CITY OF HOPEWELL
Hopewell, Virginia 23860

AGENDA

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June 28, 2022 SPECIAL MEETING Special Meeting - 6:30 p.m.

OPEN MEETING

6:30 p.m. Call to order, roll call, and welcome to visitors

Roll Call

SPECIAL MEETING

Special Meeting – Hopewell Water Renewal Budget

Roll Call

Adjournment

PRELIMINARY ENGINEERING REPORT

LABORATORY EXPANSION AND NEW ADMINISTRATION BUILDING

HOPEWELL WATER RENEWAL
CITY OF HOPEWELL, VIRGINIA
DRAFT FOR HWR REVIEW

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APRIL 2022

PROJECT NO. 21.08302

TABLE OF CONTENTS

APPENDICES

Since the mid-1970s, Hopewell Water Renewal (HWR) has operated its laboratory in the same building as the administration staff, sharing office space, meeting rooms, restrooms, and storage areas. This original space of approximately 3,500 square feet (SF) provided offices for the facilities director, plant superintendent and other associated administrative staff in addition to the required laboratory staff at that time. Over time, laboratory functions and staffing have increased to address additional plant flow, capacity expansions, treatment complexity and regulatory monitoring, testing, and reporting. In 2000 a 2,900 SF expansion was added to the west side of the existing building. This expansion added 3 bays with rollup doors, designated space for receiving operations, breakroom, and additional office space for added personnel. As the need for administrative staff has expanded since 2000, HWR has sought additional space for these functions by converting some of the bayed areas into additional office, storage, and restroom facilities sometime around 2016. The original 1,200 SF designated for laboratory functions from the 1974 plans has not significantly increased since that time forcing laboratory supervisors to find creative ways to do more in less space or use outside sources for testing. While the expansion in 2000 did provide some additional storage, the primary space addition accommodated the receiving of samples function for HWR and office space for additional administrative staff. The original conference room, restrooms/lockers, along with other common areas used by both HWR administrative and laboratory staff have not significantly expanded during that time to adequately accommodate staffing, increased plant operations and regulatory considerations.

McGill evaluated the current space and space needs to determine if the existing single building could effectively continue to house and serve both the laboratory and administrative functions efficiently and reliably, both currently and in the future. Also included in this evaluation was the overall condition and age of the existing laboratory equipment and furnishings.

Visual examinations were made to assess the overall condition of the building and uses in the available spaces. Interviews were conducted with the laboratory manager and technicians to help identify the adequacy of the building's spaces and uses. In addition, McGill consulted with EPA Quality Assurance Staff and Pace Labs Regional Supervisor to provide independent confirmation of future laboratory workloads and related space and equipment needs. The information gathered in this effort was provided to an architect experienced in space-needs analyses to conduct a study to develop alternative solutions and recommendations. The evaluation attempted to consider laboratory and receiving requirements to meet the existing and anticipated regulatory requirements for the near future. The results of this evaluation indicate an additional 850 SF of dedicated laboratory space is needed both for improved workflow and efficiency and to

accommodate future testing needs, including the ability to bring appropriate outsourced testing in house. Additionally, much of the existing laboratory equipment, casework and cabinetry is aging and in need of replacement and upgrade to meet current standards.

To accommodate these current and future laboratory needs, the existing lab area needs to increase significantly. The preliminary design includes reallocating the 850 square feet of space noted above for a second laboratory space within the existing building. The additional lab space drives the need for other interior alterations to replace other functions being displaced by the new lab, including the IT/communications room, staff breakroom, and several office spaces. Significant improvements to the bathroom facilities and locker room facilities are also needed and proposed to accommodate current and future staff needs. An additional 500 SF previously used by HWR administrative staff for office and storage would be converted to accommodate additional restrooms and relocation of IT/communications and breakroom. These improvements will provide necessary accommodations for both male and female staff and visitors in compliance with federal and state building code requirements, including Americans with Disabilities Act (ADA) accommodations. Finally, the roof of the existing building has failed in multiple locations and must be replaced to prevent further damage to the interior from leaks. It is expected this expansion into the entire existing space will accommodate HWR's receiving and laboratory needs for the next 15 to 20 years.

Based upon the condition, configuration, and availability of the existing building site to accommodate the necessary expansion, relocating administrative functions to a new building, and renovating the existing building to align with laboratory functions is recommended. The entire 6,400 SF of existing space in the combined administration and laboratory building is needed to accommodate the proposed laboratory/receiving upgrade and improvements. The result of the expanded laboratory space is the need for additional space for HWR administrative staff. In addition to simple office space requirements, this relocation will require an accommodation for meeting and training room space, along with necessary restrooms/lockers, breakroom, file storage, and office equipment such as copier/printer/scanner areas to provide staff the ability to properly archive and store necessary files and folders. There is also the anticipation that additional staff may need to be accommodated for billing functions to be brought in house at the HWR facility. For preliminary sizing, it is anticipated approximately 7,500 SF of programmed space would need to be accommodated.

Based on this evaluation and the above stated goals the preliminary opinion of probable cost for these improvements are shown below.

Project Component	Preliminary Opinion of Probable Cost
Laboratory Expansion and Building Renovations Conversion of existing 6,400 SF building	$3.7M
New Administration Building 7,500 SF of programmed space on HWR site with parking to accommodate employees and training events	$4.8M
TOTAL	$8.5M

Please note these estimated costs are in 2022 dollars and attempt to account for current inflationary construction costs and supply chain challenges that have been experienced over the past 12 months. If these renovations and new facilities continue to move toward design and construction phase, probable cost opinions should be revisited prior to bidding.

1.0 EXISTING FACILITIES

1.1 Facility Overview

1.1.1 Location

The City of Hopewell is an independent city surrounded by Prince George County, City of Petersburg, the Appomattox River, and the James River in the Commonwealth of Virginia. The City is located approximately 30 minutes south of Richmond, Virginia. The existing Hopewell Water Renewal Facility (HWR) is located off Hummel Ross Road where Bailey Creek empties into James River. This project explores improvements to the administration and laboratory building so that the 50 million gallons per day (MGD) wastewater treatment plant can continue to perform necessary testing to ensure public and environmental health. As the regulatory environment continues to change, it is imperative for HWR to be able to perform appropriate testing and to accommodate necessary staff to collect samples and conduct such tests. Currently, the administration space and laboratory space are in the same building. The project reviewed the existing and anticipated needs for laboratory space to determine if the current available space in the building is sufficient to serve HWR's collection and testing needs on-site. The project area is shown in Appendix A.

1.1.2 Description of the WWTP, components, and current flows

The Hopewell Water Renewal Facility started under construction in 1975 and began operations in 1977 with the mission of reducing oxygen consuming pollutants in the area's domestic and industrial wastewaters. Typically, HWR handles about 27 MGD coming from Hopewell, Fort Lee, FCI Petersburg Correctional Facility, Riverside Regional Jail, portions of Prince George County, and major industries, including AdvanSix, Evonik, WestRock, Ashland Specialty, and the Virginia American Water Company. Since operations began there have been four major upgrades to the plant. Those upgrades were changing sludge dewatering from heat to centrifuges, installation of a denitrification system and post aeration, relocation of old City domestic plant to Hopewell Water Renewal, and installation of nitrogen reduction facilities. The total cost of these projects totals $112.6 million. The treatment plant includes a domestic preliminary treatment facility, headworks including a screen chamber and grit chamber, Parshall flume, primary solids pump station, 4 industrial primary clarifiers, 3 domestic primary clarifiers, denitrification basin, 4 aeration tanks, 8 secondary clarifiers, 5 moving bed biofilm tanks, chlorine contact tank, effluent reaeration, 2 gravity thickeners, biosolids storage building, solids handling building, 2 decant tanks, dissolved air flotation thickener, various chemical feeds and related appurtenances, and various pump buildings. The wastewater is a combination of industrial and domestic wastewater. In evaluating data from 2020 and 2021, 70 to 80% of the wastewater flow comes from industries the facility serves and frequently

treats wastewater with elevated pH, high temperatures, and adds phosphoric acid to balance pH in the treatment process.

Table 1: WWTP Discharge Monitoring Report

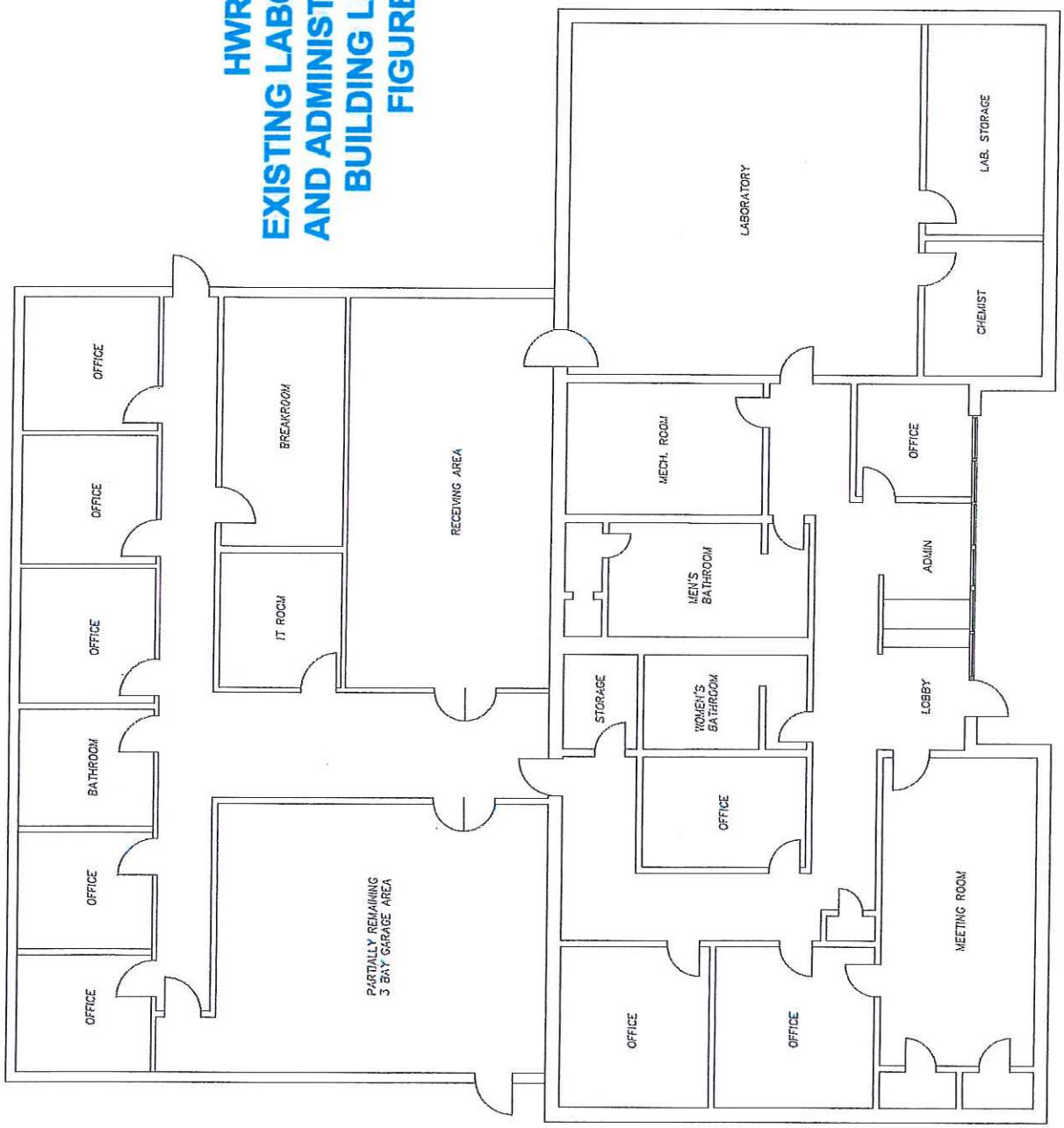
Month	Average Flow (MGD)
October 2020	25.46
November 2020	24.82
December 2020	25.74
January 2021	25.00
February 2021	25.89
March 2021	25.22
April 2021	21.86
May 2021	22.74
June 2021	24.02
July 2021	25.88
August 2021	26.89
September 2021	23.08

1.2 Laboratory and Administration Building

1.2.1 Building Structure Description

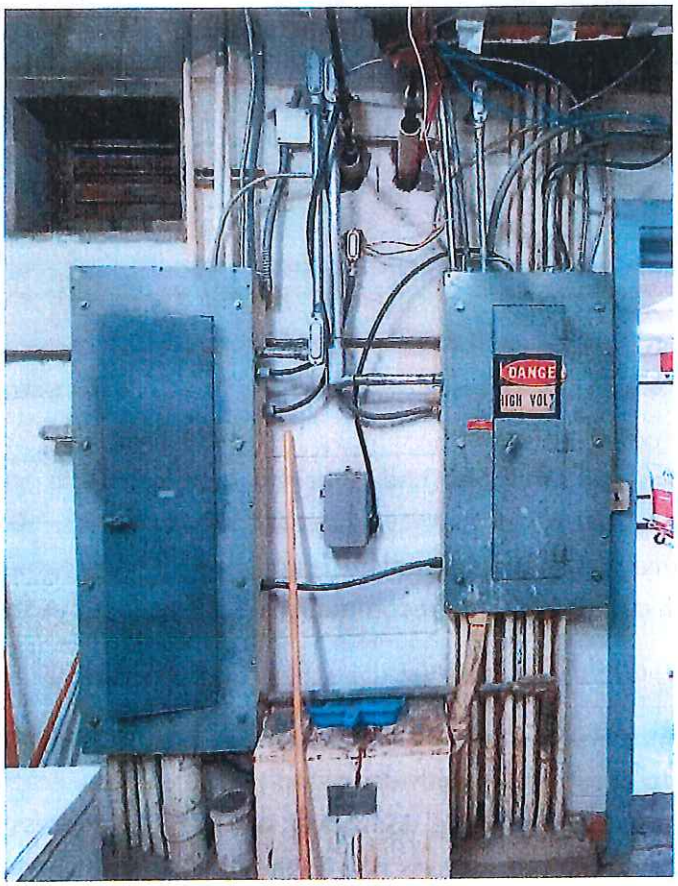
The current laboratory/administration building was constructed in three different projects. The first project was designed in 1974. This included a lobby, meeting room, director's office, office staff room, plant supply room, mechanical room, laboratory, chemist office, lab storage, and men's and women's bathrooms. The first edition of the building is approximately 3,500 square feet. The second project, designed in 2000, included the expansion of the existing building from 1974. This expansion included a 2,900 addition of the western side of the building. This expansion included three offices, an IT room, a breakroom, a receiving area, and a 3-bay garage. The final project, completed around 2015-2016, included a renovation of the space created in the second project. This renovation provided three more rooms used as office spaces and was constructed in the 3rd bay of the garage. The layout of the building after all three projects is generally shown below in the figure.

HWR
EXISTING LABORATORY AND ADMINISTRATION BUILDING LAYOUT
FIGURE 1



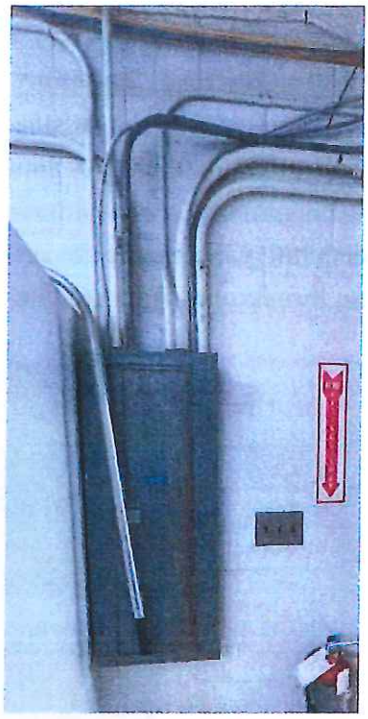
1.2.2 Existing Electrical Conditions

As noted previously, the existing laboratory/administration building was built in the mid '70's and expanded in 2000-2001 timeframe. The original building distribution system is made up of Westinghouse, Cutler-Hammer, and Sylvania panels. During the expansion, panelboards were added in the garage space to serve new lighting, receptacle, and various equipment loads in the offices, breakroom, and receiving areas.



Existing Main Service Panel and Sub Panel

Existing Sub Panel



Existing Sub Panel

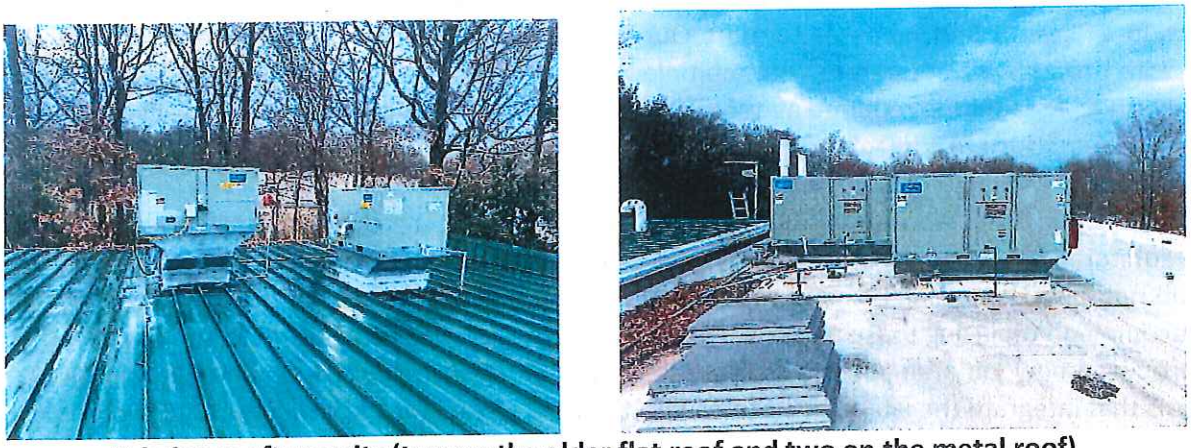
Most of the original panels have had breakers replaced with various and different manufacturer's due to age and availability of discontinued breakers. Given the age of these panels (over forty-five years) and amount of renovation being proposed all original panels, transformers, branch circuits would be recommended to be replaced as they have reached their useful life.

Also, communications in the building will be upgraded to current standards and a new IT room will be constructed to house the IT with dedicated HVAC. Communications system since the 70's has changed, and upgrades were done over the years to address technology changes. However, with the proposed renovations now is the time to fully upgrade the system to the latest communication infrastructure.

Exposed communication cables with wireless router

1.2.3 Mechanical and Plumbing

The heating and cooling for the existing building is served by four Trane gas rooftop units and two Ameristar ductless mini-split units. The rooftop units were all replaced in 2019 and seem to be in good condition. We reviewed the model numbers of the existing units with a Trane representative and determined these are basic units with gas forced air furnace, cooling coils, and have single zone control. We noted that HWR staff indicated the existing laboratory area tends to be warm. Also, the two mini-split units may have been added to address warm areas caused by capacity shortfalls.



Existing rooftop units (two on the older flat roof and two on the metal roof)

Existing outdoor ductless mini-split unit

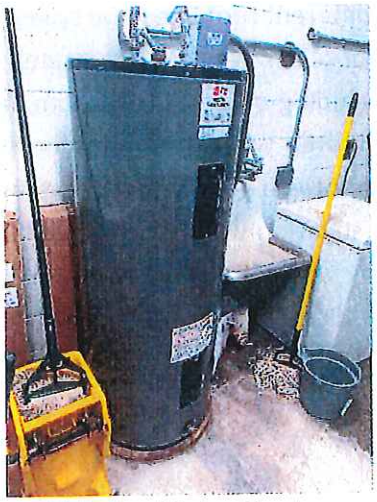
Typically for a laboratory building we would specify HVAC units that have more options for multiple zone control using variable air volume (VAV) to each space. This allows the air to be delivered to the load more efficiently and increases comfort. Our recommendation is to replace the existing rooftop units with units have can operate with multiple zones of VAVs. The ductwork should be replaced and reworked to meet the required air for each space. We also recommend installing a direct digital control system (DDC) to control the rooftop units, VAVs, and laboratory hoods.

There are two existing laboratory hood systems in the lab area. The existing units do not have air flow monitoring and seem to be at their typical end of service life. Also, the roof mounted exhaust fans do not have the mixing box and bypass damper required to meet current code requirements. We recommend replacing these two existing systems and providing three new lab hood systems in the proposed new lab area spaces, as requested by HWR staff. Lastly, we recommend providing controls that integrate the lab hood systems into the DDC system for the building HVAC system.

Existing laboratory hood

Plumbing:

The building is served by a 2" domestic water line that routes to the mechanical room. The existing water entry to the building does not have a backflow preventer. The building is served by an 80-gallon electric water heater. We recommend replacing the existing water heater with two new water heaters that have adequate storage capacity to deliver tepid water for the safety showers. Current codes require the delivery of tepid (85°F) water to safety showers for 15 minutes.



Existing Water Heater

The building is currently served by two sanitary waste lines. One is a 4" gravity line that serves the original building and the other goes to a small grinder pump station that pumps around the building to a manhole. We recommend using the existing 4" gravity line to serve the entire building to eliminate the need for the pump station. The 4" line is of adequate size for the needs of the entire building. Also, based on survey information, it appears feasible to maintain required slope on the

line from the furthest fixture in the building to the invert elevation in the manhole located on the northern side of the building. Based on the drawings provided by HWR there is an existing acid waste system, but it ties into the main sewer system. If the operation is such that collection of acid waste is required, then it needs to run outside separately and be neutralized before tying into the sewer system.

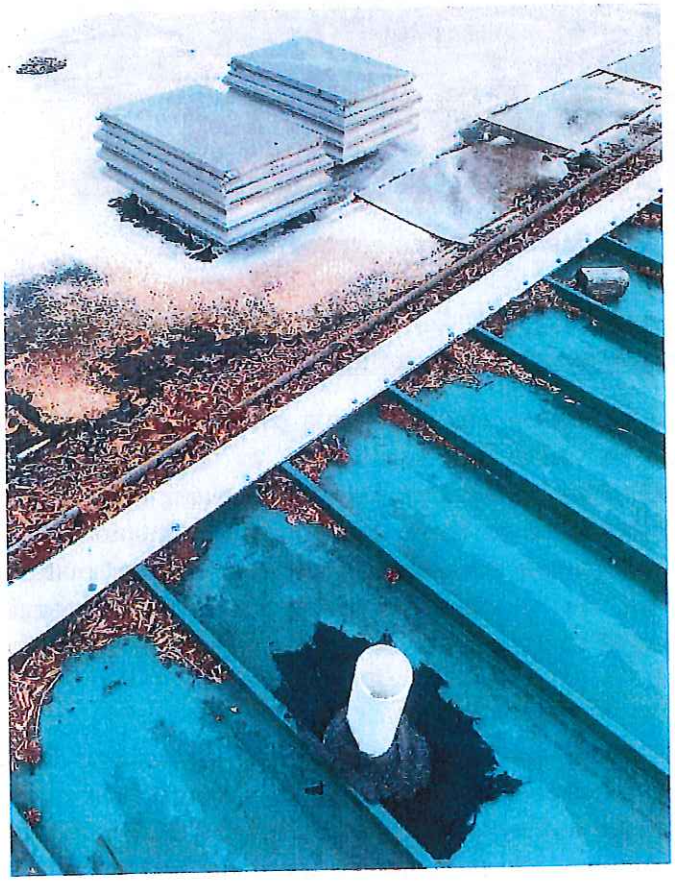
Currently there are no floor drains in the laboratory room. One of the review comments from the HWR staff review of the schematic drawing requests floor drains be installed in the laboratory to facilitate cleaning. There is an existing deionized water system in the building that is in the Lachat equipment room. It also, routes to a sink in the lab room. This existing system will need to be relocated for the proposed renovation layout.

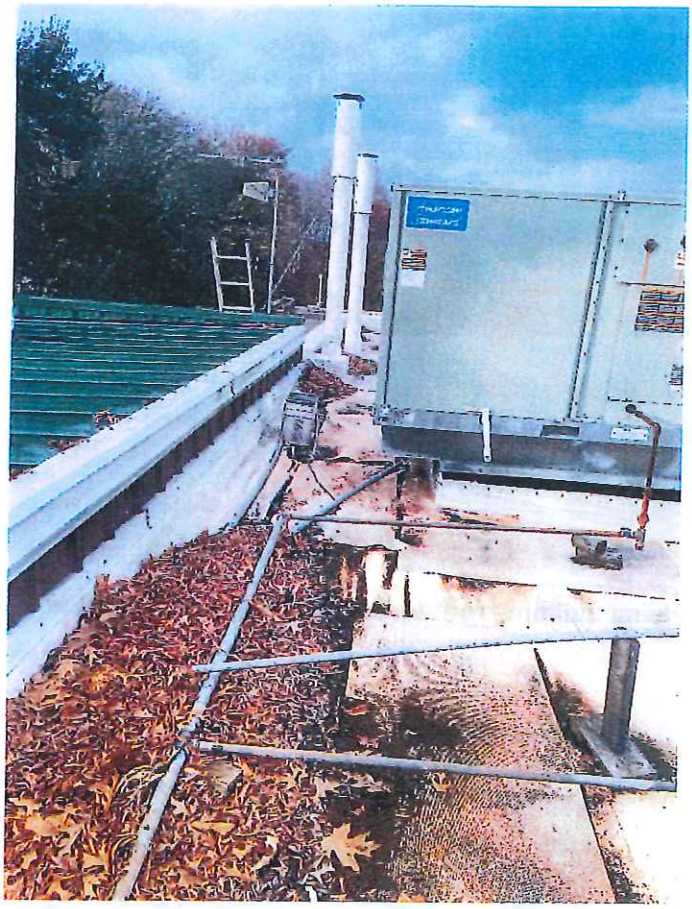
There is an existing vacuum system located in a small shed behind the building and has a flexible pipe routed to one of the lab counters. Our recommendation is to reuse the existing vacuum system and provide new piping from the existing system to the desired areas in the upgraded laboratory spaces.

1.2.4 Structural Description of Existing Building

As noted above the current laboratory/administration building was constructed in three different projects, beginning in the mid-70's, then 2000 and finally interior additions in the 2016 timeframe. The block wall construction of the original building, with the addition of the metal framed construction in 2000 ended up with 2 different roof lines and types. One of the significant concerns of the existing building is the amount of rainwater that penetrates the roof and ends up in various locations throughout the structure, including offices, breakroom, laboratory, receiving areas, and significant leaking in the bayed garage area where the addition shares a common wall with the original construction. As seen in the photos below, efforts have been made to repair the original roof. However, a more thorough investigation will be conducted in the next phase of this project to determine what exactly is happening with the seam where the 2 roofs were combined in 2000. It appears there is leaking around the HVAC rooftop units noted in the prior section when these units were replaced in 2019.

Original building roof looking toward newer section





Transition between two roof lines

1.2.5 Laboratory Workstation Description

The tests performed for the wastewater treatment plant are all currently performed in the laboratory which equates to about 822 square feet or approximately 13% of the existing laboratory/administration building. When including the receiving area, there is roughly a total of 1,200 square feet (19%) dedicated to these two functions. Countertop and floor spaces are overloaded with equipment, sample containers, supplies and other materials required for the analytical work. Walkways are narrowed, impeding movements throughout the lab areas. Locations and configuration of computer workstations can hinder staff productivity and diminish sample testing throughput.

Time is lost maneuvering around spaces and surfaces overloaded with items that should be in dedicated storage areas in reasonable proximity to various workstations. Supplies stacked above cabinets are difficult to manage and can pose a safety concern. Walking through cramped quarters to locate materials and supplies, access computer terminals and interact with co-workers can further limit productivity and lower overall morale.

Laboratory personnel share workspace, computers and other ancillary facilities that can place an additional burden on producing accurate documentation, record keeping and effective management, supervision, and communications. Dedicated spaces are not available to provide adequate working environments to support all the current and expected functions.
As the following pictures demonstrate, spaces for current laboratory functions are deficient.

Cabinets and countertops exhibiting age of original laboratory grade casework

As seen in the pictures above, the lab space provides minimal space for testing and there are not enough dedicated workstations for tests and staff.

1.3 Testing Capabilities and Operations

Laboratory testing is required to meet regulatory monitoring and reporting requirements set forth to ensure compliance with NPDES permit discharge limitations, industrial pretreatment and biosolids treatment and disposal. Process control testing is also necessary to manage treatment processes and overall plant performance. HWR treatment plant operators and laboratory staff collect all samples. Analytics are performed primarily in-house except for metals and fecal coliform. The following tables summarize current laboratory equipment and testing.

HWR Laboratory Functional Summary

Regulatory Compliance	Analysis
Biochemical Oxygen Demand	In-House
Total Suspended Solids	In-House
Chlorine Residual	In-House
Phosphorus	In-House
Nitrogen – Total	In-House
Nitrogen – TKN	In-House
Nitrate	In-House
Fecal Coliform	Contracted
Industrial Pretreatment	
Metals	Contracted
Others	
Biosolids Management	
Metals	Contracted
Vector	Contracted
Nutrients	Contracted
Others	
Process Control	
Dissolved Oxygen	In-House
pH	In-House
MLSS	In-House
Others	

Laboratory Equipment Description

To perform all the tests necessary that ensure public and environmental safety there is certain equipment and amounts of space required. The equipment utilized in the lab is summarized in the table below.

Table 2: Laboratory Equipment

Equipment	In service	Out of service	Total
ATP Inventory			
ATP Spectrophotometer	3	1	**4**
ATP Bluetooth Display	1	1	**2**
Auto Pipettes			
Auto Pipette	12	17	**29**
Dishwashers			
Dishwasher (TSS, BOD, Receiving)	3	0	**3**
Laboratory			
pH meter	1	1	**2**
Balance (Mettler, Ohaus)	2	1	**3**
Drying Oven	1	0	**1**
Muffle Furnace	1	0	**1**
Spectrophotometer	2	0	**2**
Barometer	2	0	**2**
Homogenizer	3	1	**4**
Digester	6	2	**8**
Lachat			
Lachat Unit	1	0	**1**
Peristaltic Pump	2	0	**2**
Auto Dilutor	1	0	**1**
Auto Sampler	1	0	**1**
Receiving			
Receiving DO Meter	2	1	**3**
Receiving DO Cable/Probe Assay	2	2	**4**
Receiving pH Meter	2	4	**6**
Receiving IR Gun	12	0	**12**
Receiving TRC Meter	2	0	**2**
Refrigerators/Incubators			
Refrigerator	4	3	**7**
Incubator	4	2	**6**
Skalar			
Skalar Unit	1	0	**1**
Peristaltic Pump	2	0	**2**
Skalar Handheld Meter	1	0	**1**
Skalar DO Meter	2	0	**2**
Skalar DO Probe Assay	3	10	**13**

Equipment	In Service	Out of Service	Total
Thermometers			
Reference	2	0	2
Incubator	4	1	5
Refrigerator	6	0	6
CBOD/BOD	4	4	8
Back Up Thermometer	6	0	6
Segregated	2	0	2
Raw	2	0	2
Solids Refrigerator	2	0	2
Centrate	2	0	2
Primary Effluent	2	0	2
UNOX Influent	2	0	2
RAS Influent	2	0	2
VOC Refrigerator	2	0	2
HAP	2	1	3
MBBR Influent	2	1	3
MBBR Effluent	2	0	2
DAF Effluent	2	0	2
Secondary Effluent	2	0	2
Final Effluent	2	0	2
Final Effluent Backup	2	0	2
AdvanSix	2	0	2
VAWCO	2	0	2
Rock-Tenn (WestRock)	2	0	2
Hercules (Ashland Specialty)	2	0	2
Evonik	2	0	2
Bailey St	2	0	2
1st St	2	0	2
Green Plains	1	1	2
Fort Lee	2	0	2
Calibrated Backup	4	2	6
Extras	8	0	8
Weights/Balances/Hoods			
Metric Weight Set	2	2	4
Lab Fume Hood	3	0	3
Operations Fume Hood	1	0	1
Operations Balance	2	0	2

The below table summarizes the test being performed at the HWR facility.

Table 3: Laboratory Testing

Analyte	Requirement and/or Purpose	Reference	Equipment
CBOD/BOD	VPDES Permit/Process Control	SM 5210 B (2011)	BOD meter, SKALAR Autoanalyzer, incubators
Total Phosphorus	VPDES & General Nutrient Permits	HACH Method 10210 rev2016	HACH DR3900, HACH DRB200 reactors
Ortho Phosphate	Process Control	HACH Method 8048 rev2017	HACH DR3900, DR2800
Alkalinity	Process Control	HACH Method 10239	HACH DR3900, DR2800
Ammonia	VPDES Permit	Lachat10-107-06-1I (2015)	Lachat QuikChem 8500
Ammonia	Process Control	HACH Method 10205 rev 2016	HACH DR3900, HACH DRB200 reactor(s)
Nitrate – Nitrite	VPDES & General Nutrient Permits	Lachat10-107-04-1A (2007)	Lachat QuikChem 8500
TKN	VPDES & General Nutrient Permits	Lachat10-107-06-2D (2001)	Lachat QuikChem 8500
Total Solids	Process Control/Title V Air Permit	SM 2540G (2011)	Balance, Convection oven, desiccators
Total Volatile Solids	Process Control/Title V Air Permit	SM 2540G (2011)	Balance, Convection oven, Muffle Furnace, desiccators
Total Suspended Solids	VPDES Permit	SM 2540G (2011)	Balance, Convection oven, desiccators
COD	Process Control	HACH Method 8000 rev2014	HACH DR3900, HACH DRB200 reactors
pH	VPDES Permit	SM 4500H$^+$ B (2011)	Accumet pH meter

Analyte	Requirement and/or Purpose	Reference	Equipment
Total Residual Chlorine	VPDES Permit	SM 4500Cl G (2011)	DPD meter 0 HACH Pocket Colorimeter
Dissolved Oxygen	VPDES Permit	SM 4500O G (2011)	YSI DO Meter
ATP	Process Control	QG21	Luminultra

Laboratory operations begin with sample collection, preservation, transport and receiving samples into the lab. Technicians access designated locations to collect specified sample types (grab or composite), utilizing assigned tools and equipment. Samples are preserved as necessary using prescribed containers and labels for clear identification by the analyst. Samples are delivered to the lab receiving area and checked by a lab analyst for quality control, then placed in designated storage areas having proper environmental control. Sampling logs are kept to record individual date/time stamps and provide a clear chain of custody and then entered into the laboratory database.

Properly collected and stored samples are then accessed by laboratory analysts for preparation and analysis. Labels and sampling logs are checked to verify proper collection, preservation, and storage. Work areas are prepared, equipment checked, reagents and other supplies accessed, and equipment started and calibrated. Samples are then prepared, and analytical testing is conducted. Results are recorded in the lab's database and available for process control, regulatory reporting, and quality control.

1.3.1 Laboratory Staff Description

General oversight of laboratory operations is provided by the laboratory manager that includes supervision of analysts and technicians, scheduling, quality control, data management, record keeping, staff training, equipment and building maintenance. Procurement and inventory management are also included in this operation.

Management of laboratory operations is provided by the laboratory director. This includes permitting, regulatory compliance, staffing, certifications, licenses, budget preparation, fiscal management, maintaining adequate laboratory facilities and equipment.

The following is a general summary of laboratory staff positions and responsibilities. Detailed accounts of duties and responsibilities are found in corresponding job descriptions:

Laboratory Director

Staffing Level – 1 position.
Reports to HWR Operations Director.
Direct Subordinates: Laboratory Manager – 1 position
Responsible to maintain VPDES Permit and demonstrate compliance with related reporting and regulatory requirements including all licenses and certifications. Working knowledge of regulations and future testing and compliance issues. Maintains adequate staffing, facilities, equipment, IT systems, inventory, and contracted services to ensure all laboratory functions are properly equipped and able to perform all duties and related responsibilities. Secures adequate funding through the annual budget process and is responsible for fiscal management and capital planning.

Laboratory Manager

Staffing Level – 1 position.
Reports to HWR Laboratory Director.
Direct Subordinates: Laboratory Analyst - 5 positions; Sample Technicians – 2 positions.
Responsible for all laboratory functions necessary to develop testing results and data that fully support regulatory reporting requirements and provide adequate information to effectively manage treatment process controls. Provides general oversight of laboratory functions, supervision of analysts and technicians, scheduling, quality control, data management, record keeping, staff training, equipment and building maintenance. Duties are focused on ensuring all laboratory operations are consistently performed with accuracy and reliability. Regulatory reporting and compliance are maintained error-free and all records are accurate, organized, and accessible. Recommendations are prepared for the budgeting process. Manages purchasing, procurement, and contracted services.

Laboratory Analyst

Staffing Level – 5 positions.
Reports to HWR Laboratory Manager.
Direct Subordinates: None.
Performs analytical testing for regulatory compliance and process controls for various treatment process throughout the plant. Responsible for sample preparation, equipment setup, calibration, test runs, quality assurance/quality control, reporting results and maintaining a comprehensive information database. Performs testing in accordance with applicable analytical methods and standards. Properly disposes of samples following testing, cleans containers, equipment, and work area. Manages supply inventories and monitors

equipment performance. Recommends inventory levels and maintenance and/or replacement of equipment. Coordinates with vendors and suppliers as needed. Conducts research as directed relative to laboratory testing operations, equipment, testing methods and emerging technologies.

Sample Technician

Staffing Level – 2 positions.
Reports to HWR Laboratory Manager.
Direct Subordinates: None.
Performs sampling of various influent, effluent and treatment process locations as directed to provide adequate volumes for testing and other analytical purposes. Utilizes proper tools, and sampling equipment and other apparatus to ensure representative sampling is achieved. Prepares sampling containers and preservatives, as necessary. Labels completed samples, transports to laboratory receiving area and delivers to proper storage areas. Maintains chain of custody protocols and record keeping. Maintains sampling schedule and responds to unscheduled events as required.

2.0 FUTURE LABORATORY OPERATIONAL PLAN

2.1 Laboratory Workstation Requirements

Laboratory workstations require adequate floor areas to efficiently move personnel, samples, equipment, and supplies into and through the work area, countertop areas sufficient to locate and operate analytical equipment including supporting computer network systems, and other dedicated areas to store necessary reagents, supplies, etc. Each analytical function should have its own space for sample preparation, testing apparatus and related equipment, running tests and related analyses and cleanup. Care should be taken to avoid sharing spaces which can lead to sample contamination, equipment miscalibration, testing errors and damage. Equipment redundancy should also be considered for each testing area.

2.2 Future Workstation Requirements

In addition to input provided by HWR staff, McGill consulted with an EPA Regional Quality Assurance Chief and Pace Labs Regional Supervisor to provide independent confirmation of future laboratory workloads and related space and equipment needs. The following topics were identified by these experts and opinions were offered as follows:

2.2.1 Emerging Contaminants

The expectation for additional sampling and testing to be required for each of the following contaminant categories is as follows:

- Metals – No additional sampling and testing anticipated.
  - No action required.
- Nutrients – No additional sampling and testing anticipated.
  - No action required.
- Volatiles and Semi-Volatiles – No additional sampling and testing anticipated.
  - No action required.
- PFAS – Recently added contaminant. HWR is currently sampling for this contaminant and testing is performed by a contract lab.
  - In-house testing is considered cost-prohibitive based on purchasing a PFAS-specific liquid chromatography apparatus, related climate control and cooling systems, and constructing separate areas for sample preparation and analytical equipment. These potential costs could exceed $1 million.

2.2.2 Metals Testing

Metals are currently sampled by HWR staff and analysis is performed by a contract lab. Both lab experts identified in section 2.2 agree that lab space should be set aside for this testing to be potentially returned to the HWR lab in the future. In-house testing can improve quality control and the timeliness of testing results.

2.2.3 Fecal Coliform Testing

Fecal Coliform samples are currently collected by HWR staff and analysis is performed by a contract lab. Both lab experts identified in section 2.2 agree that lab space constructed today should be designed to readily accommodate the potential for HWR to perform fecal coliform testing in the future. The space equipment needs for this testing is minimal, so this parameter could be added into the proposed expanded lab configuration. In-house testing should also improve quality control and the timeliness of testing results.

2.2.4 Dedicated Workstations for Lab Employees

Assignment of an individual workstation to each lab technician facilitates accountability and improves the integrity of analytical information, thoroughness of research conducted and fosters more accurate communications. Shared equipment and spaces are prone to more distractions and time constraints that reduce quality and effectiveness of data management and communications. After space needs review and various conversations with HWR staff, it was determined an additional 3 workstations are needed to accommodate the current and anticipated laboratory functions. These additional workbenches allow individual stations for TSS/TVS, Volatile Solids, BOD, ATP/TNT and COD/TP testing. Individual spaces and equipment promote a greater sense of ownership and value to the organization that leads to improved performance.

2.3 Laboratory Facility Appurtenances

2.3.1 Office Space

Office space is typically required for those employees working in a management or supervisory role. This space accommodates the ability to set down at a desk while working on reports, data entry, and other regulatory forms dictated by state regulatory and resource agencies. Supervisory positions often require review and communications with other staff and an appropriate office space facilitates one on one meetings. HWR currently has 10 staff members associated with laboratory, receiving and environmental compliance functions. Of these staff, 3 currently will require offices and a 4th would need to be planned for future staff considerations. The current space designated for administrative functions near the front entrance door and lobby would be maintained.

In this type of facility setting, generally 120 to 150 SF is adequate to accommodate desks, 2 chairs and minimal storage using overhead bins or multi-drawer files storage. The 3 existing offices located on the east side of the original 1974 building and the smaller office adjacent to the administrative area would provide 4 adequate office spaces. These types of planned spaces often promote a greater sense of ownership and value to the organization that can also lead to improved performance.

2.3.2 Meeting Room/Training Room

It is important to have a designated space to accommodate meetings or training sessions. For HWR's existing space, a meeting/training room is currently located adjacent to the entrance of the building. This area is approximately 300 SF and can adequately continue to serve in the same capacity for the laboratory, receiving and environmental compliance staff that would continue to use the space. This space can easily accommodate 12 people, which should be adequate for meetings for all noted staff plus others associated with necessary training sessions.

2.3.3 Breakroom

As discussed above, additional laboratory space is needed to accommodate new workstations and will require approximately 850 SF of additional space. To provide the additional space, the existing breakroom and offices along the western back wall of the building will need to be removed and the breakroom relocated. This can be accommodated by putting a new 300 SF breakroom in the southwest corner of the existing building where the 2016 interior improvements for offices and additional bathroom were added.

2.3.4 Men and Women's Bathrooms with Showers

The existing restrooms and shower facilities are significantly lacking when viewed from current standards and expectations. As noted in the Proposed Renovations Section below, the proposed improvements would revise and expand both men and women's facilities and be made ADA compliant. Updated locker space would be added for both facilities and each would have a toilet stall. The men's facility would have a urinal as well. After discussions with HWR staff it was determined a single private shower room would be adequate to accommodate HWR staff that may want to use a shower facility in the renovated building while on the facility grounds. Since the space for the restrooms with lockers limited both facilities to single stall units, 2 additional restrooms will be provided adjacent to the new location for the breakroom.

3.0 PROPOSED LABORATORY BUILDING RENOVATIONS

3.1 Proposed Overall Renovations

As discussed in detail in the previous sections of this report, the existing laboratory building requires significant renovations to provide for adequate space for laboratory functions and associated staff. Additionally, and no less significantly, the existing building is also in need of repairs to several of its major components such as the roof, HVAC equipment, and electrical systems. The following sections will detail the proposed renovations in more detail.

3.1.1 Laboratory Area and Receiving Area Renovations

McGill evaluated the current space and space needs to determine if the existing single building could effectively continue to house and serve both the laboratory and administrative functions efficiently and reliably, both currently and in the future. Also included in this evaluation was the overall condition and age of the existing laboratory equipment and furnishings.

Visual examinations were made to assess the overall condition of the building and uses in the available spaces. Interviews were conducted with the laboratory manager and technicians to help identify the adequacy of the building's spaces and uses. In addition, McGill consulted with EPA Quality Assurance Staff and Pace Labs Regional Supervisor to provide independent confirmation of future laboratory workloads and related space and equipment needs. The information gathered in this effort was provided to an architect experienced in space-needs analyses to conduct a study to develop alternative solutions and recommendations. The evaluation attempted to consider laboratory and receiving requirements to meet the existing and anticipated regulatory requirements for the near future. The results of this evaluation indicate an additional 850 SF of dedicated laboratory space is needed both for improved workflow and efficiency and to accommodate future testing needs, including the ability to bring appropriate outsourced testing in house. Additionally, much of the existing laboratory equipment, casework and cabinetry is aging and in need of replacement and upgrade to meet current standards.

To accommodate these current and future laboratory needs, the existing lab area needs to increase significantly. The preliminary design includes reallocating the 850 square feet of space noted above for a second laboratory space within the existing building.

Figure 3.1 illustrates the preliminary design concept for the expanded laboratory space, including the reconfigured receiving area. This figure also shows related space plan modifications which will be discussed individually below.

3.2 Other Building Renovations

The additional lab space drives the need for other interior alterations to replace other functions being displaced by the new lab, including the IT/communications room, staff breakroom, and several office spaces. Significant improvements to the bathroom facilities and locker room facilities are also needed and proposed to accommodate current and future staff needs. An additional 500 SF previously used by HWR administrative staff for office and storage would be converted to accommodate additional restrooms and relocation of IT/communications and breakroom. These improvements will provide necessary accommodations for both male and female staff and visitors in compliance with federal and state building code requirements, including Americans with Disabilities Act (ADA) accommodations.

3.3.1 Office Space

The proposed building reconfiguration shown in Figure 3.1 includes the reuse of four existing offices to accommodate the needs of the current laboratory staff. Three of these will be located in the same location and will require only cosmetic upgrades while the fourth, along with a new copy room will be repartitioned from existing general office space to make more efficient use of this space.

3.3.2 Bathrooms and Locker Rooms

The existing bathroom and locker room facilities in the original building are dated and not ADA compliant. These will be reconfigured to provide both men's and women's bathrooms, and locker rooms, and a common unisex shower. These renovations will require several new walls and significant plumbing modifications but will result in modern, ADA compliant facilities.

The bathroom that was added with the building expansion will be relocated to provide for the relocated IT room (as discussed below). As with the other bathroom renovations, these will require new wall construction and plumbing modifications. These bathrooms are currently served by a small grinder pump station located behind the building. A preliminary evaluation of this situation shows that the new

bathrooms should be able to connect to the upgraded plumbing systems for the other bathrooms and allow the pump station to be decommissioned and removed.

3.3.3 Breakroom

The existing breakroom will be absorbed by the laboratory expansion (see Figure 3.1). It is recommended that a new breakroom be constructed to provide a space for staff to prepare and/or eat meals during work hours. The proposed breakroom will be constructed by reallocating space currently used for offices and the garage and will thus also require the construction of new walls as well as the reconfiguration of the exit doors in this location.

3.3.4 IT Room

Currently the IT equipment is located in an interior room adjacent to the receiving area. The additional laboratory space requires this room be relocated to provide the necessary room for the addition of the 2nd lab space. After consultation with HWR and their IT staff, it is recommended that the IT room be relocated to an exterior wall location and that a new access door be constructed so this equipment can be serviced directly from the outside and not require entry into the building proper. As is currently the case, this equipment will be provided a conditioned space.

3.3.5 Roof Replacement

As documented previously, the existing roof system leaks and needs significant repair or replacement. Failure to address this situation will allow water damage to the building interior to continue and likely worsen with time. A structural engineer has been engaged during this preliminary evaluation and will be an integral part of the schematic design phase which will address both the issue of the roof line as well as the incorporation of any existing or new roof mounted HVAC equipment, including those associated with the laboratory vent hoods. The preliminary estimate presented below assumes a complete roof replacement with an allowance for structural improvements as necessary.

3.3.6 HVAC Equipment

As detailed in Section 1.2.3, while the existing HVAC equipment is in good condition, replacement of all of the existing equipment is recommended due to limitations of the existing equipment and its inability to provide for multiple zone control. The new units are proposed to be rooftop units like the current equipment and will be designed in conjunction with the roof replacement.

3.3.7 Electrical Systems

As detailed in Section 1.2.2, the electrical systems in the facility are at the end of their useful life and should be replaced in conjunction with the overall building renovations. This would include upgrades to the communication systems to more modern equipment in conjunction with the relocation of the IT equipment.

3.4 Preliminary Opinion of Probable Cost

Table 3.1 below provides a preliminary opinion of probable cost for the proposed building renovations. These should be considered planning level costs with the understanding that they will be refined as the project moves through Schematic Design and ultimately to Construction Documents. An appropriate level of contingency at 20% is also included to provide additional safeguard against unknown conditions and the volatility of the construction industry and supply chain issues currently being experienced.

Table 3.1 – Preliminary Opinion of Probable Cost – Laboratory Building Renovations

Item	Quantity	Unit	Unit Price	Cost
Architectural Renovations	6400	SF	$ 125.00	$ 800,000.00
Mechanical/Plumbing Renovations	6400	SF	$ 200.00	$ 1,280,000.00
Electrical Renovations	6400	SF	$ 65.00	$ 416,000.00
Roof Renovations	6400	SF	$ 55.00	$ 352,000.00
Lab Equipment	1	LS	$ 135,000.00	$ 135,000.00
Misc. Items/Site Utilites	1	LS	$ 100,000.00	$ 100,000.00
Sub-Total Construction				**$ 3,083,000.00**
Contingency	20%			$ 616,600.00
Total Lab Building Renovation Cost				**$ 3,699,600.00**

INSERT FIGURE 3.1 – 11 x 17

4.0 CONCLUSIONS AND RECOMMENDATIONS

After evaluating the current laboratory/administration building it is apparent that the ability of this building to continue to serve a dual purpose of both laboratory and administration is not feasible. After accounting for the space requirements for strictly laboratory functions (testing and staff), providing for necessary accommodations for staff including, offices, ADA compliant bathrooms and lockers, conference room, and break room, there is inadequate space remaining in the building to accommodate the administrative staff that currently work in this building. The impacts of this are two-fold; the current building requires significant renovation to provide a functional and modern laboratory facility and the displacement of the administrative staff creates a need for a new administration building.

As part of this preliminary engineering evaluation and report was the development of a conceptual plan for the new administration building that is needed and recommended. Initial discussions with HWR staff have focused on the area of the site adjacent to the existing DAF facility (see Appendix A). In a parallel effort to this evaluation, HWR contracted to have an archaeological survey performed on the proposed building site. This study was conducted in the fall of 2021 by the William & Mary Center for Archaeological Research. Evaluation of this study did not identify any significant obstacles to construction of a new structure and associated appurtenances and so McGill and its team developed a conceptual level cost estimate for the new building.

Given the site considerations, it is anticipated 2-story construction would be used to minimize the horizontal footprint of the building. In addition to simple office space requirements, this new facility will require an accommodation for meeting and training room space, along with necessary restrooms/lockers, breakroom, file storage, and office equipment such as copier/printer/scanner areas to provide staff the ability to properly archive and store necessary files and folders. The conceptual programmed space evaluation also considered space needs for IT/communications, mechanical and electrical rooms, and accommodations for an elevator and stairwell. There is also the anticipation that additional staff may need to be accommodated for billing functions to be brought in house at the HWR facility. Preliminary conversations with staff on space needs included consideration of adequate space for broader training events that could accommodate up to 25-30 people including those outside the City of Hopewell. Site work to account for the building and adequate parking for HWR administrative staff and visitors was also considered. Based on preliminary sizing, it is anticipated approximately 7,500 SF of programmed space would need to be accommodated. Using architectural estimating input, civil engineering estimating for preliminary site work, and RS Means data, for typical facilities resulted in a conceptual level cost estimate of $4.8M broken out as follows:

Table 4.1 – Preliminary Opinion of Probable Cost – New Administration Building

Item	Quantity	Unit	Unit Price	Cost
Building Cost	7,500	SF	$360	$2,700,000
Furnishings	1	Lump Sum	$300,000	$ 300,000
Site Work	1	Lump Sum	$1,000,000	$1,000,000
Sub-Total Construction				**$4,000,000**
Contingency	20%			$ 800,000
Total New Administration Building Cost				**$4,800,000**

Adding this cost to the costs for the laboratory renovations shown in Section 3 results in a total opinion of probable project cost of $8.5M as shown below in Table 4.2.

Table 4.2 – Total Project Cost – Laboratory Expansion and Building Renovations and New Administration Building

Project Component	Preliminary Opinion of Probable Cost
Laboratory Expansion and Building Renovations Conversion of existing 6,400 SF building	$3.7M
New Administration Building 7,500 SF of programmed space on HWR site with parking to accommodate employees and training events	$4.8M
TOTAL	**$8.5M**

Please note all estimated costs are in 2022 dollars and attempt to account for current inflationary construction costs and supply chain challenges that have been experienced over the past 12 months. If these renovations and new facilities continue to move toward design and construction phase, probable cost opinions should be revisited prior to bidding.

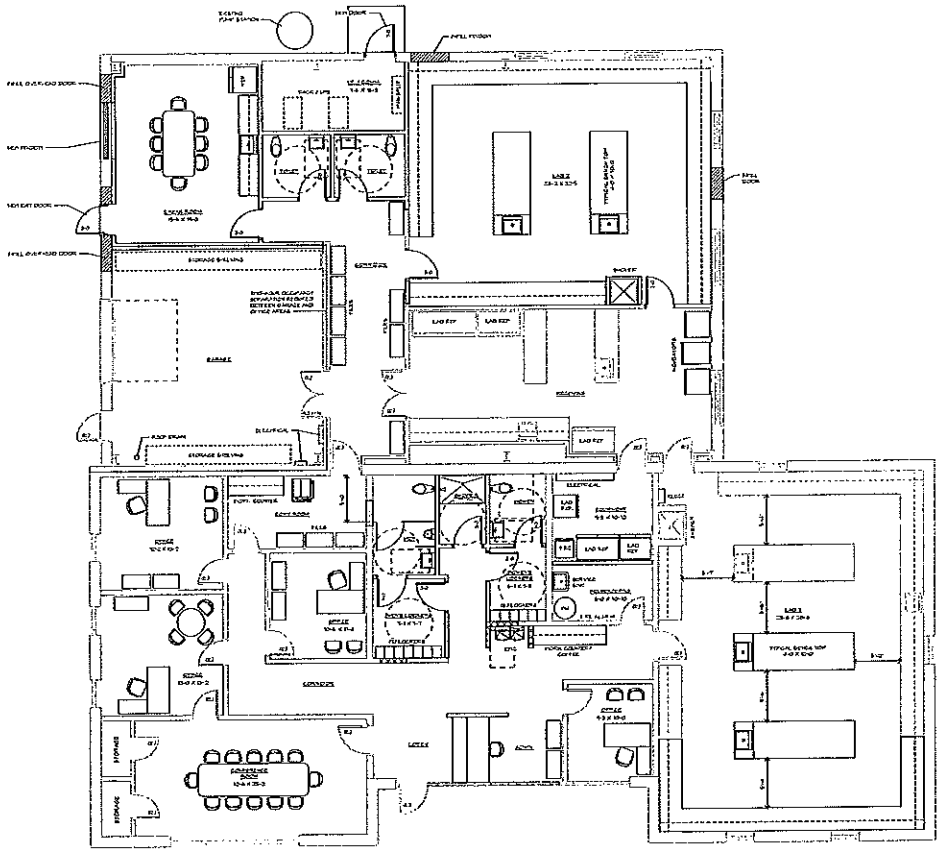
APPENDIX A

Hopewell Water Renewal

City of Hopewell, Virginia

mcgill

Figure 3.1 - Lab Building Alterations - Schematic Design



LEGEND

PLUMBING FIXTURE CALCULATION

LAB BUILDING ALTERATIONS

MATTHEW G BURTON ARCHITECT

LAB BUILDING ALTERATIONS

HOPEWELL WATER RENEWAL

REVISIONS

SCHEMATIC FLOOR PLAN

1

CITY OF HOPEWELL WATER RENEWAL

P.O. Box 969
231 Hummel Ross Road
Hopewell, VA 23860

804.541.2214
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June 23, 2022

Re: Hopewell Water Renewal Lab Expansion Justification

Mr. Byerly,

The following is justification for upgrading of the current Admin/Laboratory Building at HWR.

- More space to meet current and future regulatory requirements that have and will increase the amount of QA/QC to be done on analysis. This means additional chemicals, reagents, labware, instrumentation, and sample containers. Currently the lab has no additional space for these materials.
- As regulatory requirements change to meet EPA and DEQ requirements, this will require additional testing to properly operate the facility. Additional lab testing from increased regulatory requirement will require additional personnel and there is not space available to add another lab technician to the current space.
- Failure to expand existing facility to meet laboratory demands will requiring sending additional samples to a contracted lab for analysis. Therefore, increasing the cost of outside laboratory services.
- ***Safety:*** Expanding the current building by providing additional laboratory space will create isolated locations for the preparation, transport, and use of acids, caustics, and hot glassware. Currently, there are anywhere from 5-6 lab staff in the existing space which is congested and increases the probability of an accident occurring.
- Expanding the space of the current lab will also reduce the risk of cross contamination of samples due to the close proximity of sampling and analysis work stations. Expansion will create designated areas for specific laboratory procedures.
- In order to bring in additional lab testing back from the contracted lab, the laboratory space needs additional space for fume hoods, additional equipment, and testing space.
- The existing laboratory does not meet current regulatory code.

Estimated Cost Savings for upgrading the laboratory, updated equipment, and performing additional in-house samples

- $150,000 (bringing ALL NH3, TKN, NN, %TD, %TVS analysis back in)
- $30,000 (reducing overtime from ability to analyze more samples during 8 hours)
- $10,000 (reducing reoccurring maintenance cost on aging equipment)

Sincerely,

Dickie Thompson

Dickie Thompson
Deputy Director HWR

The City currently utilizes a third party to perform the function of utility billing to customers and collect the utility billing payments. The third party has not provided the City with adequate and reasonable reports in conjunction with the customer utility billing and payment collection function on behalf of the City.

The ability to properly report internal and external the accounts receivable and revenues based upon generated postings (customer account billing and collection information) and reconciliation to the City general ledger is minimized.

The current average cost per month for the third party is $23K. It is anticipated the monthly cost savings to bring the utility billing and collection function back to the City would be approximately between 20-30% reduction in monthly cost; inclusive of the City performing proper accounting, reconciliation, both internal and external reporting of utility billing accounts receivable and revenues.