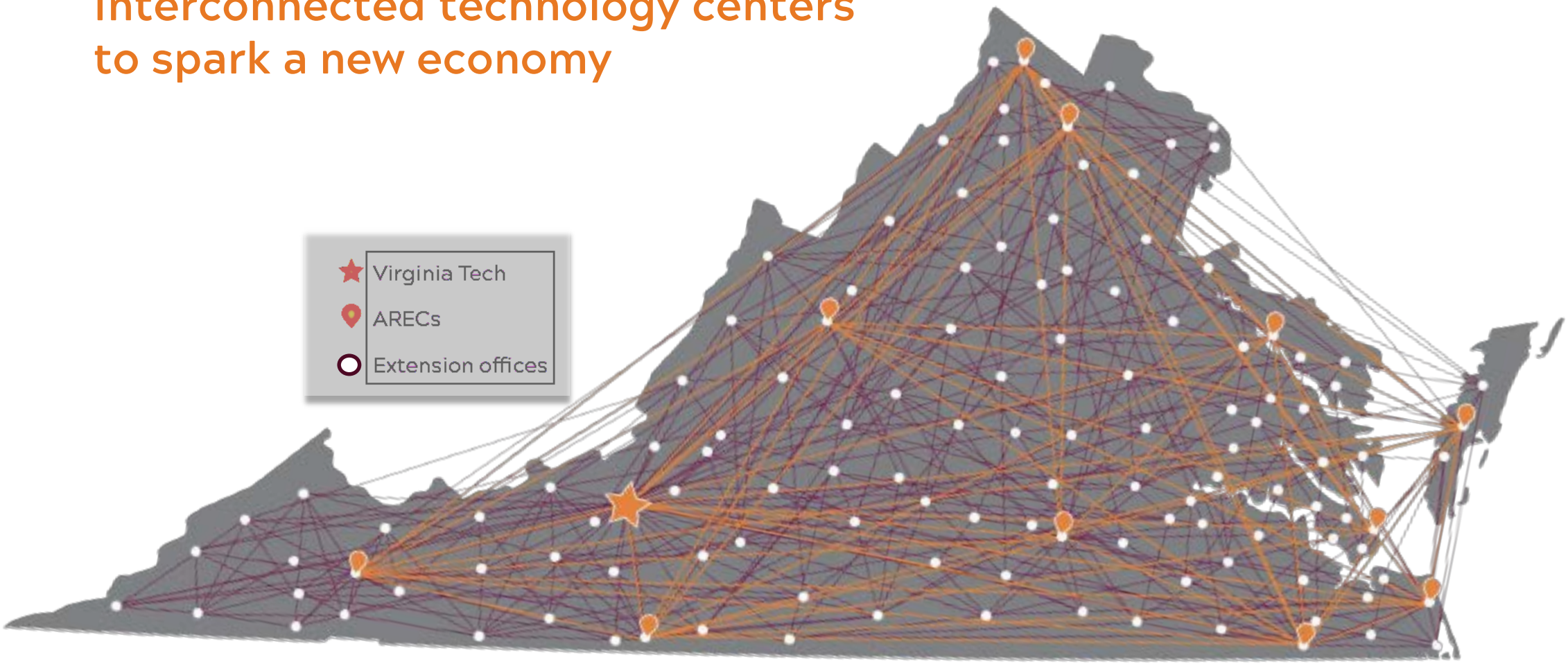


2015 Office of Sponsored Programs Data

Smart Farm Innovation Network

ANR Initiative

Building a network of interconnected technology centers to spark a new economy



The Plan Covers Four Major Strategic Areas

- *Capital Project Needs*
  - *Top Immediate Priorities*
- *Infrastructure and Land Needs*
- *Comprehensive Preventive Maintenance Plan*
- *IT, Connectivity, Wi-Fi Availability, A/V Needs, and Signage*

IT Infrastructure Upgrade at AECs

Component	Fixed-One Time Cost	Annual Cost
Router Upgrade	$55,000	--
Building Re-wiring	$850,000	--
Interior Wi-Fi Upgrade	$132,000	--
RTK (GPS Accuracy)	$175,000	$14,000
Exterior Wi-Fi Network	$1,030,000	--
Communication (A/V)	$195,000	--
Annual Service Cost	--	$414,000 ($117,000)
TOTAL	$2,434,000	$428,000

Signage

- *Identified 2 high-profile signs per location for prioritized installation*
- *Working with University Relations to develop standard for off-site locations*

AREC	Estimated One-Time Cost (2 signs, incl. demo & install)
Alson H. Smith	$7,200
Eastern Shore	$6,200
Eastern Virginia	$7,300
Hampton Roads	$7,300
Middleburg	$7,400
Reynolds Homestead	$6,300
Southern Piedmont	$7,800
Shenandoah Valley	$7,400
Southwest	$7,000
Tidewater	$7,900
VA Seafood	$5,800
TOTAL	**$77,600**

Summary of Capital Projects & Land Needs

Core Facility Type	No. Projects	New Cons. (ft^2)	Renovation (ft^2)	Est. Cost ($)
Research Support	35	97,510	27,000	21,560,000
Extension/Outreach	6	27,500	2,500	8,363,000
Infrastructure	25	150	500	2,903,000
Admin/Office	2	--	900	199,000
Housing	12	14,200	24,700	4,671,000
Grand Total	**80**	**139,360**	**55,600**	**$37,696,000**
Land	3	350 acres	--	$3,150,000

High Priority Capital Projects by AREC

AREC	Item	Estimated Cost	Est. Sq. Ft.
A. H. Smith	Pesticide Storage (R)	$675,000	5,400
Eastern Shore	Tenant House (N)	$240,000	1,200
Eastern Virginia	Seed Drying and Experiment Bldg (R)	$195,000	1,100
Hampton Roads	Classroom Expansion (N)	$812,500	2,500
MARE Center	Animal Teaching/Outreach (N)	$1,050,000	7,500
Reynolds Hstd	Basement upgrade (R)	$310,000	1,240
S. Piedmont	Lab facility (N)	$1,125,000	2,500
Shen. Valley	Multipurpose building (N)	$937,500	7,500
Southwest	Livestock facility Expansion (N)	$625,000	5,000
Tidewater	MPB(10,000 ft^2)and Smart greenhouse (N)	$1,850,000	13,000
TOTAL		$7,820,000	46,940

Maintenance Reserve Projects: Recent Actions & Discussions

MR Project Type	No. of Projects	Cost (Million)
Moisture Penetration	17	$1.824
MEP Systems	12	$1.444
Structure	7	$0.391
Other	14	$1.575
TOTAL	**50**	**$5.234**

- *Maintenance Reserve Funds*
  - *Allocation : $250,000/YR*
  - *Actual: $395,000/YR*
  - *On-going discussion to increase allocation for future years*
- *CALS Expenditure:*
  - *2010-2018 : $601,000/YR*

AREC Facilities Support

Identifying Projects

- *The Facilities Engineering and Assessment team routinely visits the AREC's at 5-year intervals.*
- *The team updates information in the Facility Index Condition and Assessment System based on on-site observations and discussions with AREC staff.*
- *CALS then meets with Facilities to discuss the resulting priorities and a plan is developed.*

Project Support

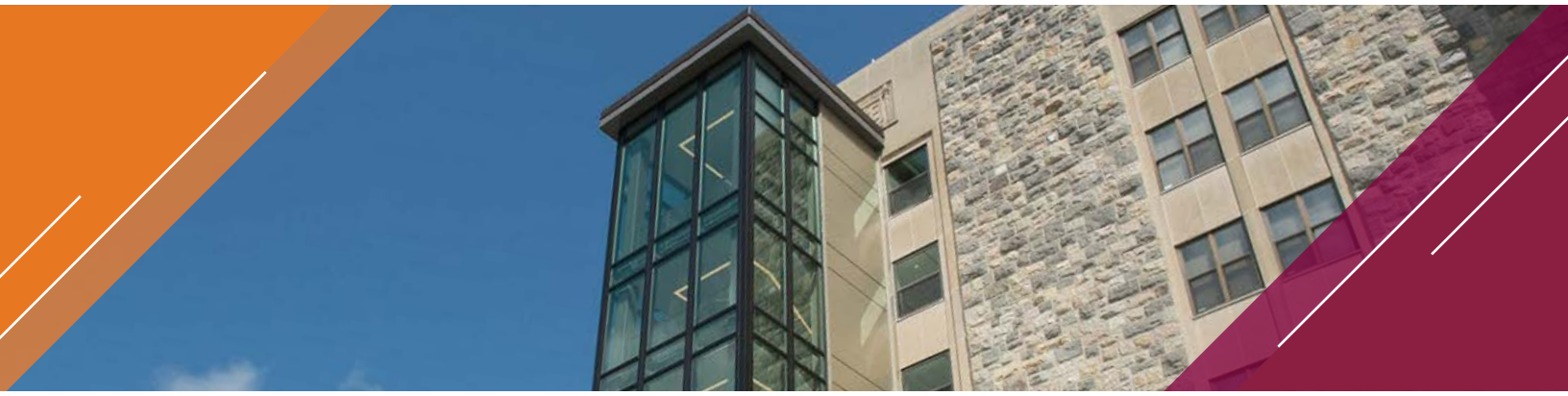
- *Currently, projects are managed by the Facilities Renovations group and all work has historically required UBO review and permit.*
- *The UBO has recently lifted the review and permit requirement for agricultural buildings meeting certain criteria, which will assist with expediting projects.*
- *In addition, Facilities is working with CALS to identify other methods of project management (through a delegation of authority) that could reduce management fees for many facilities projects.*
- *The university is also working with the state to mitigate the impact of capital project definitions (aka: the 5,000 sq. ft. rule) on overall project costs.*

Summary

- *ARECs are the gateway to VT for many communities, particularly in rural areas*
- *Impressive level of engagement with private industry*
- *CALS and VT investment in ARECs, while significant, is not keeping up with the needs*
- *Significant need for preventive maintenance, connectivity, infrastructure and capital projects*
- *Developing different policies/mechanisms for procurement and delegated authorities for ARECs*

FACILITIES
VIRGINIA TECH

University Building Official
Facilities Department (0529)
Sterrett Facilities Complex, Virginia Tech
230 Sterrett Drive, Blacksburg, VA 24061
540-231-4300



University Building Official Annual Report

Metrics and Major Accomplishments

April 1, 2018 - March 31, 2019

Background

The Virginia Tech Office of the University Building Official has primary responsibility for the proper management for, and enforcement of, the Virginia Uniform Statewide Building Code to ensure that construction projects conducted on property owned by the university are completed in compliance with the code, related laws, and regulations.

The office serves as primary liaison with outside regulatory agencies on code issues that affect the design, construction, and approval to occupy new university facilities or maintain existing facilities.

The office was established in July 2010 after the Restructured Higher Education Financial and Administrative Operations Act of 2005 and the Management Agreement with the Commonwealth of Virginia granted the university the authority to designate its own building official.

The Board of Visitors approved a resolution to establish a University Building Official and Building Code Review Unit in June 2008, and the office was established in July 2010. Formal delegation of building official authority was transferred from the Bureau of Capital Outlay Management to the new university building official in June 2011.

This report serves as an annual summary of activities from the Virginia Tech university building official (UBO). As prescribed in University Policy 5407, the annual report will identify the code enforcement and building permit activities performed during the prior year.

Metrics and Major Accomplishments

April 1, 2018 - March 31, 2019

Metrics

2,172 Total Reviews

1,322 Total Permits

2,485 Total Inspections

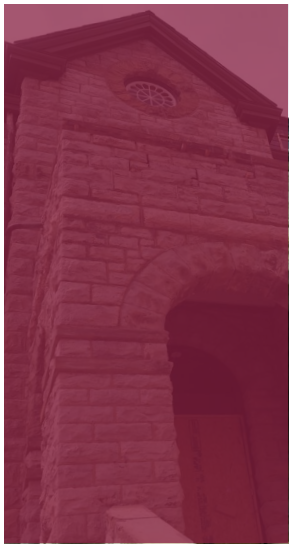
Including:
909 small project reviews

Fully implemented the Small Project Review Process and reviewed:
909 projects in 38 small project review sessions

Total Certificates of Occupancy

4

College of Liberal Arts and Human Sciences Building



O'Shaughnessy Hall

Davidson Hall

Sandy Hall

Operational Improvements

The UBO office has implemented a series of operational improvements to enhance service delivery and create greater alignment with existing university technologies.

The UBO office transitioned to electronic document submittal, plan review, and approval stamping. The building permits process is expected make the electronic transition in the near future. The electronic transition has consolidated UBO materials in one central location, enabling a more structured review process, less bottlenecks, and improved timeliness for service delivery.

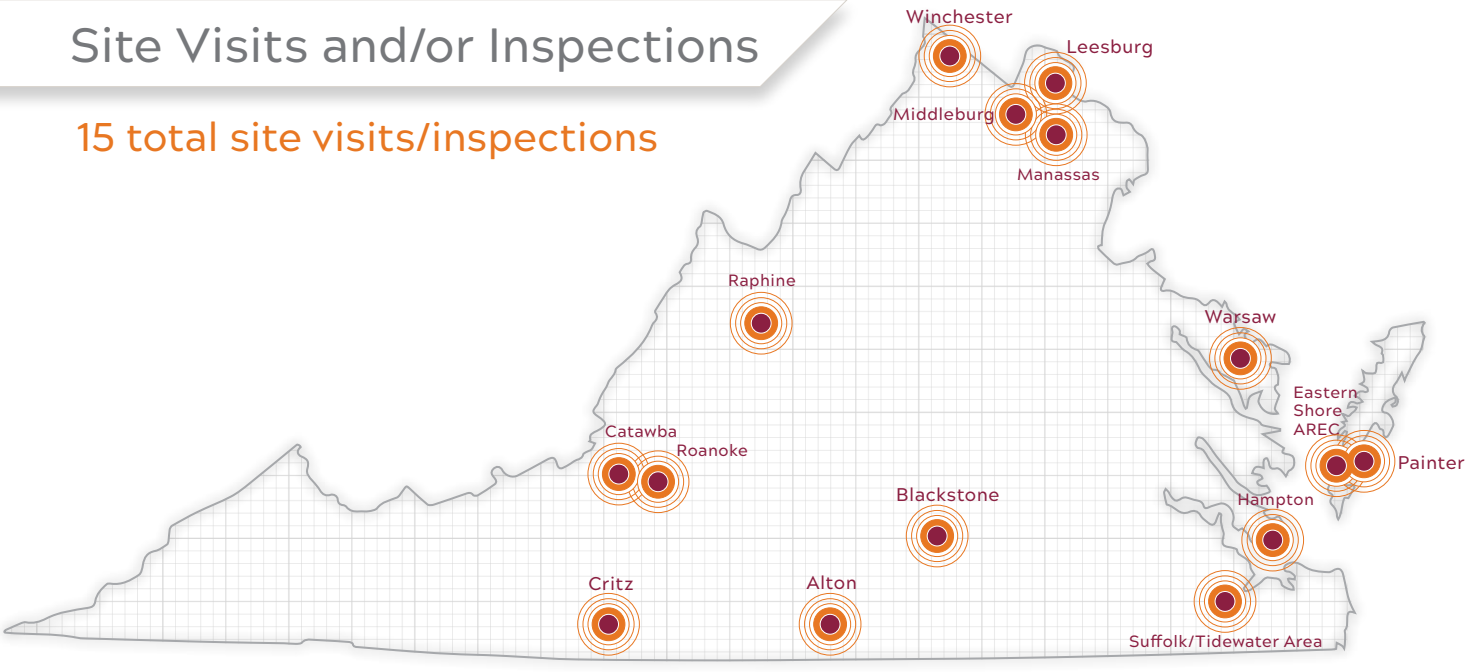
Integration of UBO tracking and reporting into HokieServ is another operational improvement. HokieServ is used to manage approximately 30,000 work orders generated yearly through the Facilities Department. The system interfaces with HokieMart as a vendor to receive Interdepartmental Service Requests and as a purchaser associating all purchases with the related work orders.

The integration into HokieServ will offer UBO clients the opportunity to utilize one, centralized system to submit UBO and Facilities requests. The integration will also offer improved onsite technical assistance when compared to the previous UBO tracking system. The transition to HokieServ is expected to deliver nearly $10,000 in annual savings. The integration is currently in its final stages.

In addition, the UBO office edited and streamlined the majority of its forms to improve client usability. The UBO website was also updated with the latest university branding to achieve compliance with Virginia Tech branding standards.

Site Visits and/or Inspections

15 total site visits/inspections



Personnel and Professional Development Updates

The UBO team continues to expand in order to meet the need for top-notch customer service. This growth of expertise and organizational capacity has helped the team deliver the highest and most timely service possible to the university community.

Over the past year, new members joining the team have included John Bush, architect, who ensures accessibility issues are fully reviewed and inspected; Marie Castillo, part-time permit technician, who improves UBO efficiency through logging in plans, notifying clients of review and permit status, and archiving documents both during and after completion; Jack Thompson, building code plan reviewer and inspector, assumed responsibility of all electrical review and inspection duties after the retirement of Joe Zokaites; and Tim Hagedorn, structural building code plan reviewer and inspector, who joined the team in an official capacity. Steve Smith continues to serve as building code plan reviewer, responsible for mechanical, plumbing, and fuel gas reviews and inspections. Header Snidow continues to serve as permit technician and administrative coordinator for the UBO team.

Furthermore, **Elaine Gall** transitioned from interim to full-time university building official.

The UBO team continues to take a proactive approach in capacity building and succession planning. An ongoing goal for the department is for all members to obtain Certified Building Official (CBO) certification. Team members are also encouraged to take advantage of ongoing training and professional development opportunities offered through the state and professional associations.

Annual Report of the University Building Official

ELAINE B. GALL, P.E., CBO

JUNE 3, 2019

VIRGINIA TECH™

Background

BRIEF HISTORY

Office Established

Following Restructured Higher Education Financial & Administrative Operations Act of 2005 and the Management Agreement with the Commonwealth.

Established a University Building Official & Building Code Review Unit

2008

2010

2011

Formal Delegation

Building official authority was transferred from the Bureau of Capital Outlay Management to the new university building official.

2019

Present State

Metrics & Major Accomplishments

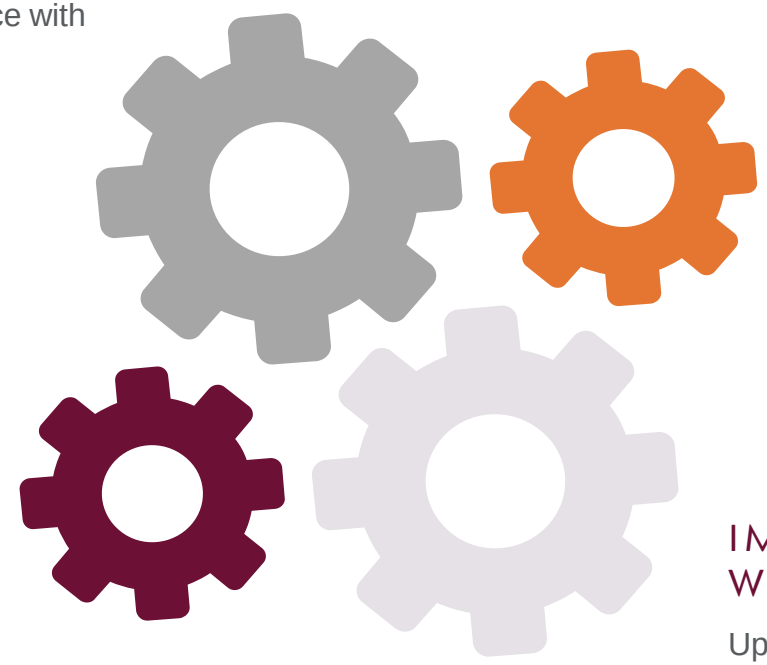
OPERATIONAL IMPROVEMENTS

IMPROVED WORK FLOW & TRACKING

Improved tracking and reporting with HokieServ allows the system to interface with the university's procurement system, HokieMart.

CENTRALIZED SYSTEM

HokieServ provides an improved client experience with a centralized system to submit UBO and Facilities requests.



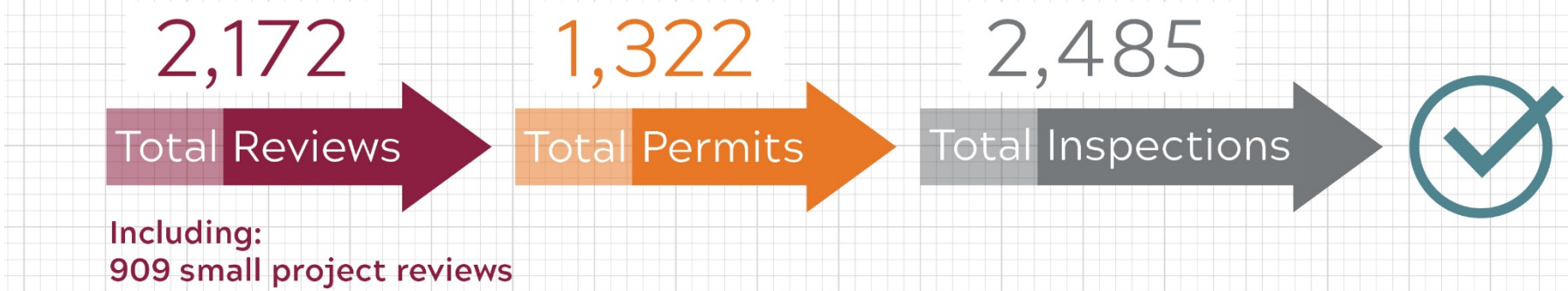
ELECTRONIC SUBMISSION

Document submittals, plan reviews, and approval stamping allow for a structured review process, fewer bottlenecks, and improved timeliness for service delivery.

IMPROVED FORMS & WEB PRESENCE

Updated and streamlined forms to improve client usability. Website was updated to improve functionality and comply with brand standards.

Metrics



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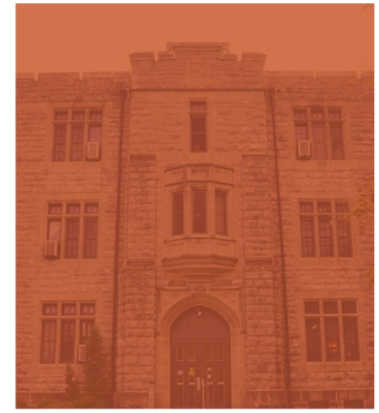
O'Shaughnessy Hall

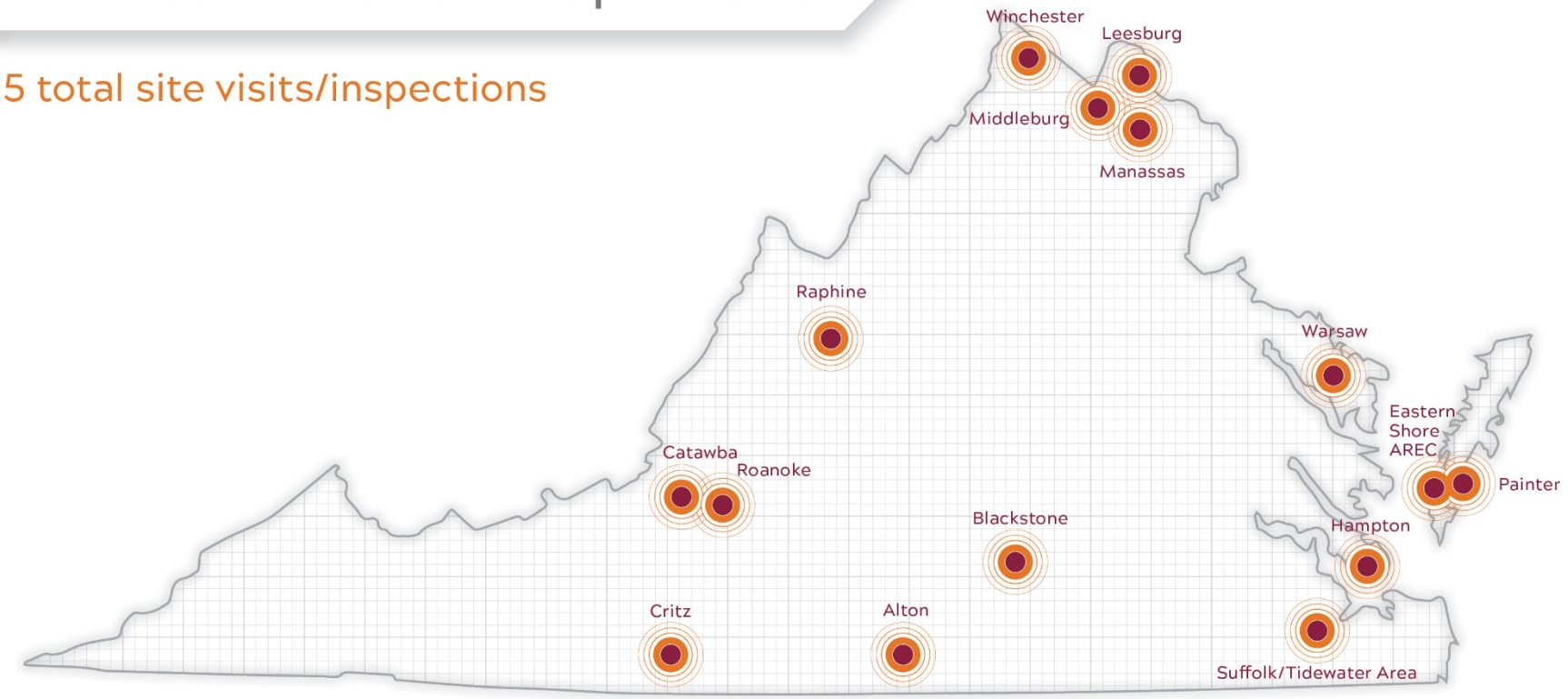
College Liberal Arts and Human Sciences Building

Sandy Hall



Site Visits and/or Inspections

15 total site visits/inspections



PERSONNEL

Elaine Gall, university building official

John Bush, architect

Ensures accessibility issues are fully reviewed and inspected.

Steve Smith, building code plan reviewer

Responsible for mechanical, plumbing, and fuel gas reviews and inspections.

Marie Castillo, permit technician

Logs plans, notifies clients of review and permit status, archives documents both during and after completion in a part-time role.

Heather Snidow, office manager

Serves as a permit technician and administrative coordinator for the team.

Tim Hagedorn, building code plan reviewer

Serves as the structural building code plan reviewer and inspector.

Jack Thompson, building code plan reviewer

Responsible for all electrical review and inspection duties.

Outcomes & Looking Ahead

IN CLOSING

GOAL: BOOST UBO SERVICE DELIVERY EFFICIENCY THROUGH TECHNOLOGICAL & OPERATIONAL IMPROVEMENTS

2018-19 OUTCOMES:

- Improved, more timely customer service delivery
- New, annual administrative cost savings
- Enhanced partnerships with clients across university; bolsters overall culture of compliance

LOOKING AHEAD:

- Personnel growth presents new opportunities for succession planning
- UBO team members must continue to engage in professional development opportunities
- Continue to leverage technology to drive deeper partnerships within Facilities, across university

CONTACT THE UBO TEAM

vtubo-g@vt.edu

540-231-5534

facilities.vt.edu/about/departments-and-units/university-building-official

Sterrett Facilities Complex
230 Sterrett Drive
Blacksburg, VA 24061

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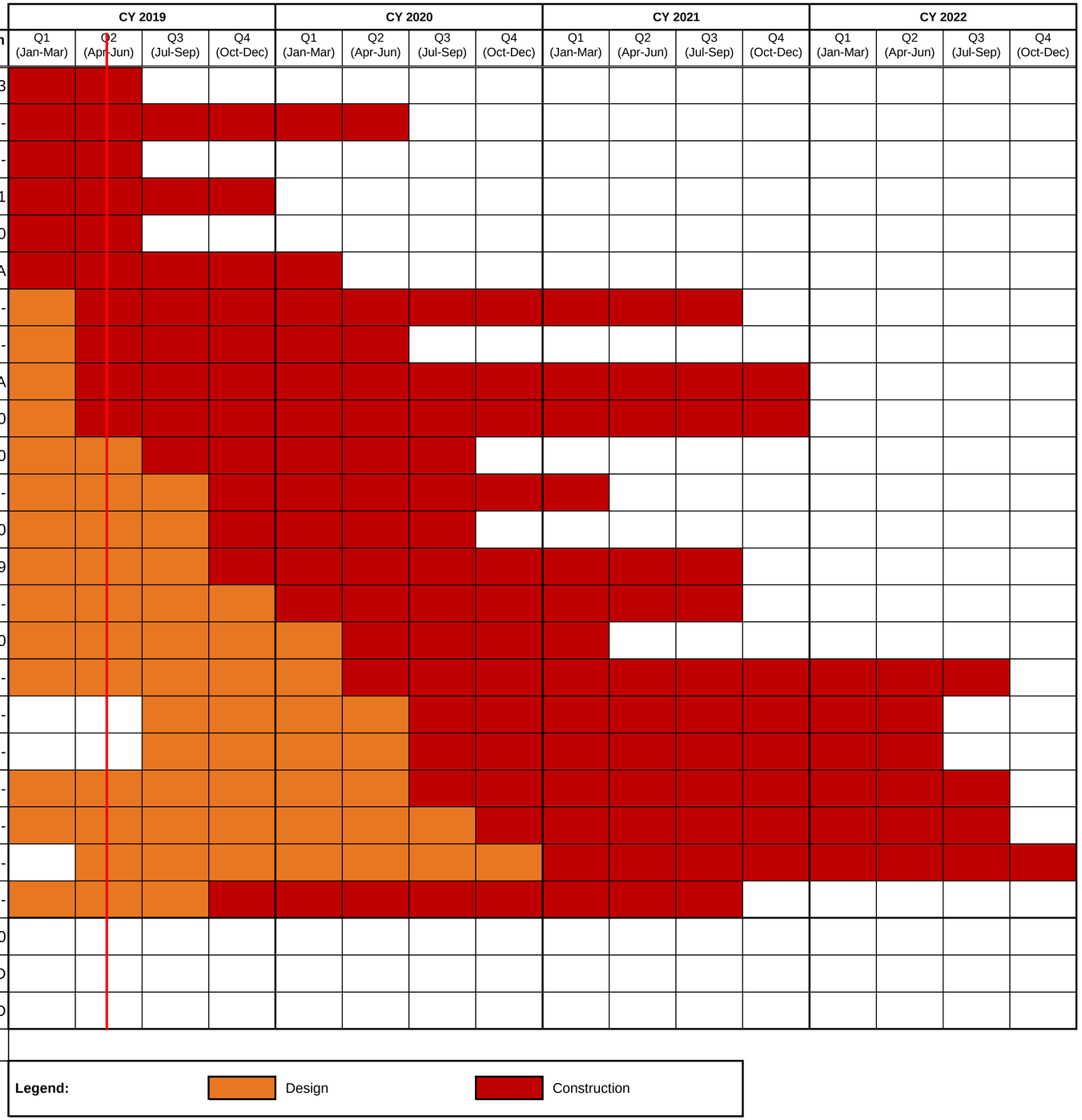
Capital Construction Executive Summary

Date Prepared: May 17, 2019

Project Title	Total Project Cost, $M	New Const (SF)	Renovation (SF)
Renovate/Renew Academic Buildings	$35.0	7,743	56,563
VTC Biomedical Research Expansion (PPEA)	$91.7	139,586	-
ACC Network Studio	$10.0	4,161	-
Undergraduate Science Lab (Renovations - Derring & Hahn Halls)	$10.0	338	14,781
Commonwealth Ballroom -- Squires	$3.2	0	13,800
New Package Boiler #12	$6.8	N/A	N/A
Creativity & Innovation District Living Learning Community	$105.5	225,000	-
Improve Kentland Facilities (Phase II) -- Various Locations	$12.5	28,403	-
Chiller Plant Phase II	$41.3	N/A	N/A
Holden Hall Renovation	$72.3	81,000	20,240
Student Athlete Performance Center (Jameson Hall)	$16.7	10,800	15,000
Livestock & Poultry Research Facilities (Phase I) -- Various Locations	$22.5	128,895	-
Merryman Center Weight Room Renovations	$4.9	4,880	17,640
Student Wellness Improvements (War Memorial Gym & McComas Hall)	$58.7	15,315	247,619
HITT Hall and New Dining Facility	$68.0	102,000	-
Dietrick Dining Hall First Floor Enclosure & Spirit Plaza	$8.3	6,298	11,960
Corps Leadership & Military Science Building	$52.0	75,500	-
New Upper Quad Residence Hall (Femoyer Hall Replacement)	$33.0	54,500	-
Global Business & Analytics Complex (GBAC) Residence Halls	$84.0	160,000	-
Undergraduate Science Lab (New)	$74.8	102,000	-
Slusher Hall Replacement	TBD	TBD	-
Data & Decision Sciences Building (D&DS)	$79.0	120,000	-
Multi-Modal Transit Facility	$34.0	13,606	-
Tennis Facility Addition & Renovation	TBD	6,731	150
Surge Building Replacement & Parking Structure (VT Foundation)	TBD	TBD	TBD
Northern Virginia Center Falls Church (PPEA)	TBD	TBD	TBD
TOTALS	**$924.2**	**1,286,756**	**397,753**



Capital Construction Executive Summary - Major Vertical Structures Only

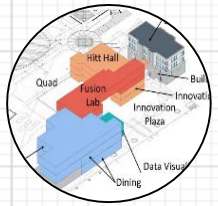
Date Prepared: May 17, 2019

Project Title	Total Project Cost, $M	New Const (SF)	Renovation (SF)	CY 2019 Q1 (Jan-Mar)	CY 2019 Q2 (Apr-Jun)	CY 2019 Q3 (Jul-Sep)	CY 2019 Q4 (Oct-Dec)	CY 2020 Q1 (Jan-Mar)	CY 2020 Q2 (Apr-Jun)	CY 2020 Q3 (Jul-Sep)	CY 2020 Q4 (Oct-Dec)	CY 2021 Q1 (Jan-Mar)	CY 2021 Q2 (Apr-Jun)	CY 2021 Q3 (Jul-Sep)	CY 2021 Q4 (Oct-Dec)	CY 2022 Q1 (Jan-Mar)	CY 2022 Q2 (Apr-Jun)	CY 2022 Q3 (Jul-Sep)	CY 2022 Q4 (Oct-Dec)
VTC Biomedical Research Expansion (PPEA)	$91.7	139,586	-	Construction	Construction	Construction	Construction	Construction	Construction										
Creativity & Innovation District Living Learning Community	$105.5	225,000	-	Design	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction					
Improve Kentland Facilities (Phase II) -- Various Locations	$12.5	28,403	-	Design	Construction	Construction	Construction	Construction	Construction										
Holden Hall Renovation	$72.3	81,000	20,240	Design	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction				
Livestock & Poultry Research Facilities (Phase I) -- Various Locations	$22.5	128,895	-	Design	Design	Design	Design	Construction	Construction	Construction	Construction	Construction							
Student Wellness Improvements (War Memorial Gym & McComas Hall)	$58.7	15,315	247,619	Design	Design	Design	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction					
HITT Hall and New Dining Facility	$68.0	102,000	-	Design	Design	Design	Design	Construction	Construction	Construction	Construction	Construction	Construction	Construction					
Corps Leadership & Military Science Building	$52.0	75,500	-	Design	Design	Design	Design	Design	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	
New Upper Quad Residence Hall (Femoyer Hall Replacement)	$33.0	54,500	-			Design	Design	Design	Design	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction		
Global Business & Analytics Complex (GBAC) Residence Halls	$84.0	160,000	-			Design	Design	Design	Design	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction		
Undergraduate Science Lab (New)	$74.8	102,000	-	Design	Design	Design	Design	Design	Design	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	
Slusher Hall Replacement	TBD	TBD	-	Design	Design	Design	Design	Design	Design	Design	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	
Data & Decision Sciences Building (D&DS)	$79.0	120,000	-		Design	Design	Design	Design	Design	Design	Design	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction
Multi-Modal Transit Facility	$34.0	13,606	-	Design	Design	Design	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction					
Surge Building Replacement & Parking Structure (VT Foundation)	TBD	TBD	TBD																
Northern Virginia Center Falls Church (PPEA)	TBD	TBD	TBD																
TOTALS	**$788.0**	**1,245,805**	**267,859**																

Legend: Design; Construction

Construction Beginning Summer/Fall 2019

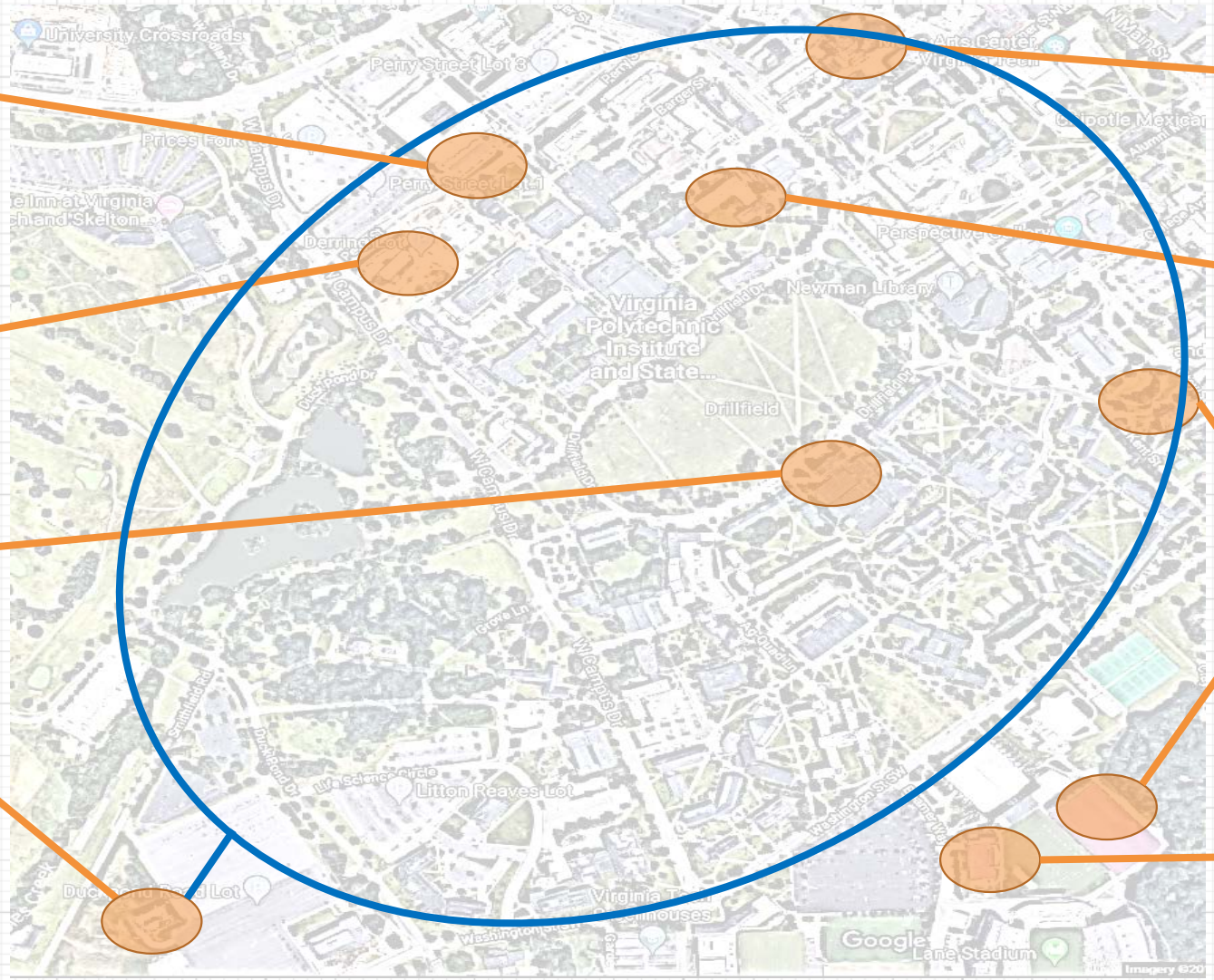
MMTF
Fall 2019
$34M



HITT Hall and New Dining
Winter 2019
$68M

Student Wellness
Summer 2019
$58M

Chiller Plant Phase II
Spring 2019
$41.3M



Package Boiler 12
Summer 2019
$6.8M

Holden Hall
Summer 2019
$72.3M

CID LLC
Spring 2019
$105.5M

Student Athlete Performance Center
Summer 2019
$16.7M

Merryman Center Weight Room
Fall 2019
$4.9M

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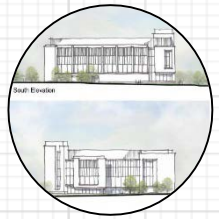
Anticipated Construction Beginning 2020

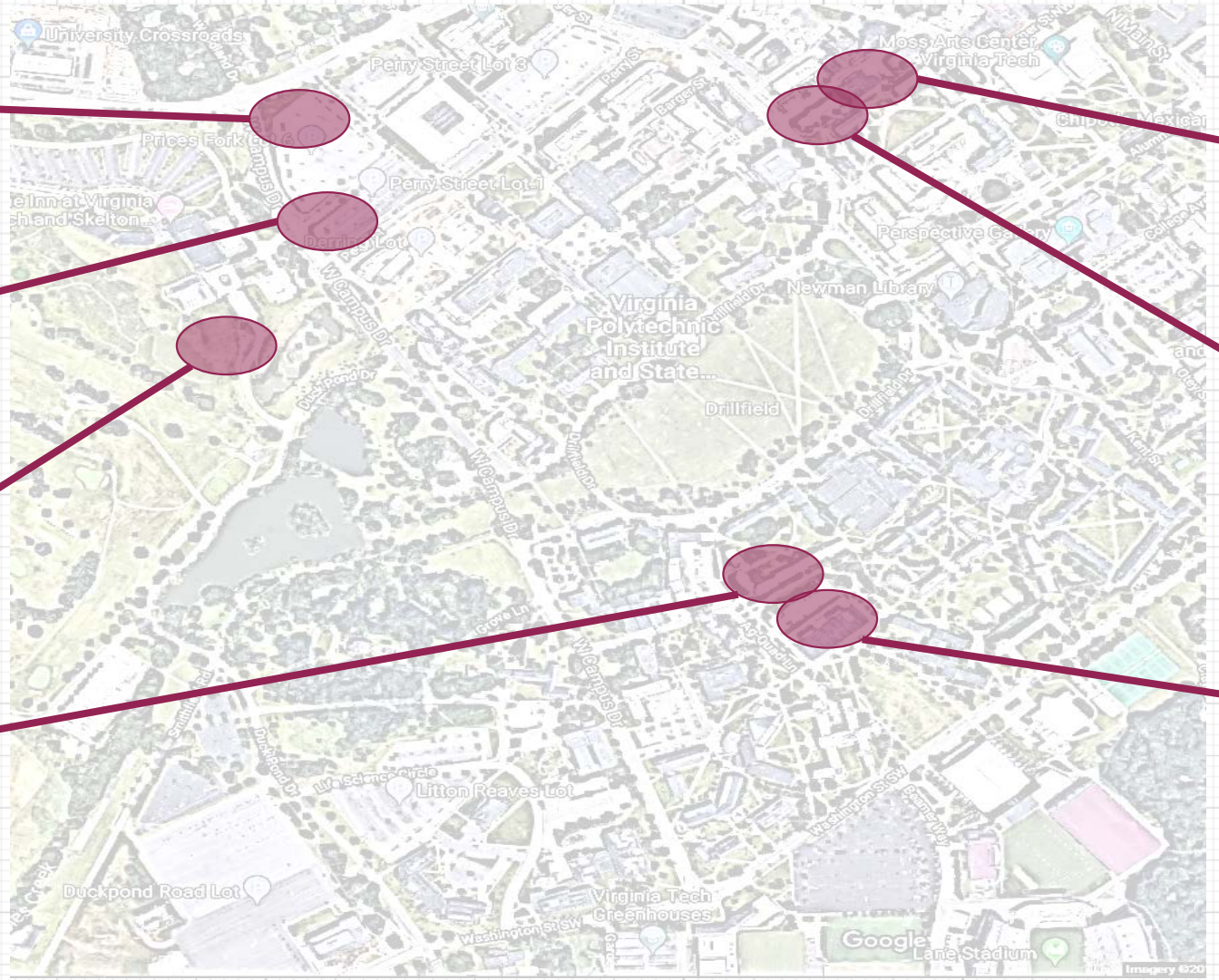
D&DS
$79M



Undergraduate Science Lab (New)
$ TBD

GBAC LLCs
$ TBD

Slusher Hall Replacement
$ TBD



CLMS
$ TBD

Femoyer Replacement
$ TBD

Dietrick Plaza
$8.3M

FACILITIES
VIRGINIA TECH

Potential Capital Construction On Campus 2020

D&DS

MMTF

Undergraduate Science Lab (New)

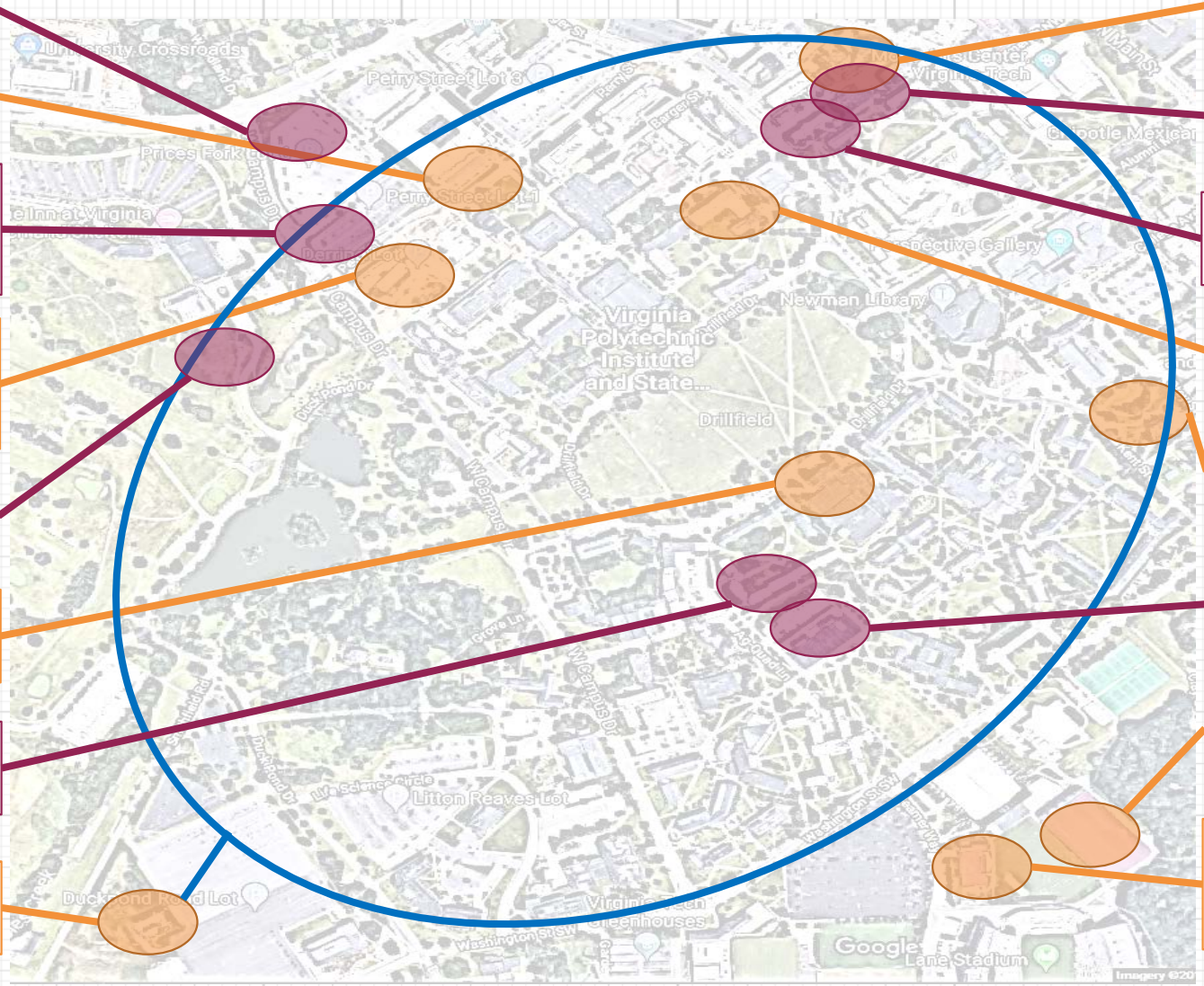
HITT Hall and New Dining

GBAC LLCs

Student Wellness

Slusher Hall Replacement

Chiller Plant Phase II



Package Boiler 12

CLMS

Femoyer Replacement

Holden Hall

CID LLC

Dietrick Plaza

Student Athlete Performance Center

Merryman Center Weight Room

FACILITIES
VIRGINIA TECH

DESIGN PREVIEW FOR MERRYMAN CENTER WEIGHT ROOM RENOVATION & EXPANSION

The Merryman Center Weight Room Renovation and Expansion project represents an additional Virginia Tech resource for student-athlete training and preparation. The project, in combination with the to-be constructed Student-Athlete Performance Center dining facility, will introduce spaces for a full spectrum of training needs in a centralized location. Practice facilities, strength training, classroom preparation, and dining facilities will all be located adjacent to one another.

With a minor addition, which remains within the footprint of the original building, the Merryman Center will accommodate new program spaces while maintaining the fundamental character of the original facility. Physical preparation (i.e., weight room) spaces are located on the lower level and largely consist of a renovation and reconfiguration. Mental preparation (i.e., classroom/meeting room) space is located on the upper level and will be housed in the newly constructed space.

All project funding will come from private gifts. The total project cost is estimated at $4.9 million.

Capital Project Information Summary – Merryman Center Weight Room Renovation & Expansion

BUILDINGS AND GROUNDS COMMITTEE

June 3, 2019

Title of Project:

Merryman Center Weight Room Renovation & Expansion Project

Location:

Located in the Virginia Tech Athletics District, the Merryman Center abuts Beamer Way between Lane Stadium and Washington Street. The project itself, on the east side of the building, faces the existing outdoor practice field and indoor practice facility.

Current Project Status and Schedule:

The project is currently in preliminary design. Design is targeted to conclude in fall 2019 with occupancy targeted for fall 2020.

Project Description:

The project helps to create an athletic quad-like experience centered on the outdoor practice field. Consisting of an expanded weight room, classroom meeting spaces, and grab 'n go dining, the project adds to a network of support spaces for student-athlete preparation and training. This expanded capacity enhances off-the-field training opportunities necessary for successful performance in competition.

Brief Program Description:

The project consists of seven key program elements. The major element is the renovated weight room (approximately 12,700 square feet). By combining two previously separated spaces, the renovation will expand strength and conditioning opportunities with new workout equipment and stations, as well as improved space for circulation between the stations. Position meeting rooms (approximately 4,400 square feet) will enable position-focused player meetings for game preparation and review. Directly adjacent to the weight room, coaches' offices (approximately 1,250 square feet) will facilitate off-the-field interaction with players. The project will also contain a small grab 'n go food service option (at approximately 650 square feet). Remaining space is devoted to entryway, circulation, and support spaces.

Contextual Issues and Design Intent:

The original late 1990's-era Merryman Center will remain largely intact with no visible signs of modification as viewed from Beamer Way. Renovation includes a

minor expansion to accommodate the position rooms. The new clear anodized storefront system, aluminum composite material column covers and spandrel panels will complement the existing Merryman Center while transparency, modulation, and proportions will knit together the Virginia Tech Athletics District including the proposed Student-Athlete Performance Center addition to the Jamerson Center.

Funding:

All project funding will come from private gifts. The total project cost is estimated at $4.9 million.

Architect/Engineer:

Colley Architects

General Contractor:

To be determined

June 3, 2019

Merryman Center Weight Room Renovation & Expansion

Board of Visitors Design Preview

VIRGINIA TECH

Merryman Center Weight Room Renovation & Expansion

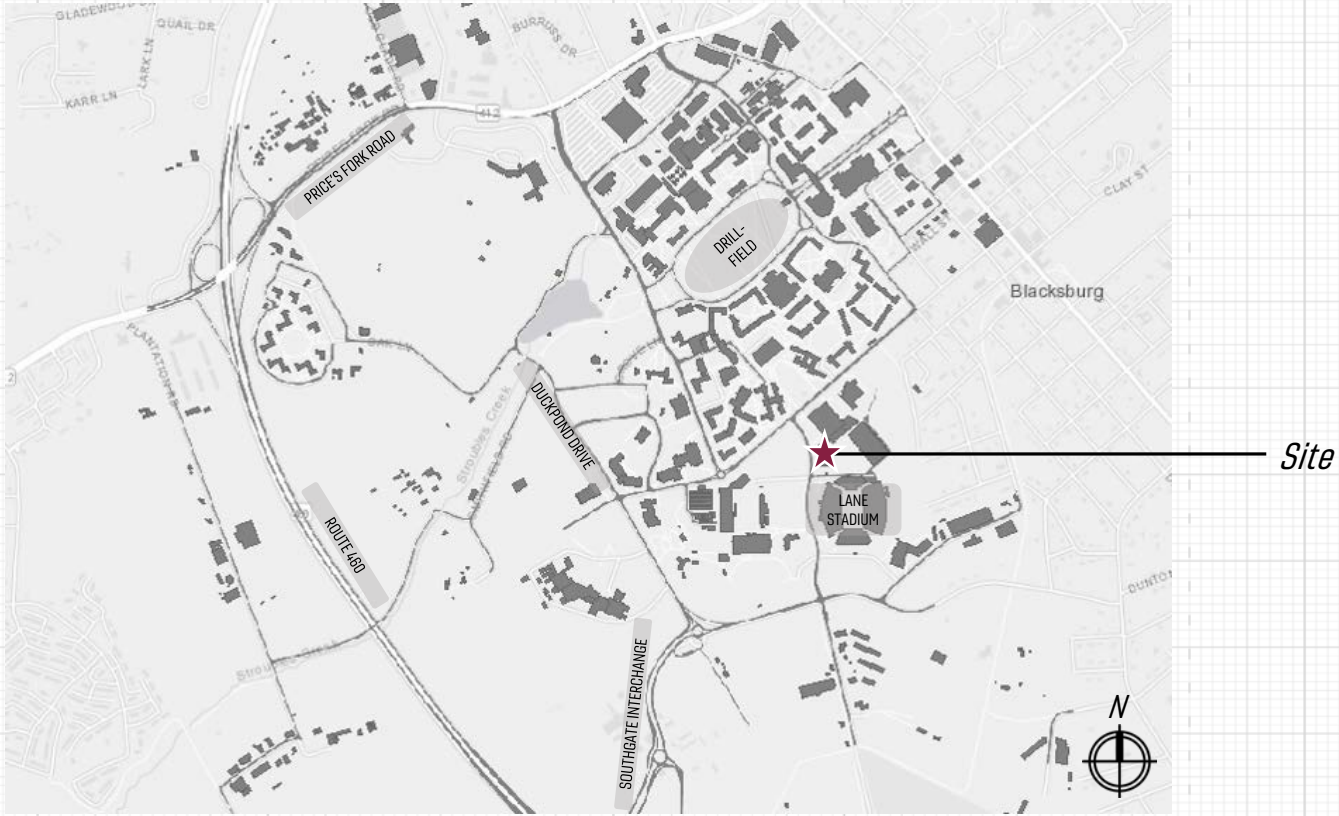
Project Information

- Scope: ~22,500 GSF
  - New Construction: ~2,600 GSF
  - Renovation: ~19,900 GSF
- Delivery Method: Design-Bid-Build
- Funding (Max. Authorized): $4.9 million
- Design Phase: Preliminary
- Construction Start: Late fall 2019
- Targeted Occupancy: Fall 2020

VIRGINIA TECH

Merryman Center Weight Room Renovation & Expansion

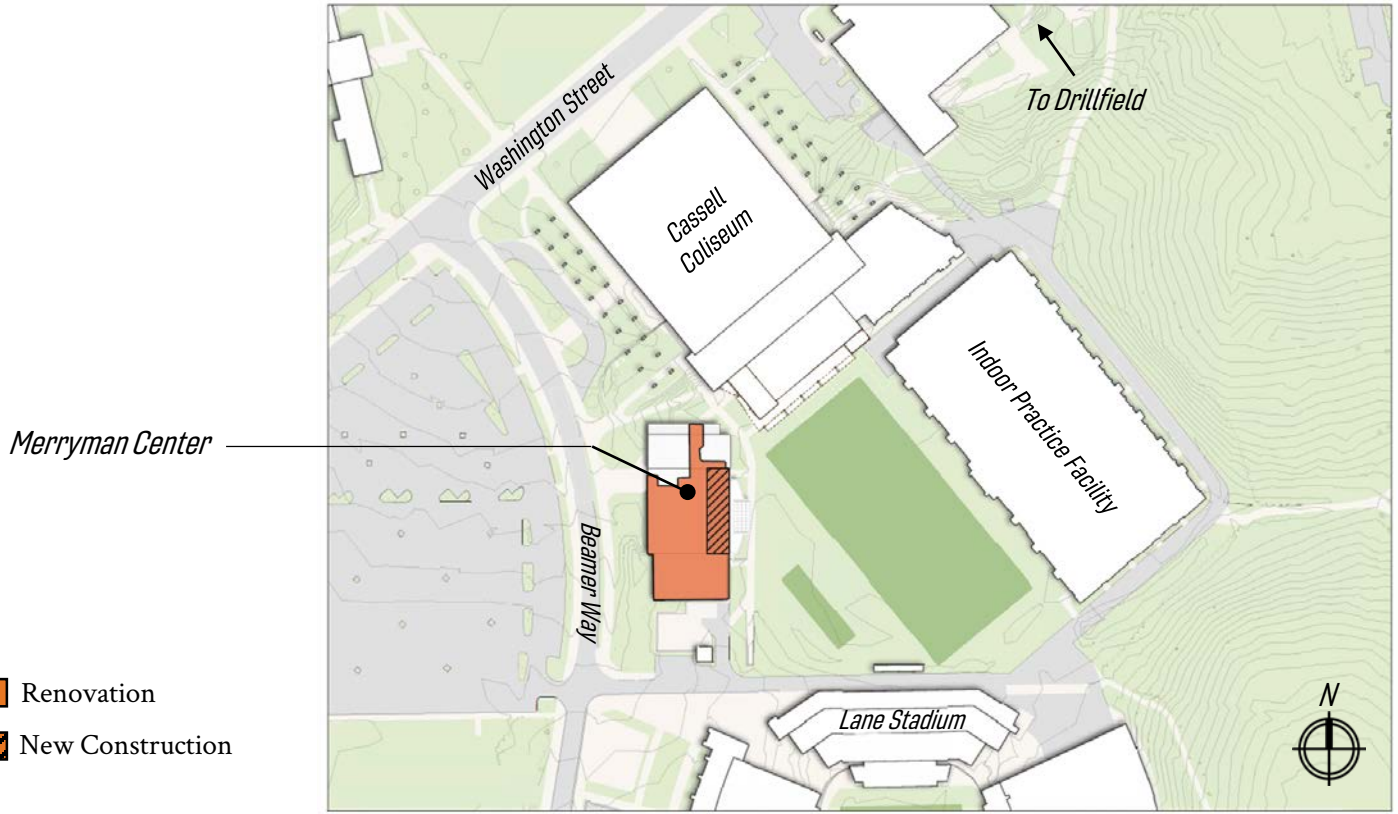
Project Location



VIRGINIA TECH

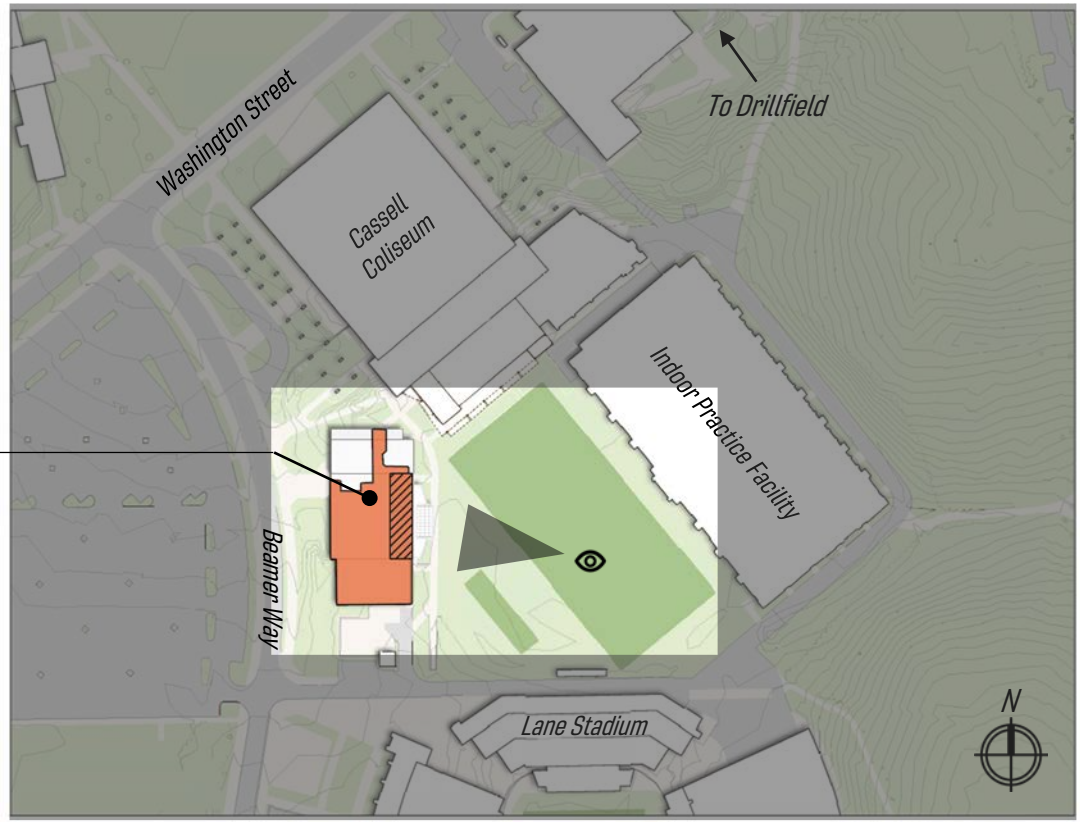
Merryman Center Weight Room Renovation & Expansion

Site Plan



Merryman Center Weight Room Renovation & Expansion

Site Plan



Merryman Center Weight Room Renovation & Expansion

Existing Condition (Exterior)

Merryman Center Weight Room Renovation & Expansion

Proposed Condition (Exterior)

New story

New entryway

Merryman Center Weight Room Renovation & Expansion

Existing Condition (Entryway & Glazing)

Merryman Center Weight Room Renovation & Expansion

Proposed Condition (Entryway & Glazing)

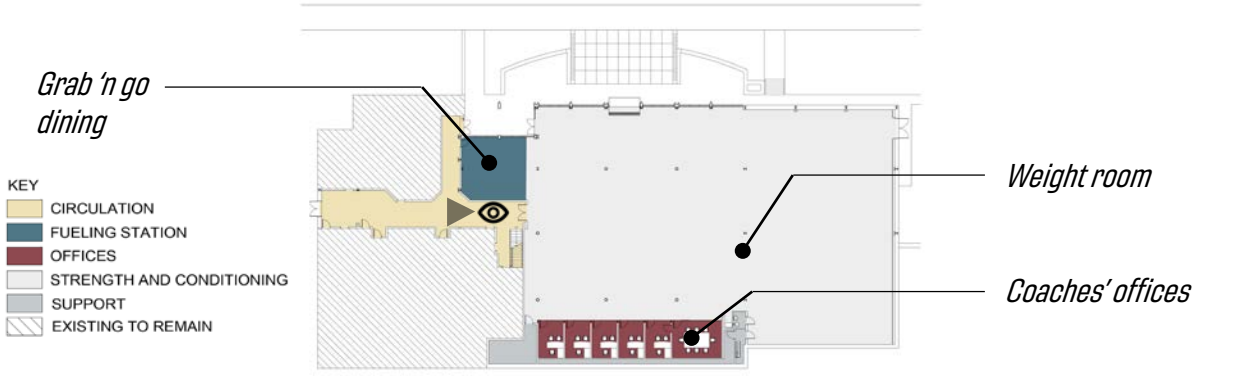
Anodized aluminum column covers

Storefront glazing system

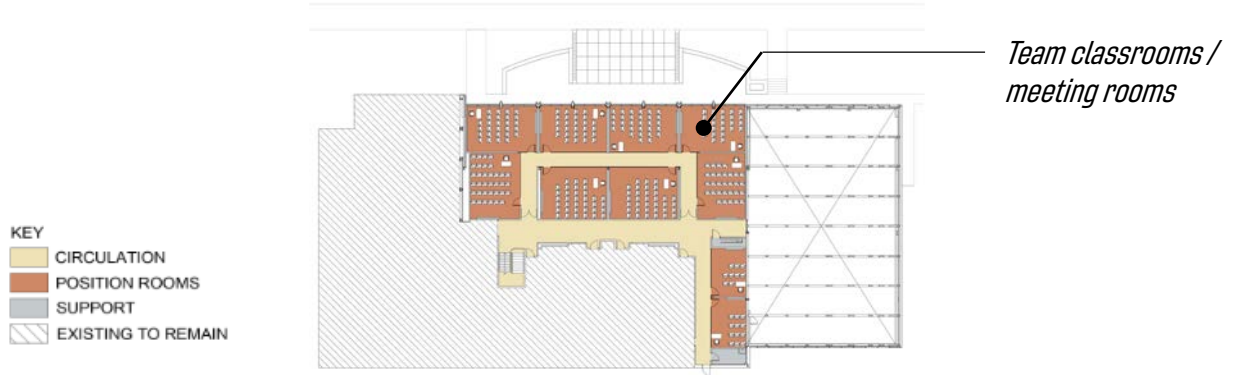
Merryman Center Weight Room Renovation & Expansion

Floor Plans

Lower Level



Main Level

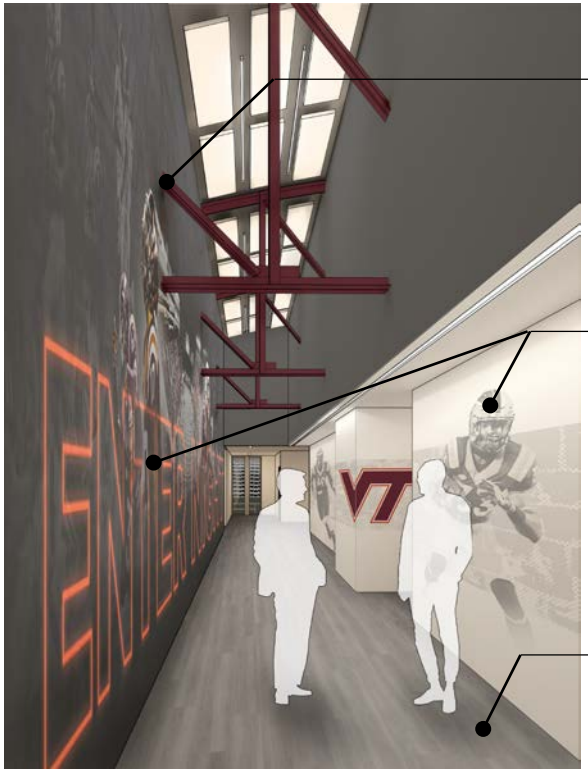


Merryman Center Weight Room Renovation & Expansion

Existing & Proposed Conditions (Entry Sequence)

Existing

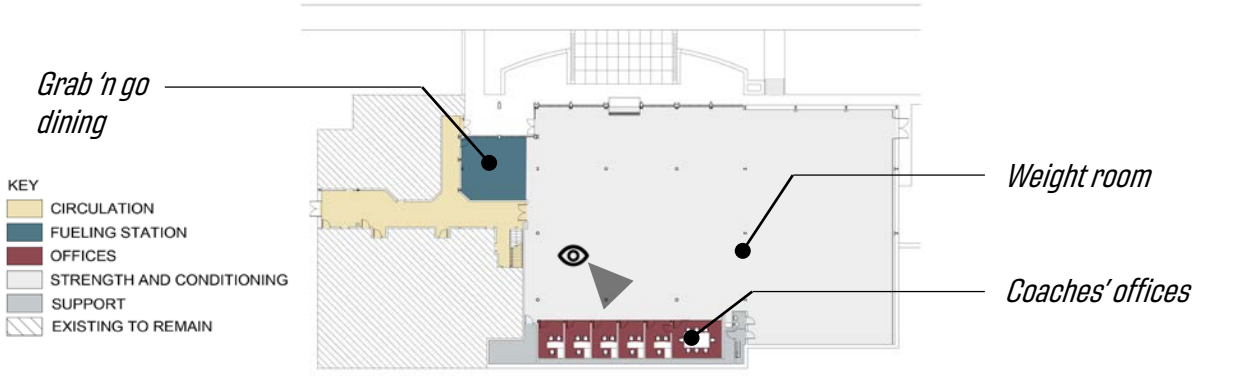
Proposed



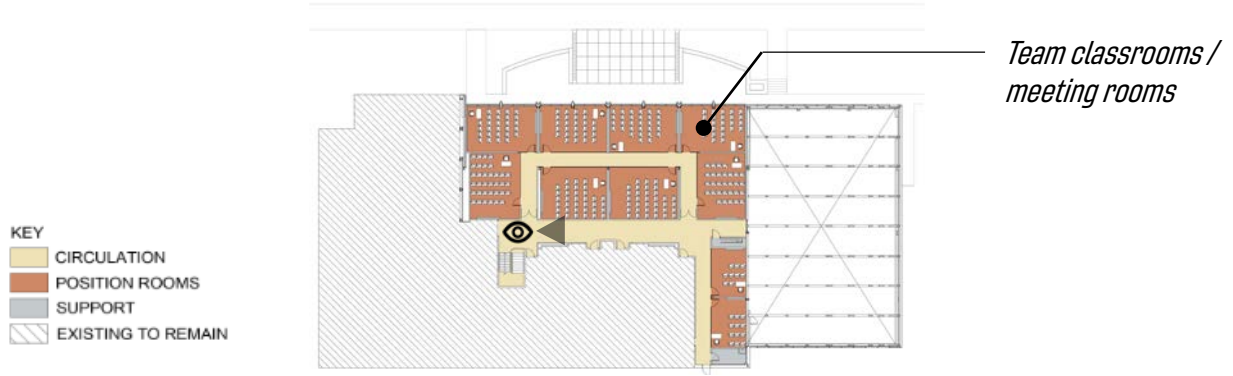
Merryman Center Weight Room Renovation & Expansion

Floor Plans

Lower Level



Main Level



Merryman Center Weight Room Renovation & Expansion

Interior Renderings (Weight Room & Position Rooms)

Lower Level

Coaches' offices

Graphics package

Weight room (sports flooring)

Main Level

Graphics package

Position rooms

Luxury Vinyl Tile

Merryman Center Weight Room Renovation & Expansion

Recommendation

- That the Design Preview graphics be approved, and authorization be provided to continue with the project design consistent with the drawings shown.

VIRGINIA TECH

DESIGN REVIEW FOR THE CREATIVITY AND INNOVATION DISTRICT LIVING-LEARNING COMMUNITY

The Creativity and Innovation District Living-Learning Community (CID LLC) is a new residence hall to be located on the eastern edge of the Blacksburg campus. At approximately 600 beds and 234,000 gross square feet of space, this project helps the institution develop the capacity to meet its enrollment growth goals. In addition, this facility serves an educational, as well as a residential, function.

Its space program promotes student interaction and transdisciplinary engagement. For project efficiency, the university selected a design-build delivery method. Construction is targeted to begin in spring 2019 with building occupancy targeted for summer 2021.

This $105.5 million project was first proposed as part of the 2018-2024 Capital Outlay Plan. Funding will be derived primarily from debt instruments supported by university resources (i.e., auxiliary revenues from the Division of Student Affairs and the Athletic Department). General education, rather than residential, space in the facility will be occupied under a facility use agreement.

Capital Project Information Summary – Creativity and Innovation District Living Learning Community

BUILDINGS AND GROUNDS COMMITTEE

June 3, 2019

Title of Project:

Creativity and Innovation District Living Learning Community (CID LLC)

Location:

The project is located on the eastern edge of Virginia Tech's Blacksburg Campus. Directly south of the existing Graduate Life Center, the site is bound by Otey Street, Wall Street, and Kent Street. It is located across from the existing Vawter and Barringer residence halls.

Current Project Status and Schedule:

The project is currently in working drawings and early site work is scheduled to conclude in the near future. Following design approval, vertical construction will begin. Substantial completion is targeted for summer 2021 with occupancy to begin for the fall 2021 academic semester.

Project Description:

CID LLC is a six-story, approximately 600 bed, residence hall. It is also an important element of advancing the university's Beyond Boundaries strategy through the built environment. The facility contains a blend of academic and residential spaces. This mix will help create a high level of energy and activity in the Creativity and Innovation District. Academic uses will increase daytime visits while residents will contribute activity at non-class hours and on weekends. Its integration of learning space and faculty-student engagement also helps intentionally blend the living and learning experiences on campus.

Brief Program Description:

The building program focuses on creating spaces for community, engagement, and creativity. On the ground floor, common and educational spaces are connected by corridors featuring exhibition opportunities for student creations (as well as windows into educational spaces). These moments allow pedestrians to witness the wide variety of making, performance, and innovation happening within the building. Residential spaces are also organized to promote connection and a sense of community at multiple scales. Clustering rooms in groups allows students to create micro-communities on each floor. By bringing them together through a central core with shared lounge space and common circulation, groups are encouraged to interact and develop a common floor identity.

Contextual Issues and Design Intent:

Contextually, a focus on community is integrated into the building's exterior spaces and entry into the facility. The CID LLC's primary entry and circulation are designed to engage the natural pedestrian pathway already existing through the site. The layout encourages students and faculty to enter through the primary northern entrances, promoting opportunities for strategic collisions among diverse members of the CID. Each of the building's primary public spaces also connects with a corresponding landscape space or courtyard, which are developed to respond to the unique conditions and needs of the adjacent program and use. Primary exterior materials include precast concrete, Hokie Stone, insulated metal panels, aluminum frame windows, storefront, and curtainwall, synthetic slate shingles, standing seam metal roof, and a green roof system.

Funding:

This $105.5 million project was first proposed as part of the 2018-2024 Capital Outlay Plan. Funding will be derived primarily from debt instruments supported by university resources (i.e., auxiliary revenues from the Division of Student Affairs and the Athletic Department). General education, rather than residential, space in the facility will be occupied under a facility use agreement.

Design/Build Team:

Hanbury & WM Jordan

June 3, 2019

Creativity and Innovation District Living-Learning Community

Board of Visitors Design Review

VIRGINIA TECH

CID LLC

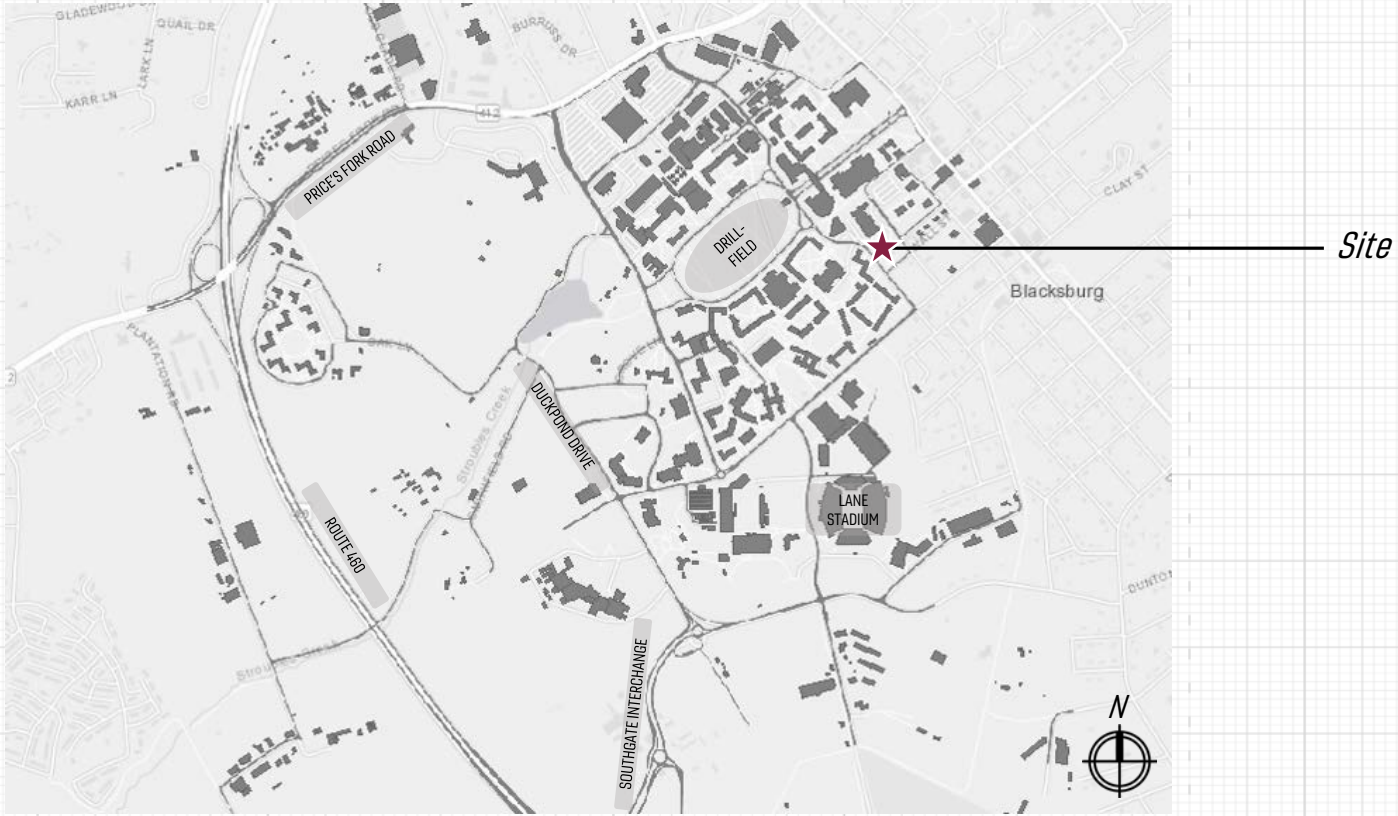
Project Information

- New Construction: ~ 234,000 GSF
- Delivery Method: Design-Build
- Funding (Max. Authorization): $105.5 Million
- Design Phase: Working Drawings
- Construction Start: Spring 2019
- Targeted Occupancy: Summer 2021

VIRGINIA TECH

CID LLC

Project Location



VIRGINIA TECH

CID LLC

Existing Condition

VIRGINIA TECH

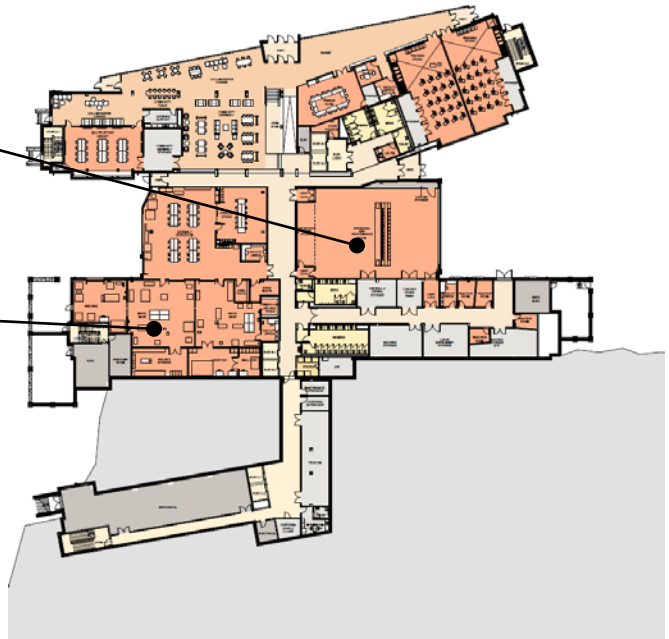
CID LLC

Site Plan

CID LLC

Floor Plans

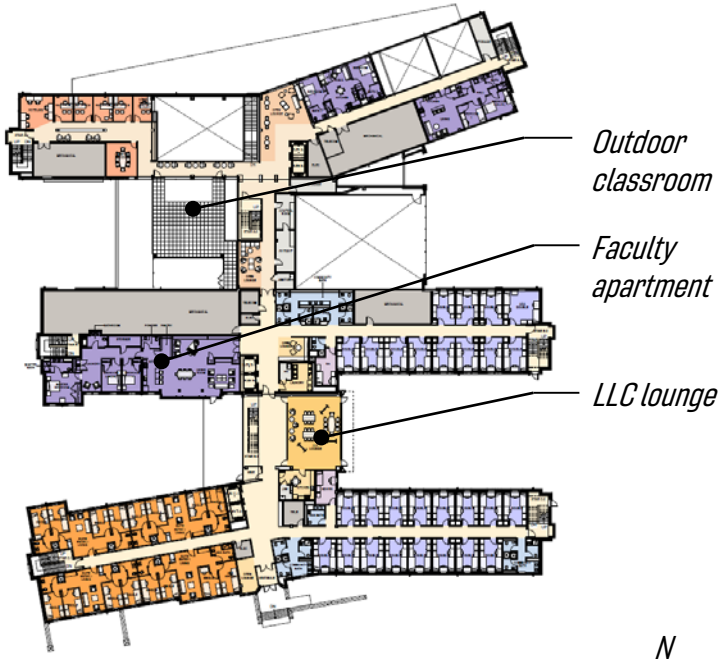
First Floor



ROOM TYPE LEGEND

- LOUNGE
- STUDY
- MULTI-PURPOSE ROOM
- LAUNDRY / KITCHEN
- HOUSING - CIRCULATION
- HOUSING - DOUBLE
- BATHROOM
- HOUSING - RA
- HOUSING - SUITE
- STAFF APARTMENT
- PUBLIC - BATHROOM
- PUBLIC - CIRCULATION
- PUBLIC - COMMON SPACE
- PUBLIC - PROGRAM
- BUILDING SUPPORT
- SERVICE / STORAGE

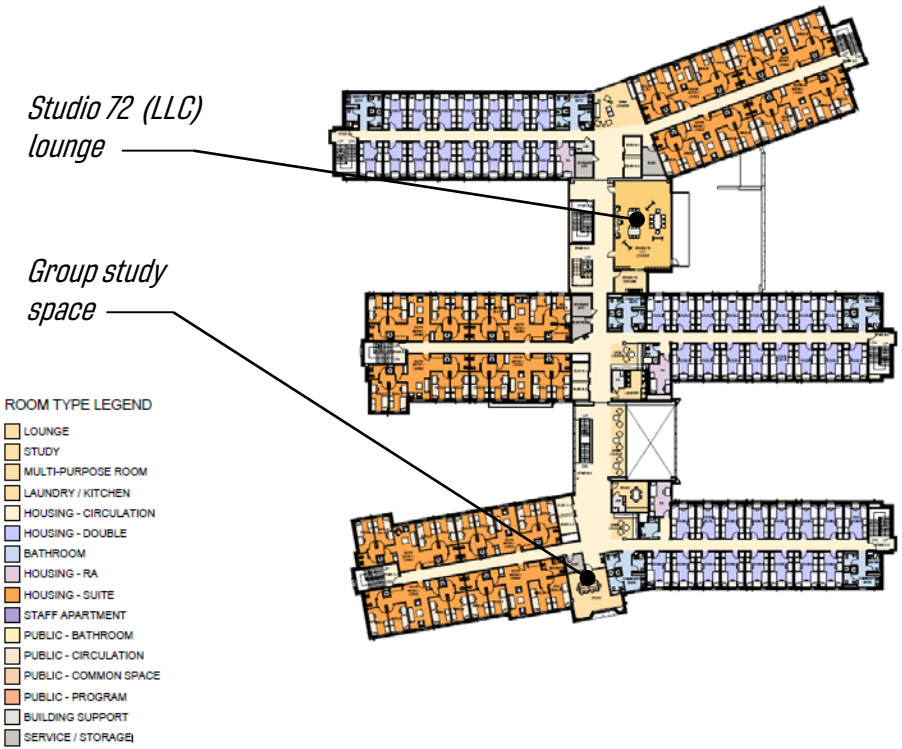
Second Floor



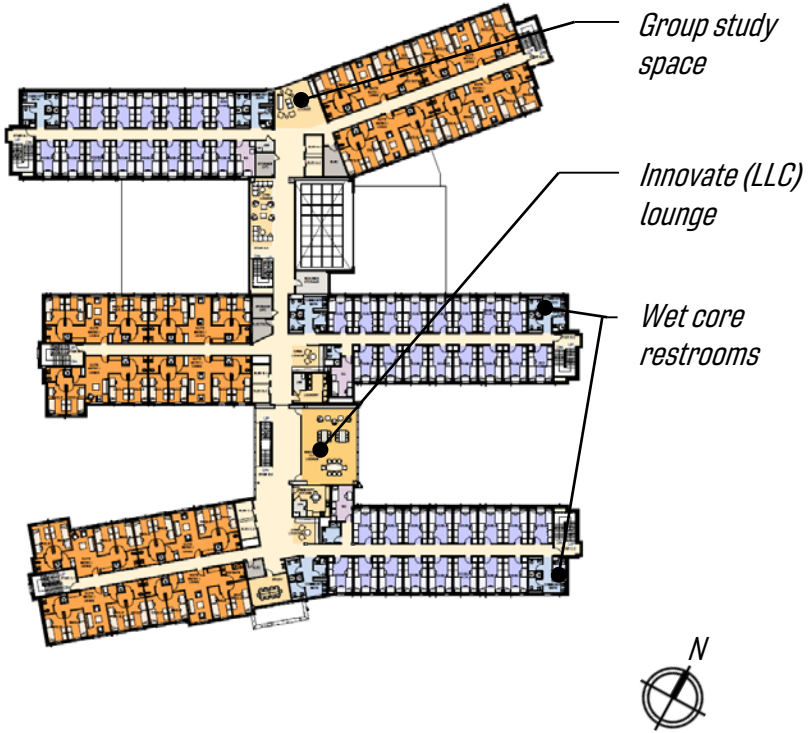
CID LLC

Floor Plans

Third Floor



Fourth Floor



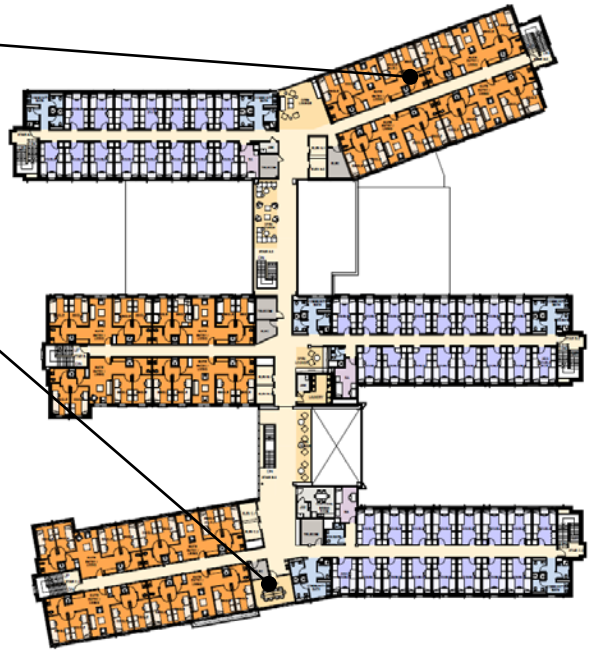
CID LLC

Floor Plans

Fifth Floor

Four -bedroom suite

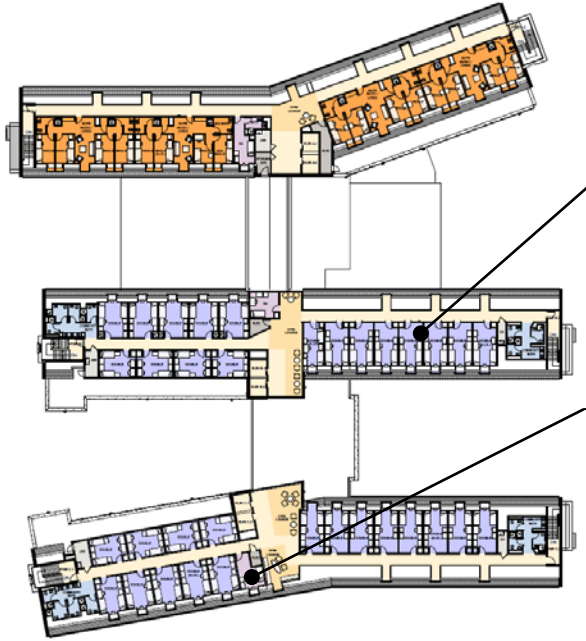
Group study space



ROOM TYPE LEGEND

- LOUNGE
- STUDY
- MULTI-PURPOSE ROOM
- LAUNDRY / KITCHEN
- HOUSING - CIRCULATION
- HOUSING - DOUBLE
- BATHROOM
- HOUSING - RA
- HOUSING - SUITE
- STAFF APARTMENT
- PUBLIC - BATHROOM
- PUBLIC - CIRCULATION
- PUBLIC - COMMON SPACE
- PUBLIC - PROGRAM
- BUILDING SUPPORT
- SERVICE / STORAGE

Sixth Floor



Double-occupancy bedroom

Resident advisor housing

N

CID LLC

View from Northwest

Gabled roof with dormers

Glass façade and canopy along promenade

CID LLC

Makerspace Courtyard

CID LLC

Faculty Residence Courtyard

CID LLC

View from Southwest

CID LLC

View from Southeast

CID LLC

LLC Courtyard

CID LLC

Performance Courtyard

CID LLC

View from Northeast

CID LLC

Three-Quarter Aerial

CID LLC

Interior Rendering (Common Space)

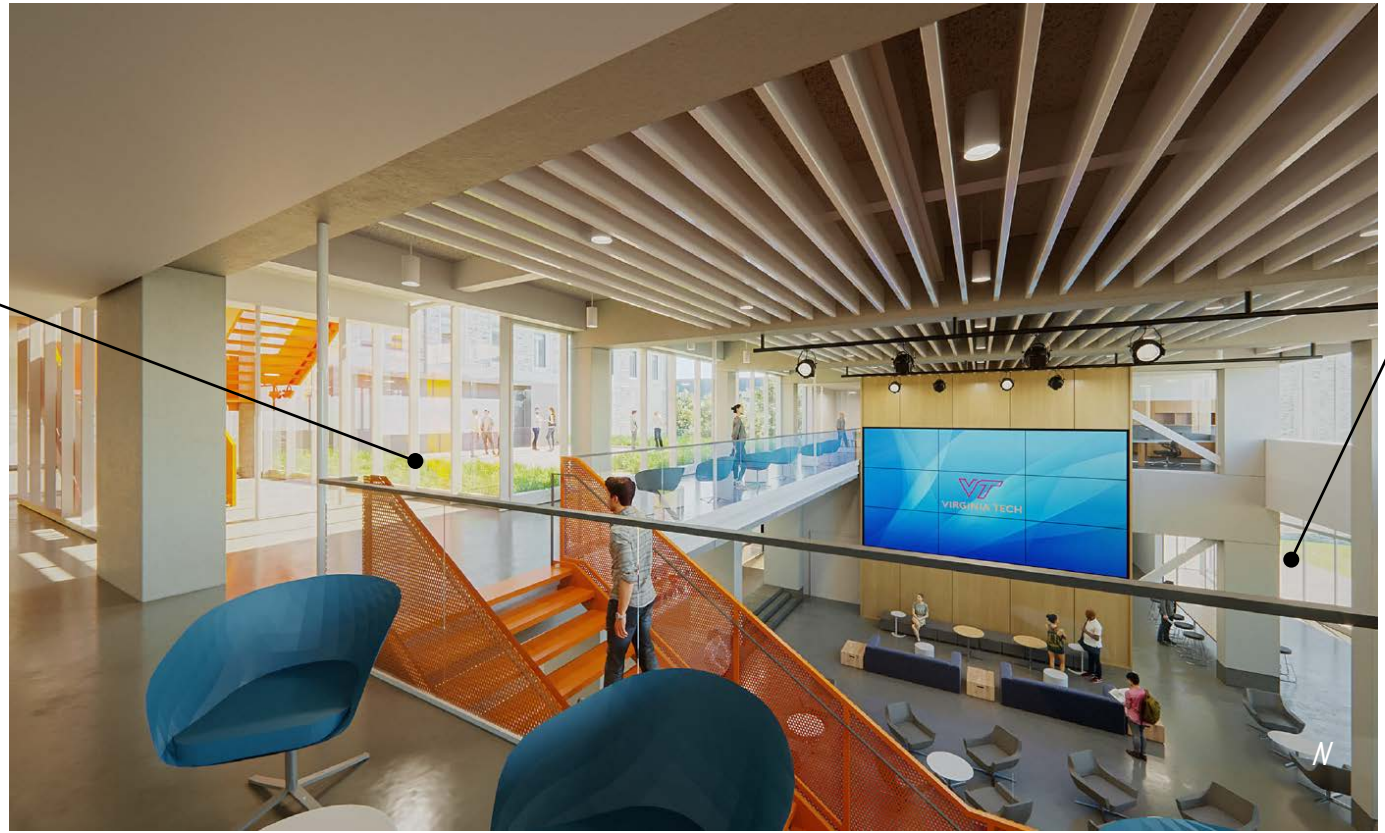
Natural light

View into learning spaces

Connector lounge

CID LLC

Interior Rendering (Common Space)



CID LLC

Recommendation

- That the Design Review graphics be approved, and authorization be provided to continue with the project design consistent with the drawings shown.

VIRGINIA TECH