PREVENTIVE MAINTENANCE PLAN

U.S. VIRGIN ISLANDS
DEPARTMENT OF EDUCATION

August 2021

CONTENTS

Appendices

List of Figures

List of Tables

List of Acronyms

AC	Air Conditioning
ARP	American Rescue Plan
CARES	Coronavirus Aid, Relief, and Economic Security Act
CIP	Capital Improvement Projects/Plans
DM	Deferred Maintenance
EAMS	Enterprise Asset Management Systems
HVAC	Heating, Ventilation, and Air Conditioning
KPI	Key Performance Indicators
MOU	Memorandum of Understanding
O&M	Operation and Maintenance
OSHA	Occupational Safety and Health Administration
PM	Preventive Maintenance
PFA	Public Finance Authority
VIDE	Virgin Islands Department of Education
VIWMA	Virgin Islands Waste Management Authority

*Royalty free cover photos sourced from www.pexels.com

Preface

The study team would like to acknowledge the leadership and support provided by the US Virgin Islands Department of Education (VIDE) Commissioner Berry-Benjamin and Chief Operations Officer Dr. Wells-Hedrington. Their support for the ABCs Initiative and willingness to commit staff time and knowledge to the development of this report are greatly appreciated.

For his outstanding support and generous provision of time, resources, and knowledge in overseeing all aspects of facility management and invaluable contributions to this report, special thanks are given to Mr. Joseph Sibilly.

The ABCs Team hopes this work will assist the VIDE facility managers in building a sustainable preventive maintenance (PM) program.

Executive Summary

This preventive maintenance (PM) plan documents critical actions that should be undertaken to ensure that US Virgin Islands Department of Education facilities, infrastructure and equipment meet industry standard service lives to maximize investments made. The plan is comprised of three core components:

1. Job Plans: identification of key PM tasks and summary steps for execution by maintenance staff or to inform scopes for contracted work.
2. Work plans: task locations and frequencies, including resource estimation and logistical considerations.
3. Organization and Management Structure Change Recommendations: a review of existing management and staff positions and conditions, and recommendations for adjustments or new positions that would help support proactive facility management.

The first section of this report provides background on what PM is, why it is important, and why it makes sense to invest in it. Goals of the program proposed herein are reviewed and discussions of environmental considerations, construction typology and material selections, and inventory age and related concerns are provided.

In Section 2, core components of the PM plan are summarized. Tables illustrate the PM tasks that are performed in-house, the ones contracted out, and the resources needed. Additional detail provided in the appendices.

Existing funding and sources for facility management, as well as estimated costs for the PM work presented in this report and associated cost controls, are reviewed in Section 3. The overall budget needed for maintenance is estimated to be about $8M to $15M (based on a national average of two to four percent current replacement value and a public-school facility inventory value of about $379M (accounting for decommissioned schools/buildings from the 2017 hurricanes)).

On average, the two VIDE school districts (St. Thomas and St. John; and St. Croix), have each received approximately $0.5M annually or a total annual average of about $1M over the past 10 years for maintenance and repairs, which is an order of magnitude under the national averages cited above. Cost controls for PM tasks and strategies for addressing facility needs with constrained budgets are reviewed in Sections 3.3 and 3.4.

Organization and management structure recommendations are provided in Section 4, along with an overview of current staffing, facility management challenges, and adjustments recommended to support the move to a knowledgeable and appropriately staffed facility management team, including training and succession planning.

Based on the findings of this report, PM work and resources required are summarized below in two groups: 1. St. Croix; 2. St. Thomas and St. John.

St. Croix

Thirty-five basic tasks and frequencies (e.g., annual, semi-annual, and monthly) are defined along with locations where the work should occur. Labor resources required to conduct this work are divided into work that can be done in-house, and work that is contracted to local service providers. It is estimated that 3,666 hours a year (approximately 2 person years) are needed for in-house PM work, which is estimated to cost approximately $125,000 in 2021 dollars. Work that is contracted out is expected to cost approximately $1.73 million in 2021 dollars.

St. Thomas and St. John

Thirty-six basic tasks and frequencies are defined along with locations where the work should occur. Labor resources required to conduct this work are broken up into work that can be done in-house, and work that is contracted to local service providers. It is estimated that 4,374 hours a year (2 person years) are needed for in-house PM work, which is estimated to cost approximately $149,000 in 2021 dollars. Work that is contracted out is expected to cost approximately $1.7 million in 2021 dollars.

To help balance School Maintenance's ability to cover PM along with other duties, the following is recommended:

1. One Refrigeration Engineer be added for St. Croix (whose time would be 100% dedicated to PM), with existing maintenance staff dedicating about 50 percent of work time to PM.

2. One Refrigeration Engineer to be added for St. Thomas and St. John (whose time would be 100% dedicated to PM), with existing maintenance staff dedicating about 50 percent of work time to PM.

1 Introduction

1.1 Why a Preventive Maintenance Plan?

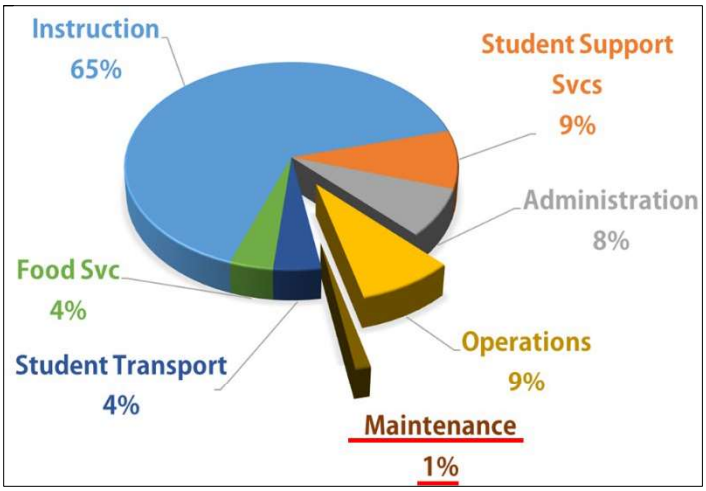
PM is conducted to ensure that assets are performing as intended, to keep tenants safe, and preserve healthy indoor and outdoor environments while helping to extend facility life. PM tasks include activities such as scheduled visual inspections of roofs and drains, lubrication of machine parts, painting, inspecting plumbing for leaks, and cleaning drains and gutters.

Over time, if facility maintenance staff can conduct this work regularly, PM will lead to a reduction in time spent responding to trouble calls (i.e., unanticipated work). Trouble calls, or emergency repairs, result in added costs such as paying a premium when urgently sourcing spare parts and labor. Routine maintenance and monitoring will inform facility managers of the needs for larger maintenance activities (e.g., major repair and replacements) that can be planned to avoid school disturbances that could result from equipment failure and unplanned downtime.

Studies show that reactive maintenance is more costly than PM (see Section 1.2). The overall program should be comprehensive, but facility managers should set priorities and allocate resources based on asset value and cost of failure (e.g., fire protection, weatherproofing, air conditioning (AC), indoor environmental quality).

1.2 Industry Standards and Trends

It is common for institutional organizations around the world to have facility management budgets that are not based on empirical data, are chronically underfunded and lack dedicated funding sources. School maintenance budgets are no different, and school districts depend on annual budget allotments that may vary based on other regional needs and public priorities. School facility management operation and maintenance (O&M) budgets must also compete with other major school related costs such as instruction and student support (e.g., staff salaries), student transportation, food services, and administration. Average maintenance budgets are estimated to account for a very small fraction of O&M budgets and about one percent of overall school district budgets (see Figure 1).



What is Preventive Maintenance?

"Preventive maintenance is the routine, regularly scheduled maintenance of a piece of equipment to ensure its continued use and maximize its life expectancy (e.g., by replacing filters, changing oil, and cleaning coils)" (NCES, 2003). This is proven to be more cost effective than the "run it to failure" approach by extending economic life and improving system reliability.

Figure 1 – Average Maintenance Budget as a Percentage of Overall School District Operating Budget
(Source: HHF Training and Sustainability Program Framework Report, 2015)

Establishing and executing a preventive maintenance program is challenging. Facility management research shows that it is a critical component of comprehensive maintenance program that will ensure reliability, reduce operating costs, and increase the life expectancy of the equipment (NCES, 2003). Key references related to justifying and guiding development of a PM program include:

- The Impact of Underfunding Preventative Maintenance on Total Cost of Ownership (2020)
- Planning Guide for Maintenance of School Facilities (2003)
- Priority Actions for Adequate & Equitable U.S. PK-12 Infrastructure (2015)
- Best Practices for School District Facilities and Maintenance (2015)
- State of our Schools (2016)

Facility management literature emphasizes the need for PM in reducing the frequency of trouble calls and overall maintenance costs in the long-term. Furthermore, because a rigorous PM program leads to fewer trouble calls or other emergency events, PM also tends to reduce school disruptions (e.g., down AC units, or repairs during school hours).

Questions to keep in mind when executing the program:

- For districts that are instituting PM for the first time, has an appropriate system (e.g., AC, lighting, roofing) been identified for piloting before commencing with a full-scale, district-wide program?
- Have manufacturer-supplied user manuals been examined for guidance on PM strategies for each targeted piece of equipment?

"To realize the full potential of a comprehensive preventive maintenance system, school staff, the school board, and town planners must incorporate maintenance priorities into all modernization goals, objectives, and budgets. However, it is also fair for stakeholders to expect the maintenance program to yield results—namely: clean, orderly, safe, cost-effective, and instructionally supportive school facilities that enhance the educational experience of all students. But stakeholders also need to demonstrate patience because the only thing that takes more time than implementing changes to a maintenance program is waiting to see the improvements bear fruit." (NCES, 2003)

- Are records of PM efforts maintained, and, if so, is it done efficiently and is historical information easily accessible?

In *The Impact of Underfunding Preventative Maintenance on Total Cost of Ownership (IFMA, 2020)*, researchers found that cutting 50 percent of funding from an existing PM program is estimated to increase total cost of facility ownership by more than 30 percent, a much higher factor than the cost of PM. As an example, a PM budget of about $30,000 was analyzed. Cutting this budget in half (i.e., "saving" about $15,000) resulted in about a $50,000 increase to overall ownership costs with a fully funded preventive maintenance program (see Figure 2).

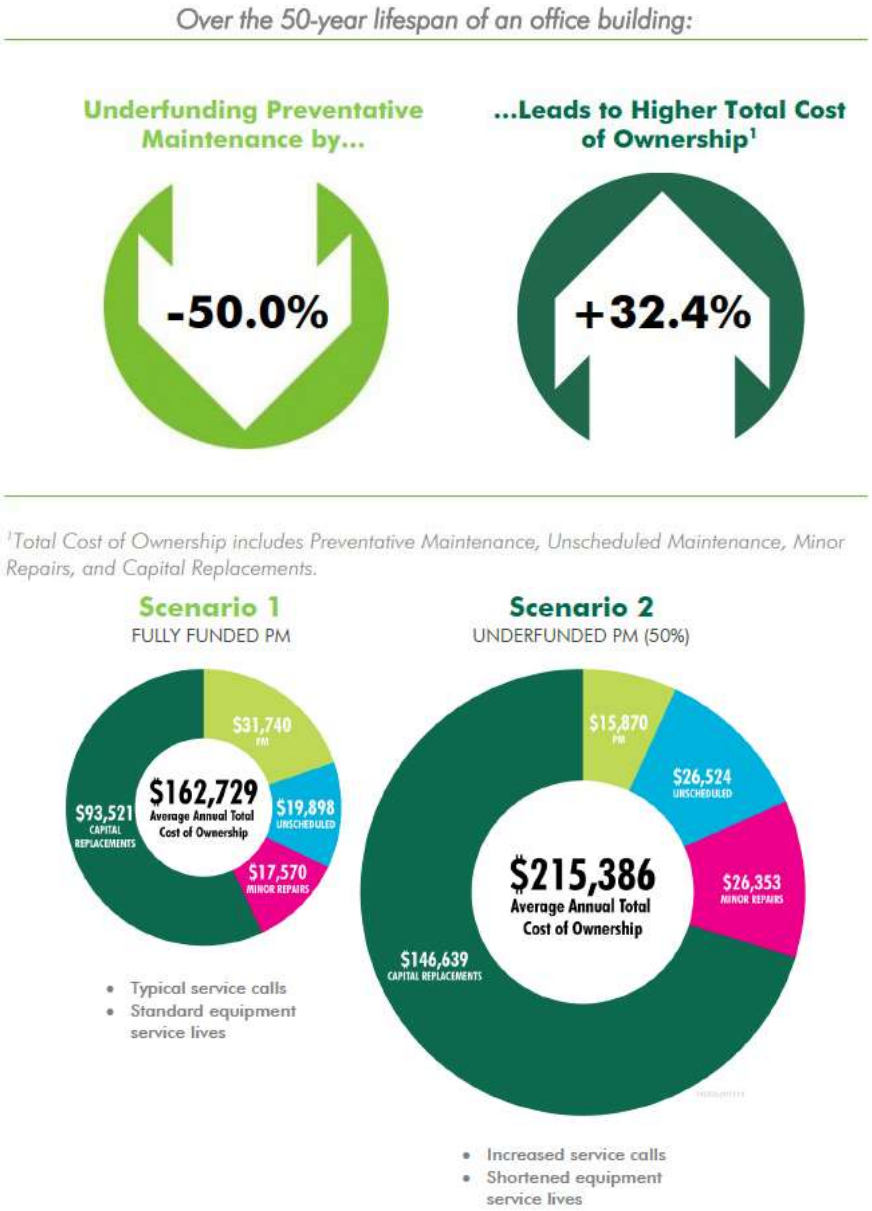


Figure 2 - Effects to Total Cost of Ownership from Reducing Investments in Preventive Maintenance (Source: IFMA, 2020)

This finding highlights the value of PM over time and is further illustrated in cumulative costs of ownership in Figure 3, which shows higher costs over time and higher probability of failure for facility assets when PM is underfunded.

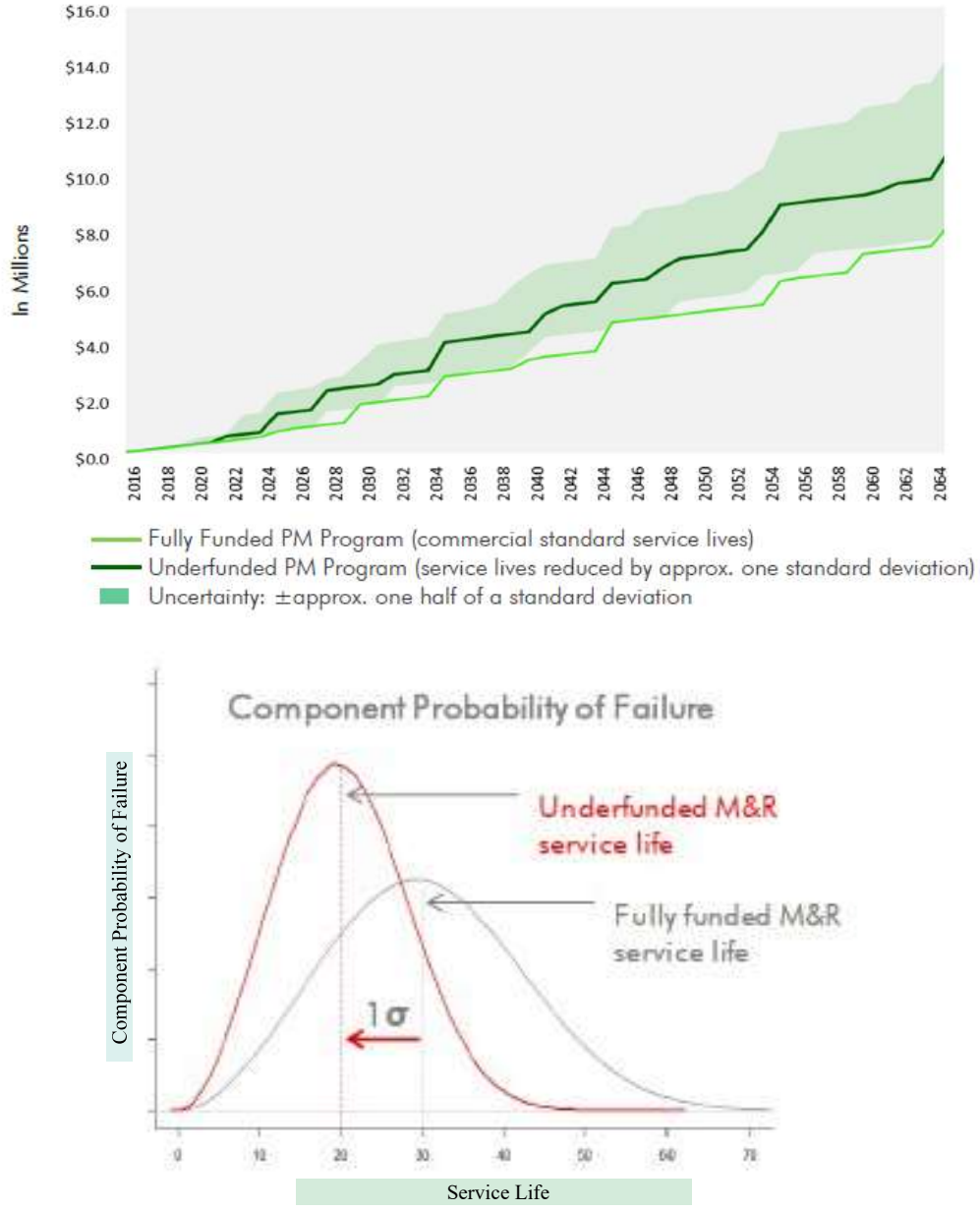


Figure 3 - Higher Costs over Time and Higher Probability of Failure for Facility Assets when Preventive Maintenance is Underfunded (Source: IFMA, 2020; disclaimer: A conclusive mathematical relationship between underfunding PM and the effect on unscheduled maintenance and replacement frequencies is unknown. This case study makes the reasonable assumption that unscheduled maintenance increases and service lives are reduced if equipment is not properly maintained.)

These concepts are widely understood by facility managers and are evident in facility conditions. The concept that regularly conducting cleaning and maintenance tasks will extend service life, reduce overall

costs, and create a more amenable environment for students and teachers serves as the basis for this report and the impetus behind instituting and sustaining a PM program.

As noted in a recent article published on FacilitiesNet (2020), in managing condition assessment data, PM actions, and planned replacements, it is important to use PM to recalibrate anticipated repair and replacement schedules. "There needs to be some mechanism for continually validating the assessments, and they need to be integrated with the operations and maintenance plans." By conducting PM, facility managers can keep an accurate accounting of conditions and priorities. An enterprise asset management system (EAMS) can facilitate an integrated approach if appropriate levels of detail are applied to maintenance planning, tasks are executed, respective data is tracked, and facility managers are able to report information effectively to leadership. For tracking performance, attention should be given to establishing the right metrics. "Rather than establishing 200 metrics, focus on key performance indicators."

Key performance indicators (KPIs) should focus on long-term goals, not short-term measures. School facility management is always in flux (e.g., alterations to building or asset inventories, building code changes, programmatic goals and facility needs). Setting a number for achievement (e.g., number of work orders completed per month or in a year, time required to execute tasks) could result in ongoing changes as milestones are reached, or targets abandoned if considered unattainable, and lose legitimacy. Short-term measures can also cause data misinterpretations (e.g., fewer work orders completed compared to last month). Looking at facility management in terms of "finite games" or playing to win and "infinite games" or for the purpose of continuing the play can help. Stacey Barr (2020) notes that "Finite games in performance improvement are the projects we implement to make a change in performance. The infinite game of performance matters more: it's continuing the play of continual improvement in the result we ultimately want to excel at, by getting better at winning the right finite games." As examples, focusing on student safety, environmental quality, continuity of student learning, and extent of ability to address all facility maintenance and repair jobs can help tailor KPIs to the administrative needs of school district leadership while accounting for the immediate needs of school facility occupants, staff, and students. This view can help facility managers select meaningful performance analysis measures and identify hidden constraints to improved performance.

Integrating current facility condition data with capital improvement plans (CIP) and O&M plans supports long-range performance goals and clarifies budget needs. Reporting this information effectively can be approached in terms of reliability, in addition to overall dollar amounts, e.g., "If I don't spend money and repair this unit, I'm afraid it's going to fail. Then we won't have air conditioning for two weeks." (FacilitiesNet, 2020) Impacts of failed assets or building elements can cause injury, downtime, and prolonged interruptions to school services. Part of conveying facility management needs in relatable terms includes the consequences of deferring needed maintenance and the risks of increased costs of facility ownership that would be projected to result.

1.3 Goals and Objectives – Best Practices

When implementing and monitoring a PM program, a set of guidelines can help achieve a successful result. The following list is a set of recommended best practices.

Facility Managers

- Should set high standards and promote workplace accountability.
- Ensure that all maintenance staff are adequately trained to perform the duties that they are assigned.
- Implement a practice of job shadowing, or an apprentice/mentor model should be used for building and transferring knowledge and experience.
- Maintain and consider staff morale and their perceptions.

Work Allocation

- Each week, a percentage of person-hours should be allocated for PM tasks (vs. trouble calls).
- It is important that all scheduled PM tasks are performed as appropriate for each site.
- Tasks should be planned well in advance (e.g., one year) to ensure that resources are available, responsibilities are clear, and personnel have enough time to perform.
- If the work is outsourced, then the in-house team should be trained to properly inspect and verify the adequacy of outsourced services.

Documentation

- A successful program involves documenting the work performed.
- Work orders should be filled out completely and should accurately indicate hours for all completed work.
- Benchmarking, analysis of program effectiveness, and ongoing revisions or modifications of the program can be informed by documented work history and are necessary to identify ways to improve processes to meet tenant expectations and ensure that maintenance staff have confidence in the program.
- Adjustments and corrective action can be pursued as needed based on data analysis.

Program Monitoring Metrics - KPIs

- KPIs should be defined to help facility managers evaluate programs in a way that considers the end users (e.g., building occupants such as students, school staff/administrators) as well as human resources (e.g., maintenance and managerial staff).
- Program performance ultimately will be judged by these groups so helping them understand program goals and soliciting input on process and performance will bolster program rollout.
- Example KPIs include completion time for maintenance tasks and percentage of all planned maintenance tasks that are completed.

- Performance metrics should be reevaluated if they fail to align with expected or desired results. Facility managers should consider how they are helping maintenance staff prepare for assigned tasks and if scheduling adjustments are needed (Cowley 2014).

Funds

- Stable, annually recurring appropriations are critical to a successful PM program. This also requires a commitment that funds will be spent on maintenance and not be directed to other priorities (e.g., teacher salaries, utilities).

New programs

- Newly initiated PM programs may require an increase in maintenance staffing during the transition from reactive or emergency maintenance to PM.

1.4 Background

1.4.1 Environment and Climate

US Virgin Islands Department of Education (VIDE) schools are in a coastal tropical environment. These conditions are hard on facilities because of constant sun, rain, salt, and humidity, frequent high winds, high salt content in the air, and potential for floods and earthquakes. Facility design and construction or renovation needs to account for these detrimental conditions to maximize a facility's useful life. The following is a listing of tropical conditions and how potential impacts to facilities adapted from the Department of Defense's discontinued tropical design guide (Department of Defense, 2006).

High Solar Radiation: The ultraviolet spectrum in the tropics is particularly harmful to many commonly used building products. High ultraviolet exposure results in rapid deterioration of most non-metallic roofing materials, paints, sealants, elastomeric coatings, and wood. High solar radiation also causes building materials to develop high material temperatures which require careful detailing of the joints in cladding and structural systems.

High Humidity: Relative humidity in the range of 70 percent to 100 percent for most of the year creates ideal conditions for mold and mildew that promote wood decay. It also accelerates rusting of various metals and intensifies galvanic action in many metals. Many paints in high humidity conditions do not perform well. In addition, high humidity conditions require careful detailing of vapor barrier locations in air-conditioned buildings. Common building materials that exhibit hygroscopic properties such as gypsum, insulation, and particle board can lose their structural and functional properties in humid climates.

Intense Rain Periods: Facility mangers may need to specify soil treatments in addition to water infiltration control. Consider and avoid structural instability and exacerbation of rust and decay due to possible water infiltration of buildings. Because tropical areas experience seasonal intense rainfall, producing flood conditions, include provisions for and consideration of ponding and runoff conditions.

Prolonged Elevated Temperatures: Elevated temperatures have adverse effects on building materials such as paints, woods, and many asphalt-based products. These high temperatures combined with high humidity will cause severe deterioration.

Salt-laden Air: Salt rapidly accelerates wood deterioration, promotes galvanic action between metals, rusting of ferrous metals (including inadequately protected reinforcing steel), and pitting of many aluminum alloys. Salt laden air also adversely effects the application of paints, sealants, elastomeric coatings, and asphalt roofing applications.

The severity of salt-laden environments varies throughout the tropics. The degree of intensity varies with elevation, prevailing onshore wind, vegetation, and rainfall. Although all tropical design must address corrosion protection, installations in known or suspected severe corrosive environments require additional protective enclosures, materials, and coatings.

Air-Conditioned Buildings: The major design problems affecting plumbing, air conditioning, ventilation, and other mechanical systems in tropical areas include accelerated corrosion of materials due to exposure to salt-spray, condensation, and rain, and condensation on building materials, equipment, ductwork, and piping. These problems lead to subsequent problems of moisture absorption, swelling, mold, and mildew formation.

1.4.2 Building Types and Construction

Structural deficiencies are relatively isolated throughout the public-school facility inventory and not consistently associated with a certain building type. Deferred maintenance associated with structural elements of the buildings observed during Phase 2 condition assessments (2012-2013) was caused primarily by corrosion of steel components, including steel reinforcing within concrete or masonry buildings, and termite damage or rot of wood framed components. Steel corrosion and wood rot is typically due to water infiltration or exposure to humid, salt-laden atmospheric conditions.

Table 1 provides an overview of structural deterioration based on building type and an indication of frequency of both the building types and the problems associated with each building type.

Table 1: Overview of Structural Deterioration Based on Building Type (Source: ABCs Condition Assessment Report; updated with input from the ABCs team structural engineer)

VF	Observed very frequently
C	Observed commonly
I	Observed in isolated instances

Common Structural Concerns by Building Type	Frequency Observed
One and Two-Story Low Slope Reinforced Concrete Roofs and Masonry Walls	**I**
Roof water ponding causing leaking, reinforcing corrosion and spalling	**C**
One and Two-story Wood Framed Gable Roofs with Masonry Walls	**C**
Termite damage or rot in wood decking and nailers	**C**
Incomplete uplift ties between walls and roof	**I**
Unreinforced Stone Rubble Walls and Wood Frame Roofs	**C**
Termite damage or rot in wood roof framing	**I**
Unreinforced walls susceptible to earthquakes	**VF**
Incomplete uplift ties between walls and roof	**C**
Steel joist and Light Gage Metal Roofs with Masonry Walls	**C**
Corrosion of steel components, esp. exposed rafter tips	**C**
Prefabricated Wood or Steel Framed Roofs with Structural Steel Walls	**C**
Corrosion of steel components affecting structural integrity	**C**
Missing strap anchors, unreinforced and ungrouted foundation piers	**C**
Wood Framed Buildings on Slabs or Elevated Piers	**C**
Isolated termite damage or rot	**C**
Missing uplift ties or under-designed for wind uplift or lateral loads	**C**
Slabs cracked or spalled	**I**

To avoid these problems, PM should focus on keeping water out of the interior enclosure with well-maintained exterior wall and roof finishes and isolation of steel components from the outside environment. This will also eliminate wood decay and most termite activity.

Steel corrosion is particularly problematic at exposed building features (e.g., overhangs, walkways, and stairs) from salt-air exposure at the one- and two-story buildings with prefabricated wood or steel framed roofs and concrete masonry shear walls. These buildings require special monitoring of the condition of weatherproofing materials.

Unreinforced walls and Incomplete uplift ties between walls and roofs are another particular concern given the seismicity and hurricane risks in the region. This is particularly problematic in the prefabricated metal buildings that have unreinforced, ungrouted masonry piers with missing or inadequate tie-down straps.

1.4.3 Age and History

Older buildings typically require more upkeep and building assets may be close to failure and require monitoring. Larger CIP may be needed to address deterioration, footprint rightsizing (physical capacity adjustments based on current enrollment), or functional obsolescence (physical layout of old buildings regarding current educational program objectives), and the regular inspection of assets conducted as a part of PM can help inform these considerations.

Potential presence of lead-based paint, asbestos containing material, polychlorinated biphenyls and/or AC refrigerants should also be considered during any PM actions that could disrupt and release any of these hazardous materials. Ways to encapsulate, work around, or otherwise not disturb these hazardous materials can be considered in addition to possibilities for removal and remediation to prevent exposure and potential health and safety risks. Referencing year-built dates and repair work history (e.g., in EAMS) can help inform hazardous material considerations.

The US Virgin Islands public school system facility inventory includes buildings with ages exceeding 50 years. One building is considered to have potential historic significance, identified as Building 4 of Positive Connections Alternative Education School, constructed in 1841 on St. Croix. Work at this building should consider original design and materials during repair and renovation.

Other structures or grounds that warrant consideration of potential adverse effect to historic properties and/or disturbance of cultural deposits during school improvements (e.g., drainage improvements or other ground disturbing activities) include:

<u>St. Thomas</u>

1. Addelita Cancryn Junior High School
2. Alfredo Andrews Elementary School
3. Charlotte Amalie High School
4. Gladys A. Abraham Elementary School
5. Ivanna Eudora Kean High School
6. Joseph Sibilly Elementary School

<u>St. Croix</u>

7. Charles Emanuel Elementary School
8. Claude O. Markoe Elementary School
9. Eulalie Rivera Elementary School
10. Juanita Gardine Elementary School
11. Pearl B. Larsen Elementary School

Any maintenance activities that include excavations below ground surface at these schools should be coordinated with the Historic Preservation Office.

Ground disturbing activities must also consider the potential presence of unknown underground infrastructure (e.g., power, communications, water, sewer) and appropriate surveying activities (e.g., toning for utility lines).

1.5 Local Regulatory Requirements (and National to the extent required for PvM actions)

- VIDPNR: (Div. of Environmental Protection) Safe Drinking Water Act
  1. Water Quality
  2. Generators
  3. Sewage Treatment Plants
- VIDOH: Div. of Environmental Health: Grease Traps / Cisterns / Pest and Rodent Controls
- VI Fire Service: Fire Extinguishers
- US Dept. of Labor: OSHA – Occupational Safety and Health
- US Dept. of Interior: SHPO- Historic Structures
- Applicable (VIDOE Adopted) Industry Standards

2 Preventive Maintenance Program

2.1 Overview of Components and Resource Needs

The core of an effective PM program is the scheduling and assigning of work, which is typically done through a work order system (Alaska Department of Education and Early Development, 1999). Enterprise asset management (EAM) consists of the management and maintenance of assets throughout their lifecycle (Rouse, 2018). EAM Systems (EAMS) focus on the time, resources, and efforts necessary to achieve optimal performance of assets (McKeon & Ramshaw, 2013).

Embedded in the EAMS architecture for the Insular ABCs Initiative is a work order system with which job plans can be applied and used as templates for many different work orders. This capability helps to schedule and plan maintenance work expediently. Job plans are the documentation of repeatable repair processes that list specific maintenance steps for a job. These plans standardize required maintenance actions to promote consistency and thorough completion for each maintenance task. Templated job plans in EAMS can also be modified for unique assets or locations to account for individual needs (e.g., different types of equipment, materials, or conditions).

Current preventive maintenance work for USVIDE facilities address the following systems:

- Air Conditioning
- Emergency Generators
- Fire Protection
- Grounds Work
- Kitchen Equipment
- Pest Control
- Play/Sport Facilities
- Plumbing-Grease Trap

- Plumbing-Pumps
- Waste Disposal
- Water Testing

Work is done at various frequencies, such as daily, monthly, quarterly, semi-annually, and annually. Each task requires various levels of skills to perform them. These certification levels have been broken down into the following 3 categories.

Skill Level

- Skill Level 1: Basic skill range with some formal training.
- Skill Level 2: Advanced skill range with formal training and certification.
- Skill Level 3: Advanced skill range with factory training and certification.
  (Source: Insular ABC's Phase 3 Preventive Maintenance Program USVI; HHF Planners, 2018)

Time

The average times required to perform the specified tasks are estimated in hours. Manpower estimates were developed based on assumptions of how tasks would be grouped (e.g., provide maintenance to all AC units of a building in one visit) and time needed for mobilization and transportation to respective sites. These estimates were developed in cooperation with host-agency facility managers.

The in-house PM tasks, skill levels required to do the work, the frequency with which the tasks should occur, and estimates of time required to execute the tasks is summarized in Table 2 and Table 3. More details are available in Appendix 2 - Preventive Maintenance Work Plan and Resource Needs.

*Table 2: **St. Croix** - Breakdown of In-House Preventive Maintenance Tasks*

In-House Tasks	Trade/ Skill Level	*Frequency	Time (Hr./Yr.)	Total Schools / Bldgs. or Units	Total Labor Hours w/ Mob/ Demob (Hr./Yr.)	**Rate $/Hr.	Est. Cost
Cistern Inspections and Maintenance	1	W	52	12	624	$ 34	$ 21,216
Air Conditioning (</=5 tons)	2	Q	10	240	2,400	$ 34	$ 81,600
Pump Maintenance (domestic water, sump, etc.)	2	SA	4	13	52	$ 34	$ 1,768
Inlets, Storm Drains, Gutters, Downspouts	1	Q	12	13	156	$ 34	$ 5,304
Swales, Culverts, Retention Basins	2	A	3	13	39	$ 34	$ 1,326
Tree Inspection	1	A	5	13	65	$ 34	$ 2,210
Track and Field and Ball Court Inspection	1	Q	12	13	156	$ 34	$ 5,304
Playground Inspection	1	Q	6	13	78	$ 34	$ 2,652
Termite Inspection	1	Q	8	12	96	$ 34	$ 3,264
				Total:	**3,666**		**$ 124,644**

**Frequency Categories: W = Weekly, Q = Quarterly, SA = Semi-Annually (2x/YR), A = Annually*
***Assumed hourly rate of $34*

*Table 3: **St. Thomas and St. John** - Breakdown of In-House Preventive Maintenance Tasks*

In-House Tasks	Trade/ Skill Level	*Frequency	Time (Hr./Yr.)	Total Schools/ Bldgs. or Units	Labor Hours w/ Mob/Demob (Hr./Yr.)	**Rate $/Hr.	Est. Cost
Cistern Inspections and Maintenance	1	W	52	12	624	$ 34	$ 21,216
Air Conditioning (</=5 tons)	2	Q	10	317	3170	$ 34	$107,780
Pump Maintenance (domestic water, sump, etc.)	2	SA	4	11	44	$ 34	$ 1,496
Inlets, Storm Drains, Gutters, Downspouts	1	Q	12	12	144	$ 34	$ 4,896
Swales, Culverts, Retention Basins	2	A	3	11	33	$ 34	$ 1,122
Tree Inspection	1	A	5	11	55	$ 34	$ 1,870
Track and Field and Ball Court Inspection	1	Q	12	12	144	$ 34	$ 4,896
Playground Inspection	1	Q	6	12	72	$ 34	$ 2,448
Termite Inspection	1	Q	8	11	88	$ 34	$ 2,992
				Total:	**4,374**		**$148,716**

**Frequency Categories: W = Weekly, Q = Quarterly, SA = Semi-Annually (2x/YR), A = Annually*
***Assumed hourly rate of $34*

The total hours shown in Tables 2 and 3 were used to estimate the resources required for the proposed PM program. See Section 3.2 for more information on resource estimates.

Tables 4 and 5 provide an overview of the PM tasks contracted out, their estimated annual contract costs, and recommendations or assumptions listed in the *Notes* column.

*Table 4: **St. Croix** Contracted Tasks*

Contracted Tasks	Annual Contract Cost	Notes
Coliform Bacteria Testing	$11,520	
Chemical/Lead Copper Testing	$6,660	
UV Lights/Chlorine Injector/Filter Services	$9,600	
Cistern Inspection and Maintenance	$9,600	
Full Cistern Cleaning – Every 5 Years	$30,571	(11) Locations; Units in gallons
Septic System Maintenance		VIDE to secure a maintenance Memorandum of Understanding (MOU) with Virgin Islands Waste Management Authority (VIWMA)
Sewer Lift Station Inspection		VIDE to secure maintenance MOU with VIWMA
Kitchen Grease Trap Servicing	$62,400	
Generator Servicing	$20,400	
Air Conditioning (>5 tons)	$151,077	
Pump Maintenance (Jockey)	$3,700	
Grass Cutting and Grounds Cleaning	$780,833	Does not include major tree pruning or removal; Units in acres
Tree Trimming	$322,833	
Track and Field Maintenance	$94,000	
Fire Extinguisher Inspection and Servicing	$12,000	National Fire Protection Association recommends inspection annually at $40/unit (approx.)
Fire Alarm Inspection	$3,700	
Fire Alarm System Testing and Servicing	$3,700	
Sprinkler System - Semi Annual	$3,696	
Sprinkler System - Annual	$3,696	
Security Equipment - Quarterly	$36,000	
Security Equipment - Semi Annual		Assume cost is covered by quarterly maintenance
Security Equipment - Annual		Assume cost is covered by quarterly maintenance
Pest Control for Kitchens	$53,772	
5-Year Termite Treatment	$18,900	
Rodent Bait Stations	$24,500	
Kitchen Equipment Service	$67,000	
Total:	**$1,730,158**	

Table 5: ***St. Thomas and St. John*** *Contracted Tasks*

Contracted Tasks	Annual Contract Cost	Assumptions or Questions
Coliform Bacteria Testing	$10,560	
Chemical/Lead Copper Testing	$12,000	
UV Lights/Chlorine Injector/Filter Services	$7,000	
Cistern Inspection and Maintenance	$9,600	
Full Cistern Cleaning - Every 3 Years	$38,900	(2) Locations; Units in gallons
Full Cistern Cleaning - Every 5 Years	$113,630	(24) Locations; Units in gallons
Septic System Maintenance		VIDE to secure maintenance MOU with VIWMA
Sewer Lift Station Inspection		VIDE to secure maintenance MOU with VIWMA
Kitchen Grease Trap Servicing	$67,203	
Generator Servicing	$20,398	
Air Conditioning (>5 tons)	$535,167	
Pump Maintenance (Jockey)	$5,700	
Grass Cutting and Grounds Cleaning	$159,600	Does not include major tree pruning or removal; Units in acres
Tree Trimming	$397,900	
Track and Field Maintenance	$84,000	
Fire Extinguisher Inspection and Servicing	$9,625	National Fire Protection Association recommends inspection annually at $40/unit (approx.)
Fire Alarm Inspection	$5,700	
Fire Alarm System Testing and Servicing	$5,700	
Sprinkler System - Semi Annual	$5,697	
Sprinkler System - Annual	$5,697	
Security Equipment - Quarterly	$43,000	
Security Equipment - Semi Annual		Assume cost is covered by quarterly maintenance
Security Equipment - Annual		Assume cost is covered by quarterly maintenance
Pest Control for Kitchens	$31,800	
5-Year Termite Treatment	$15,000	
Rodent Bait Stations	$29,900	
Kitchen Equipment Service	$84,333	
Total:	**$1,698,110**	

2.2 In-house and Contracted Work

To reduce costs, facility managers evaluate the cost effectiveness of retaining in-house specialists for frequently occurring tasks compared to the benefits of contracting the work. Reactive maintenance, or responding to emergency repairs, often occupies most of the available staff time, resulting in large workload fluctuations. Adding PM activities to staff duties reduces the peaks and valleys in maintenance workload by reducing the amount of maintenance emergencies and creating a more predictable schedule. PM includes periodic servicing and inspections to ensure proper functioning and keep warranties intact (e.g., roofing, AC units, and fire protection systems).

If the organization is still uncertain whether to outsource, other factors to consider are specialized skills, certifications, tools required, liability, urgency of timing and workload. Highly specialized tasks that do not occur very often (i.e., a small fraction of a typical staff year) should probably be outsourced. Alternatively, some routine maintenance tasks that must occur on a frequent basis might also be better outsourced, as that frees up in-house staff to attend to unplanned maintenance activities. Maintenance tasks associated with liability such as servicing expensive equipment or accessing rooftops, may justify outsourcing.

Planned repair and capital renewal are typically contracted because they are long cycle (i.e., once every 5+ years) and require specialized tools or skills. If a surge of maintenance or capital improvements need to be completed before a tight deadline, contract labor may also be better suited to coordinate the multiple tradesmen needed (APPA 2011).

The majority of USVIDE's maintenance work is contracted out. Some maintenance work is conducted in-house, but associated efforts are primarily focused on responding to trouble calls. The goal of this PM plan is to reduce reactive maintenance by conducting PM and identifying and correcting developing problems before emergency work is required.

It is critical to note that a successful program requires stable, annually recurring appropriations and commitment that funds will be spent on maintenance, that no other priorities will compete for operating funds (e.g., teacher salaries, utilities) (Alaska Department of Education and Early Development 1999).

3 Preventive Maintenance Budget

3.1 Existing Funding and Sources

A review of O&M and Capital Outlay funding from the National Center for Education Statistics (NCES) in Table 6 shows that overall budgeting dropped by about 60% from $11.2M in 2014 to $4.9M in 2019. This data also shows that capital outlay was limited to about $0.5M in only two of the six years for which recent data was available. These two metrics suggest that maintenance is inadequate, and worsening, and facility or asset replacements or upgrades are also lacking.

Table 6: Expenditures, USVI

FY	O&M	Capital Outlay	Total
2014	$11,225,000	-	$11,225,000
2015	$6,829,000	-	$6,829,000
2016	$7,407,000	$433,000	$7,854,000
2017	$6,854,000	$116,000	$6,970,000
2018	$4,751,000	-	$4,751,000
2019	$4,857,000	-	$4,857,000

Note: Figures taken from NCES reports.

Sources of funding include capital improvement grants provided by OIA, American Rescue Plan (ARP) and Coronavirus Aid, Relief, and Economic Security (CARES) Act funding. Nationally, elementary, and secondary education total expenditures average 20% of a state's total expenditures, plus, school districts typically receive additional local-level funding (i.e., county government revenue from property taxes). VIDE does not have access to such local sources of funds and therefore receives sizeable supplementary funding from federal sources. The Public Finance Authority (PFA) also provides bonds for CIP actions such as major renovation or new construction. (HHF, 2017)

Table 7 shows the allotted funding for the VIDE maintenance department for the past 10 years. On average, the St. Thomas and St. John district, along with the St. Croix district has each received approximately $0.5M annually. Therefore, receiving a total annual average of almost $1M for all three districts combined.

Since 2010, the funding has been inconsistent and declining. Although funding has improved in 2021, it is still inadequate based on the national average funding required to maintain facilities.

Table 7: VIDE Maintenance Funding, 2010-2021

School Year	St. Thomas/St. John District	St. Croix District	Annual Total
2010	$1,000,000	$1,000,000	$2,000,000
2011	$300,000	$300,000	$600,000
2012	$727,411	$727,411	$1,454,822
2013	$1,125,000	$1,125,000	$2,250,000
2014	$600,000		$600,000
2015	$475,028	$475,028	$950,056
2016	$300,000	$300,000	$600,000
2017	$169,952	$4,790	$174,742
2018	$259,683	$183,795	$443,478
2019			$0
2020	$226,693	$348,118	$574,811
2021	$589,527	$691,526	$1,281,053
Annual Average	$524,845	$515,567	$910,747

3.2 Estimated Needs

St. Croix

Labor resources required to conduct PM tasks are divided into work that can be done in-house, and work that is contracted to local service providers. It is estimated that 3,666 hours a year (approximately 2 person years) are needed for in-house PM work, which is estimated to cost approximately $125,000 in 2021 dollars (see Table 2). Work that is contracted out is expected to cost approximately $1.73 million in 2021 dollars (see Table 4).

St. Thomas and St. John

Labor resources required to conduct PM work for St. Thomas and St. John are broken up into work that can be done in-house, and work that is contracted to local service providers. It is estimated that 4,374 hours a year (2 person years) are needed for in-house PM work, which is estimated to cost approximately $149,000 in 2021 dollars (see table 3). Work that is contracted out is expected to cost approximately $1.7 million in 2021 dollars (see table 5).

3.3 Cost Controls

The scopes of work for PM tasks need to be clearly defined, particularly for contracted work because oversight and course correction are difficult for the owner to enforce. This includes appropriate maintenance frequencies that should be clearly stated in bid solicitation documents to ensure that the contracts awarded fulfill maintenance needs and maximize the use of budgeted maintenance funds.

Inventories of equipment (e.g., AC units) listed in initially awarded multi-year contracts should be closely monitored throughout the maintenance contract year. Adjustments to inventories need to be made prior to award of contract option years to ensure maintenance tasks are performed in accordance with current contract equipment inventory listings and frequencies. Reduction in inventories should correspondingly reduce required maintenance costs. “Repair by Replacement” of equipment should be carefully evaluated to ensure it is done only when it is determined to be cost effective. Qualified contract managers should oversee these contracts and be diligent in enforcing contract scope, terms, and conditions.

For in-house maintenance work, the appropriate number of personnel should be tasked with performing the work. Balancing labor requirements for PM tasks and other work conducted throughout the year is required and should be adjusted based on demonstrated trends (e.g., PM may reduce trouble calls and emergency work over a few years). Additionally, job plans should specify the necessary skill levels of personnel and accurate material quantities to control labor and materials costs.

3.4 Overall Maintenance Budget Needs, Current Funding, and Deferred Maintenance

As shown in Table 6, overall budgets dropped by about 60% from $11.2M in 2014 to $4.9M in 2019. It also shows that capital outlay was limited to about $0.5M in only two of the six years for which recent data was available. VIDE accounting records show that maintenance funding is limited to about $500,000 per district annually. This does not provide adequate funding for the PM program items covered in this report. As popularized in "Committing to the Cost of Ownership: Maintenance and Repair of Public Buildings" (National Research Council, 1990), a sustainable steady state maintenance budget should be in the range of two to four percent the current replacement value of an organization's inventory, depending on the age of the facilities and construction materials used. The current replacement value for VIDE schools is estimated at $379M (HHF, 2013). This means that the school maintenance budget should be in the range of $8M to $15M.

The current replacement value for VIDE schools is estimated at $379M. This means that VIDE's school maintenance budget should be in the range of $8M to $15M. VIDE provided anecdotal information that maintenance funding is limited to about $500,000 per district annually. This does not provide adequate funding for the PM program items covered in this report.

Future budget proposals should include the PM tasks identified in this report, along with other maintenance needs identified by School Maintenance. Reliable annual funding is required to provide adequate maintenance to facilities and sustaining viable facility management operations. Furthermore, DM is currently estimated at about $71M. An investment of about $12M per year of strategic funding would be required to eliminate all DM within ten years.

DM is currently estimated at about $71M. An investment of about $12M per year of strategic funding would be required to eliminate all DM within ten years because DM continues to accrue.

Methods to consider for reducing DM include:

- Footprint reduction/consolidation or mothballing of underutilized facilities
- Preventative maintenance to extend economic life (to prevent the accrual of additional DM)
- Capital improvement, modernization/building replacement

Capital improvement projects (CIP), PM, and trouble call repairs help reduce DM costs. Addressing PM and DM will reduce overall operating costs in the long-term.

4 Organization and Management Structure

4.1 Current Staffing, and Recommended Management and Maintenance Structure

Current maintenance staffing for St. Croix, and St. Thomas and St. John is shown in Tables 8 and 10 respectively. Tables 9 and 11 indicates the staff positions that are likely to perform each task. For every full-time employee, 1,960 annual labor hours were used to estimate current available labor hours.

A total of 66,640 labor hours are available for all 34 positions in St. Croix (shown in Table 8). 3,666 hours are needed for in-house PM tasks. Tasks that require more than 50 percent of existing maintenance staff time are highlighted in yellow. Additional staff positions may be warranted to cover these duties and other maintenance tasks (e.g., trouble call response). Hiring 1 Refrigeration Engineer whose time is 100% dedicated to PM work, would bring down the total percent of time from 61% to 41% for AC related PM tasks.

*Table 8: **St. Croix** Breakdown of Work Hours by Position*

Positions	Position Count	Annual Workhours	Available Workhours	PM Hours Needed	% Of Total Time	Available Hours (+1 person)	% Of Total Time (+1 person)
Plant Facility Coordinator	5	1,960	9,800				
Laborer	12	1,960	23,520	1,118	5%		
Maintenance Mechanic/ Maintenance Engineer	9	1,960	17,640	52	0.29%		
Carpenter	1	1,960	1,960	96	5%		
Refrigeration Engineer I	2	1,960	3,920	2,400	61%	5,840	41%
Environmental Specialist	1	1,960	1,960				
Director	1	1,960	1,960				
Assistant Director	1	1,960	1,960				
Administrative Assistant	1	1,960	1,960				
District Warehouse Manager	1	1,960	1,960				
Total:	34	19,600	66,640	3,666	6%		

Table 9 shows which staff position would likely perform each PM task for St. Croix.

*Table 9: **St. Croix** Breakdown of Job Positions for each Task*

Job Position	Asset	Task
Laborer	Domestic Water - Cistern	Weekly visual cistern inspections and maintenance
Refrigeration Engineer I	Air Conditioning	Quarterly air conditioning maintenance (</=5 tons)
Maintenance Mechanic/Engineer	Pumps	Semi-annual pump maintenance (domestic water, sump, etc.)
Laborer	Inlets, Storm Drains, Gutters, Downspouts	Quarterly inspection and maintenance of storm drains, inlets, gutters, downspouts
Laborer	Swales, Culverts, Retention Basins	Annual inspection and repairs of swales, culverts, and retention basins
Laborer	Trees/Vegetation	In-house annual tree inspection
Laborer	Track & Field	Quarterly track and field and ball court inspection
Laborer	Playground Inspection	Quarterly playground inspection
Carpenter	Pest Control	Quarterly Termite Inspection

A total of 49,000 labor hours are available for all 25 positions in St. Thomas and St. John (shown in Table 10). 4,374 hours are needed for in-house PM tasks. Tasks that require more than 50 percent of existing maintenance staff time are highlighted in yellow. Additional staff positions may be warranted to cover these duties and other maintenance tasks (e.g., trouble call response). Hiring 1 Refrigeration Engineer whose time is 100% dedicated to PM work, would bring down the total percent of time from 54% to 40% for AC related PM tasks.

*Table 10: **St. Thomas and St. John** Breakdown of Work Hours by Position*

Positions	Position Count	Annual Workhours	Available Workhours	PvM Hours Needed	% Of Total Time	Avail Hours (+1 person)	% Of Total Time (+1 person)
Project Coordinator	1	1,960	1,960				
Laborer	3	1,960	5,880	1,072	18%		
Maintenance Mechanic	7	1,960	13,720	44	0.32%		
Carpenter	2	1,960	3,920	88	2%		
Refrigeration Engineer I	3	1,960	5,880	3,170	54%	7,840	40%
Per Diem Employee	2	1,960	3,920				
Painter	3	1,960	5,880				
Facilities Coordinator	3	1,960	5,880				
Facilities Engineer	1	1,960	1,960				
Total:	25	17,640	49,000	4,374	9%		

Table 11 shows which staff position would likely perform each PM task for St. Thomas and St. John.

*Table 11: **St. Thomas and St. John** Breakdown of Job Positions for each Task*

Job Position	Asset	Task
Laborer	Domestic Water - Cistern	Weekly visual cistern inspections and maintenance
Refrigeration Engineer	Air Conditioning	Quarterly air conditioning maintenance (</=5 tons)
Maintenance Mechanic	Pumps	Semi-annual pump maintenance (domestic water, sump, etc.)
Laborer	Inlets, Storm Drains, Gutters, Downspouts	Quarterly inspection and maintenance of storm drains, inlets, gutters, downspouts
Laborer	Swales, Culverts, Retention Basins	Annual inspection and repairs of swales, culverts, and retention basins
Laborer	Trees/Vegetation	In-house annual tree inspection
Laborer	Track & Field	Quarterly track and field and ball court inspection
Laborer	Playground Inspection	Quarterly playground inspection
Carpenter	Pest Control	Quarterly Termite Inspection

4.2 Training, Capacity Building, and Succession Planning

Training is required to support the move to a knowledgeable and appropriately staffed facility management team. Project management training of contract management staff for the development and administration of outsourced contracts is essential. In addition to project supervision and management needs, current trades training needs include heating, ventilation, and air conditioning (HVAC), electrical and plumbing systems, and job site safety.

5 Resources

Alaska Department of Education and Early Development. (1999). *Alaska School Facilities Preventative Maintenance Handbook*. Juneau.

Cowley, M. 2014. Management Insight Column: Measure key performance indicators that matter - Facility Management Facilities Management Feature. Retrieved from https://www.facilitiesnet.com/facilitiesmanagement/article/Management-Insight-Column-Measure-key-performance-indicators-that-matter-Facility-Management-Facilities-Management-Feature--14759\

Department of Defense. 2006. UFC 3-440-05N Tropical Engineering, With Changes 1-2. Retrieved from: https://www.wbdg.org/ffc/dod/unified-facilities-criteria-ufc/ufc-3-440-05n

FacilitiesNet. 2020. The struggle for deferred maintenance goes on. Consultants offer insights to turn the tide. Retrieved from: https://www.facilitiesnet.com/facilitiesmanagement/article/The-struggle-for-deferred-maintenance-goes-on-Consultants-offer-insights-to-turn-the-tide--15865

Hanover Research. July 2015. Best Practices for School District Facilities and Maintenance. Retrieved from: https://www.gssaweb.org/wp-content/uploads/2015/11/Best-Practices-for-School-District-Facilities-and-Maintenance.pdf

HHF Planners. 2013. Insular ABCs Inventory and Condition Assessment, Phase 2 Report.

HHF Planners. 2015. HHF Training and Sustainability Program Framework Report.

HHF Planners. 2017. Insular ABCs US Virgin Islands Organizational Sustainability Plan.

HHF Planners. 2018. Insular ABCs Phase 3 Preventive Maintenance Program USVI.

IFMA. 2020. The Impact of Underfunding Preventative Maintenance on Total Cost of Ownership. Retrieved from: https://www.cbre.us/-/media/cbre/global-shared/business%20analytics%20media%20files/2018-ifma-underfunding-pm-20190206.pdf?la=en

McKeon, P., & Ramshaw, D. (2013). *Implementing Enterprise Asset Management for Dummies*. West Sussex: John Wiley and Sons, Ltd.

National Center for Education Statistics (NCES). 2003. Planning Guide for Maintenance of School Facilities. Retrieved from: https://nces.ed.gov/pubs2003/2003347.pdf

National Council on Schools Facilities (NCSF). 2015. Priority Actions for Adequate & Equitable U.S. PK-12 Infrastructure. Retrieved from: http://www.21csf.org/best-home/docuploads/pub/337_AdequateandEquitableUSPK-12Infrastructure.pdf

National Council on Schools Facilities (NCSF). 2016. State of our Schools. Retrieved from: http://www.21csf.org/best-home/docuploads/pub/331_StateofOurSchools2016.pdf

National Research Council. 1990. Committing to the Cost of Ownership: Maintenance and Repair of Public Buildings. Washington, DC: The National Academies Press. https://doi.org/10.17226/9807.

Rouse, M. (2018). What is enterprise asset management (EAM)?. Retrieved from https://searcherp.techtarget.com/definition/enterprise-asset-management-EAM

6 Appendices

A1 - Preventive Maintenance Job Plans

A2 - Preventive Maintenance Work Plan and Resource Needs

A3 – Listing of Schools Used in Analysis

Appendix 1 - Preventive Maintenance Job Plans

The following is the list of critical preventive maintenance tasks and work steps (i.e., job plans) that are required to ensure functionality, extend useful life, and avoid school disruptions that could be caused by the failure of these assets.

The job plans are divided into categories of work type (e.g., fire alarm, grounds, AC) and provides work details for each associated task. Each category listed here correlates to the work plan tasks itemized in *Appendix 2: Preventive Maintenance Work Plan and Resource Needs Estimation*.

1 Water Quality Systems

This section includes water collection, storage, and distribution.

1.1 G3010 - Water Testing

1.1.1 G3010-BT Monthly Coliform Bacteria Testing

Contracted
Sampling Instructions: Collect samples on the same day as delivered or shipped to the testing site.

To Collect Samples for Total Coliform:

1. Use a small, plastic, 125-mL, sterilized bottle.
2. Do not touch any portion of the inside of the bottle or cap (if possible, use latex gloves).
3. Unscrew and remove the aerator screen on your faucet (if present).
4. Using a swab with bleach to wipe the inside and outside of the faucet opening. This will eliminate any bacteria present on your faucet which may contaminate your sample.
5. Turn on the cold-water faucet, rinse the outside lip well and let it run for about two minutes.
6. Remove the cap from the sample bottle (do not set the cap down) and fill the bottle only to the neck of the bottle or fill line.
7. Recap the bottle tightly.

Shipping Instructions: Carefully complete bottle labels with your name, date and time of sample collection, and the sample location (i.e., school name and building number). Place the bottle(s) and ice, with the completed instruction sheet (inside plastic baggie) in the ice chest. Seal the box and either deliver or ship the kit to the testing site.

VIDE or the local testing company to provide “Request for Testing” form if required.

Source: https://www.lcra.org/services/els/Documents/Rainwater-Harvesting-Form.pdf

1.1.2 G3010-LT Annual Chemical/Lead Copper Testing

Contracted
Sampling Instructions: Collect samples on the same day as delivered or shipped to the testing site.

Sample Collection for Lead Water Tests:

1. Use the larger, 500-mL plastic bottle.
2. Unscrew and remove the aerator screen on your faucet (if present).
3. Turn on the cold-water faucet and let it run for about two minutes.
4. Remove the cap from the sample bottle and fill one-half of the bottle.
5. Recap the bottle and shake a few times.
6. Pour all the water out then refill the bottle a second time to the neck of the bottle.

Recap the bottle tightly.

Shipping Instructions:

Carefully complete bottle labels with your name, date and time of sample collection, and the sample location (i.e., school name and building number). Place the bottle(s) and ice, with the completed instruction sheet (inside plastic baggie) in the ice chest. Seal the box and either deliver or ship the kit to the testing site.

VIDE or the local testing company to provide “Request for Testing” form if required.

Source: https://www.lcra.org/services/els/Documents/Rainwater-Harvesting-Form.pdf

1.2 G3016-Q - Quarterly Water Purification - UV Lights/Chlorine Injector/Filter Services

1.2.1 G3016-Q UV Lights/Chlorine Injector/Filter Services

Contracted

1. Inspect UV lamps in water purification fixtures, replace if needed.
2. Inspect UV sleeve and clean or replace as needed.
3. Check prefilter (e.g., such as sediment filters, carbon filters, water softener, and other systems) to confirm that it is working as expected and change filters and/or add/change chemicals as needed.
4. Monitor UV light dosage if intensity meters or sensors are present to ensure adequate penetration through the glass sleeve and the water. If a UV system does not have a sensor, then simply follow steps one and two.

Adapted from: https://www.espwaterproducts.com/uv-technical-help/

1.3 G3011 - Cistern Cleaning/Maintenance

1.3.1 Routine Cistern Cleaning

Schools whose primary water source is exclusively from cisterns (e.g., JSES, YMBES, ROWSC, and EWAE) are required to be tested and purified on a monthly basis or after every heavy rainfall or water delivery from a non-verified source. In addition to the above job plans for cisterns which are required every five years the following are recommended as more routine weekly, monthly and or quarterly Inspections and maintenance requirements:

1.3.1.1 G3011-W Weekly Visual Cistern Inspections and Maintenance

Inhouse

1. Check for leaks, clogs and or other obstructions (balls, etc.).
2. Check for holes, hatches/covers and vent openings where animals, insects and rodents may enter.
3. Schedule and repair leaks, openings with appropriate materials.

1.3.1.2 G3011-M Monthly Cistern Inspection and Maintenance

Contracted

1. Should be chlorinated every month, after a heavy rainfall or the delivery of water from an un-verified source.
2. Check roof and roof catchment systems/components to make sure no leaves, debris, particulate matter, or other parts of the roof are entering the gutter and downspout directed into the cistern. Clean gutters and downspouts as needed.
3. Check and maintain cistern water gauges/levels during the dry season at schools that are exclusively dependent on cistern water.
4. Inspect cistern covers, screens, overflow pipes, sediment traps and other accessories; submit service request for any necessary repairs and or replacement of damaged or defective components.

1.3.2 G3011-3 Full Cleaning Every Three Years (primary water source)

Contracted

1. Clean and sanitize to remove sediment and any other contaminants. Should occur every three years.
    a. Remove all debris and water from the cistern.
    b. Scrub the inside with a stiff brush and a solution of 1 cup of liquid bleach (5%-8.25%) mixed with 10 gallons of water.
    c. Rinse cistern with clean, safe water, then drain.
    d. Refill the cistern with clean, safe water.
2. Sanitize cistern if a bacteria test result is positive. If the source of bacteria is not easily found, check the inside of the cistern. Should be performed as needed.
    a. Ensure all water treatment units, are placed in bypass mode. Follow manufacturer recommendations for treatment system disinfection.
    b. Add 3 cups of 5%-8.25% unscented liquid household bleach for every 100 gallons of water in the holding cistern to achieve a chlorine concentration of approximately 100 parts per million (ppm). Reference CDC guidelines if needed.
    c. If the cistern is connected to interior plumbing, open all faucets, and run the water until chlorine (bleach) is detected by smell.
    d. Turn off all faucets and allow the solution to remain in the cistern and plumbing for at least 12 hours.
    e. Drain all water from the cistern.
    f. Refill the cistern with safe drinking water.
    g. Open all faucets and run the water until the smell of chlorine (bleach) is no longer detectable.

1.3.3 G3011-5 Full Cleaning Every Five Years (secondary water source)

Contracted

1. Clean and sanitize to remove sediment and any other contaminants. Should occur every five years.
    a. Remove all debris and water from the cistern.
    b. Scrub the inside with a stiff brush and a solution of 1 cup of liquid bleach (5%-8.25%) mixed with 10 gallons of water.
    c. Rinse cistern with clean, safe water, then drain.
    d. Refill the cistern with clean, safe water.
2. Sanitize cistern if a bacteria test result is positive. If the source of bacteria is not easily found, check the inside of the cistern. Should be performed as needed.
    a. Ensure all water treatment units, are placed in bypass mode. Follow manufacturer recommendations for treatment system disinfection.
    b. Add 3 cups of 5%-8.25% unscented liquid household bleach for every 100 gallons of water in the holding cistern to achieve a chlorine concentration of approximately 100 parts per million (ppm). Reference CDC guidelines if needed.
    c. If the cistern is connected to interior plumbing, open all faucets and run the water until chlorine (bleach) is detected by smell.
    d. Turn off all faucets and allow the solution to remain in the cistern and plumbing for at least 12 hours.
    e. Drain all water from the cistern.
    f. Refill the cistern with safe drinking water.
    g. Open all faucets and run the water until the smell of chlorine (bleach) is no longer detectable.

2 Waste Disposal Equipment and Systems Maintenance

2.1 G3025-Q - Quarterly Septic System Maintenance

Contracted (VIDE to secure maintenance MOU with VIWMA)

1. Pump/clean septic tank and grease interceptors.
2. Inspect piping systems and seals for deterioration, leaks, scaling, rust, or other signs of failure.
3. Calibrate the D.O., PH, Cl2, temp meters.
4. Collect samples for monthly routine tests.
5. Observe, check, and inspect service blowers. Maintain a record of conditions and services provided.
6. Observe, check, inspect, and maintain a record of sludge color. Address any deficiencies.
7. Check, inspect, service and maintain wet well and pumps.
8. Check and perform flow meter reading.
9. Check and perform rain gauge readings.
10. Check and perform the MCC and blower timer.
11. Check and perform effluent bi-product odor testing.
12. Wipe dust and dirt from the engine and generator.
13. Perform the 1 Hour Settle Ability Test 160MG/L/.

Contractor Requirements:

1. Engage only licensed, certified, and qualified vendor(s) to provide routine maintenance services.
2. Ensure that all retained vendors comply with equipment manufacturer's SOMP (Standard Operation and Maintenance Procedures) and conform with all Environmental Protection and Safety regulations (Standard Operation and Maintenance Procedures) in effect.
3. Require vendor to prepare a Sewage Treatment Plant (STP) assessment report for each STP including equipment, make, model, serial number, manufacturer, fuel type, air and oil filter information, fuel tank size, etc.
4. Require vendor to prepare a Sewage Treatment Plant maintenance checklist and report deficiencies (pump malfunctions, etc.).
5. Require vendor to stockpile and/or ensure 24 hours access to Sewage Treatment Plant parts.
6. Require vendor to provide a plan for addressing all emergencies (sewage spills, etc.).
7. Institute an internal system for vendor's reporting of all known deficiencies.
8. Require vendor to provide all technical responses when VIDE is required to address (respond to) all regulatory agency (complaints, deficiencies, citations, notices) concerns by the Division of Environmental Protection (DPNR).
9. Require vendor to performs periodic (specify minimum/maximum quantity) after heavy seasonal rainfalls, tropical storms, hurricanes, etc.
10. Require vendor to perform annual inspection for system failures, deflections, cracks; etc.
11. Require vendor to prepare and submit a list of all products used and its conformance to/with all local and federal regulations currently in effect.
12. Require vendor to prepare and furnish written reports on each application of products used including quantity, and area treated.

13. Require contract with vendor to contain provisions for independent certification and inspection by third party regulatory agency or certified third-party inspectors.
14. Require vendor to provide all minimum safety standards (prior to, during, and after application of treatment) per OSHA; EPA; DPNR; Division of Environmental Health; and/or manufacturer's specifications, Etc.
15. Require vendor to provide an Emergency & or Contingency Plan for addressing all emergencies (e.g., accidental spills, etc.)
16. Institute an internal system for vendor to report and correct (cure) all deficiencies.
17. Require contract to include warranty provisions (specify period).
18. Require contract to require Vendor Extended General Liability Insurance (specify period) holding VIDE, its managers, staff, facility occupants hold harmless against future liability.
19. Require vendor to comply with periodic monitoring and inspection of its facilities, equipment, etc.

Sources:
https://www.watersystemscouncil.org/download/wellcare_information_sheets/other_information_sheets/Caring-for-a-Cistern-FINAL.pdf

https://www.cdc.gov/healthywater/emergency/pdf/cistern-factsheet-eng-H.pdf

2.2 G3024 - Sewer Lift Station Inspection

Lift stations should be inspected regularly to avoid breakdowns and problems (e.g., spills). Records of these inspections must be maintained and provided by the contractor to VIDE for EAMS entry and to ensure established procedures are being followed and to be available if required by outside regulatory agencies and insurance companies in the event of a spill, equipment failure, or property loss.

Source: The Phoenix Pump Company
(https://www.phoenixpumps.com/pdf/Lift_Station_Maintenance_Guidelines.pdf)

The following information should be included within the lift station inspection information collected:

- Date;
- Time;
- Initials of person performing inspection;
- Meter readings for each pump;
- Flow reading for each pump;
- General appearance (note if there is grease buildup or if wet well baskets need to be cleaned);
- Any maintenance done to the lift station;
- Date of pump and equipment calibrations;

2.2.1 G3024-Q - Quarterly Sewer Lift Station Inspection

Contracted (VIDE to secure maintenance MOU with VIWMA)

1. Visually inspect the station for vandalism.
2. Clean up any trash or debris material.
3. Record pump hours for each pump.
4. Open wet well and visually inspect the pumping of each pump.

5. Run each pump by hand / manual control and watch level control go up and down to ensure pumps are operating properly.
6. Completely pump down the wet well to its lowest point and make a visual inspection.
7. Hose the wet well down during the pump down process.
8. Inspect wet well for excessive grease build up on surface, clean when needed.
9. Check wet well floats for rag build up, clean as needed.
10. Check pumps and piping visually for defects.
11. Power backup generator needs to be checked, and started (fuel level, battery and general condition). If applicable. Generator is to be operated, under load, for 15 minutes. This test is to be conducted by tripping power to the station and observing a successful transfer to generator power. Emergency generators are to be operated per manufacturer's requirements and in compliance with any local agency operating permit, if applicable.
12. Lock up station, including exterior power panels if required, prior to leaving.
13. Place pump controls back in auto position prior to leaving station.
14. Complete all required paperwork and turn in operations log sheets at end of the month.

2.3 E1095 - Monthly Kitchen Grease Trap Servicing

Contracted

A grease trap between 500 and 2,500 gallons will require professional equipment and training. Smaller grease traps may be cleaned by permitted staff. Grease traps should be cleaned every four to six weeks.

1. Remove grease tank cover.
   a. Carefully pry off the grease tank cover with a crowbar unless the trap cover is bolted down.
2. Remove floating fats, oils, and grease.
   a. Remove the floating fats, oils, and grease with a scoop.
3. Remove the residual solids and water with a shop vac.
   a. Once the fats, oils and greases are lifted out of the tank, water and leftover food solids will remain.
   b. Use a shop vac to remove the residual solids and water.
   c. Be sure the automatic dishwasher is turned off and the sinks are not in use to prevent the grease trap from continually filling up while you are working.
4. Scrape off the trap's baffles, sides, and lid.
5. Suction the trap.
   a. Using a shop vac, suction out any solidified grease particles that may be lodged in the recesses of the trap.
6. Scrub remaining particles.
   a. Using a steel pot scrubber, dish soap, and lukewarm water thoroughly scrub down the grease trap's baffles, sides, and lid.
7. Flush out soap and debris.
   a. Flush out the soap and debris a few times using clean water.
8. Test to ensure grease trap is clean.
   a. Test to ensure the grease trap is free from all traces of FOGs and that blockages do not prevent water from easily draining.
   b. From the kitchen sink, drain a gallon of clean water.

   c. The grease trap should allow the water to flow through without impediment.
9. Reassemble grease trap.
   a. Reinstall the parts of the grease trap, including the baffle and lid.
10. Dispose of waste.
   a. Ensure the waste from the grease trap is disposed of properly and in accordance with municipal and state regulations.

3 Mechanical, Electrical, and Plumbing (HVAC) Systems

3.1 G4092 - Generator Servicing

3.1.1 G4092-M General Monthly Generator Servicing

Contracted

1. Engage only licensed, certified, and qualified vendor(s) to provide routine maintenance services.
2. Ensure that all retained vendors comply with equipment manufacturer's SOMP (Standard Operation and Maintenance Procedures).
3. Require vendor to prepare a generator assessment report for each generator including equipment, make, model, serial number, manufacturer, fuel type, air and oil filter information, fuel tank size, etc.
4. Require vendor to prepare a generator maintenance checklist and report deficiencies.
5. Require vendor to stockpile and/or ensure 24 hours access to generator parts.
6. Require vendor to provide a plan for addressing all emergencies.
7. Institute an internal system for vendor's reporting of all known deficiencies.
8. Check with operating or area personnel for deficiencies.
9. Change engine oil and oil filter.
10. Check battery charge and electrolyte specific gravity. Add water as required and check terminals.
11. Check belt tension and wear; adjust as required, if applicable.
12. Check engine air filter; change as required.
13. Check spark plug or injector nozzle condition; service or replace as required.
14. Check wiring, connections, switches, etc., adjust as required.
15. Perform 30-minute generator test run, check for proper operation.
16. Check and maintain fuel level; fuel lines/hoses as required.
17. Wipe dust and dirt from the engine and generator.
18. Clean area around generator.

3.1.2 G4092-A Annual Emergency Generator Maintenance

Contracted

1. Inspect for dust, debris, corrosion, damage and tightness of connections.
    a. Inspect battery chargers for dust, rust and corrosion.
    b. Inspect electrical cables and connections for cracking, excessive wear, damage, and connection tightness.
    c. Clamps should be corrosion free and springs should have a secure battery connection.
2. Inspect limit switches.
    a. Inspect limit switches for dust, debris, corrosion, damage and tightness of electrical connections.
    b. Verify that limits allow full switch function.
3. Inspect shutdown switches.
    a. Inspect shutdown switches for corrosion, dust, and debris.
    b. Check electrical connections for tightness and knife blades and handles for proper switch function.

4. Inspect interlock switches.
    a. Inspect interlock switches for dust, corrosion and debris.
    b. Check electrical connections for tightness and inspect hardware connections for proper switch function.
5. Inspect fuses and fuse holders.
    a. Inspect fuses and fuse holders for dust, debris, moisture, corrosion, damage and tightness.
6. Inspect for moisture, dust, debris and corrosion, damage, cracks and chips.
    a. Clean or fix as necessary.
7. Inspect engine oil filter.
    a. Visually inspect engine oil filter conditions by checking engine oil levels on the dipstick.
    b. Remove air filter cover and inspect filter condition.
    c. The engine should not be running for these tests.
8. Service engines.
    a. Service engines by changing oil, checking coolants and greasing fittings per manufacturer specifications.
9. Verify that mounted units are securely fastened to walls or floors.
    a. Tighten as necessary.
10. Inspect starters, brushes and contacts.
    a. Inspect electric and magnetic starters, brushes and contacts for dust, debris, moisture, and corrosion.
    b. Make sure electrical connections are tight.
11. Inspect thermal insulation.
    a. Verify that thermal (building) insulation does not come in contact with the electrical system, which could result in system malfunction and cause a fire.
12. Inspect electrical connections.
    a. Verify that electrical connections designed for water submersion are connected with approved watertight connecting means as specified by applicable electrical codes.
13. Inspect connections.
    a. Verify that wire nuts, lugs and bolted connections that connect two electrical conductors meet applicable codes.
14. Inspect batteries.
    a. Inspect batteries for dust, debris, rust and corrosion. Store any acid type batteries in well-ventilated areas.
15. Inspect fans.
    a. Inspect fans for dust, debris, and corrosion.
    b. Check electrical connections for tightness and fan blades for cracks, chips, dents and free rotation.
    c. Fan blades mounted on motor shafts should be tight.
16. Inspect fluid levels.
    a. Inspect fluid levels for adherence to manufacturers' specified levels and inspect fuel levels before equipment is started.
    b. Lubricate equipment with oil and grease per manufacturer specifications and recommendations.

17. Inspect conductors.
    a. Inspect conductors for dust, corrosion and tight terminations.
    b. Inspect ground fault circuit breakers and receptacles for dust, debris, moisture, corrosion and damage.
    c. Test to verify proper operation.
18. Inspect electric housings, cabinets and junction boxes.
    a. Inspect electric housings, cabinets and junction boxes for dust, debris, moisture and corrosion.
    b. Inspect mounting conditions for secure connections.
    c. Conduits entering devices should be secure and unused knock outs should be sealed. Inspect for unusual noise and vibrations.
    d. Adjust or repair as necessary.
19. Clean work area, store tools and equipment properly.
    a. Verify that tools and equipment are stored and/or secured, that the general area is clean, fluids are mopped up and that any safety guards and rails are securely in place.
    b. Inspect general electrical equipment areas for dust, debris and corrosion.
20. Start generators.
    a. Start generators and bring online at regular intervals per manufacturer's specifications.
21. Inspect transfer switches.
    a. Inspect switches for dust, debris, moisture and corrosion.
    b. Inspect electrical terminations for tightness, and knife blades, handles and clips for excessive wear and heat discoloration.
    c. Verify proper lubrication levels.
    d. Correct deficient conditions.
22. Inspect wiring connections.
    a. Inspect wiring connections for dust, debris, corrosion, and moisture.
    b. Connections should be made tight and sealed to prevent moisture, corrosion and excess heat.
    c. Ensure that any exposed conductors, other than grounding or bonding conductors, are de-energized and replaced or reinsulated.
    d. Safely encase the repaired conductors in an approved junction box.
23. Inspect non-metallic sheath, metal, or non-metallic conduit.
    a. Inspect non-metallic sheath, metal, or non-metallic conduit or other raceways carrying electrical wiring for support conditions, which must comply with the national electric code and local building codes.
    b. Inspect all fasteners for tightness and condition.

3.2 D3063-Q-IH - Quarterly Air Conditioning Maintenance

Inhouse quarterly air conditioning maintenance is performed on units less than or equal to 5 tons.

Inhouse (1.5 hours)

1. Remove and clean all indoor filters.
2. Outdoor unit clean condenser coils.
3. Check electrical controls and proper refrigerant charge.

4. Clean drain pipeline for clogs and dirt.
5. Clean outdoor unit case and apply 1-coat of spray on automotive wax.
6. Check belts.

3.3 D3063-Q-C - Quarterly Air Conditioning Maintenance – Large Units

Contracted quarterly air conditioning maintenance is performed on units 6 tons and over.

Contracted (1.5 hours)

1. Remove and clean all indoor filters.
2. Outdoor unit clean condenser coils.
3. Check electrical controls and proper refrigerant charge.
4. Clean drain pipeline for clogs and dirt.
5. Clean outdoor unit case and apply 1-coat of spray on automotive wax.
6. Check belts.

3.4 G3015-SA - Semi-annual Pump Maintenance (Domestic Water, Sump, Etc.)

Inhouse (Contracted where staff not available – 1 hour)

1. Follow manufacturer's recommendation.
2. Visual Inspection: Observe the pump while running. Check for leaks, odors, unusual sounds and vibrations.
3. Safety: Make sure machines are properly shut down before performing maintenance and/or systems check. Proper isolation is important not only for electrical systems, but for hydraulic systems as well. Practice lock out / tag out. When the work is complete, remove lock and tag from electrical supply.
4. Clean parts and components per manufacturer's recommendations.
5. Check, repair or replace electrical components (switches, cords, plugs, etc.)
6. Check hoses, seals, or O-rings for wear or damage, and replace immediately if needed. Using a temporary rubber assembly lubricant will ensure a tight fit and prevent leaks or slips.
7. Check and lubricate components per manufacturer's recommendations.
8. Purchase, order and maintain stock of replacement components.
9. Replace damaged components or replace entire pump if required.
10. Check motors, pumps, fixtures and piping for secure fastening condition and alignment.
11. Inspect equipment controls or gauges to regulate and monitor safe water levels and flow rates per manufacturer specifications. Repair or replace damaged controls and gauges.
12. Inspect cleanliness of equipment, equipment areas and pathways. Check equipment, machinery and systems for obstructions, debris or other items that would cause improper operation of safety hazards.
13. Purchase, stock and maintain a duplicate (redundant) piece of the equipment.

For Sump Pumps:

1. Unplug the pump and remove it from the basin for evaluation. Examine for rust or corrosion. Clean the pump inlet screen.
2. Check to see if the pump bearings need lubrication. If so, lubricate with the recommended oil or grease. Pumps with sealed bearings will not require lubrication

3. Check the sump basin for debris and remove.
4. Reinstall the pump and plug it back into the power outlet.
5. Pour five gallons of water into the basin and observe the action of the float switch. Verify that it moves through its entire range of travel without binding and turns the pump on and off at the proper time.
6. Outside, check the condition of the pump discharge pipe. Make sure it's not obstructed by dirt or vegetation. Also verify that it drains fully and doesn't contain residual water that may obstruct proper flow.

Source: https://apollohome.com/tips-for-your-home/annual-sump-pump-maintenance/

3.5 G3015-SA-J - Semi-annual Pump Maintenance (Jockey)

Contracted (1 hour)

1. Visual Inspection: Observe the pump while running. Check for leaks, odors, usual sounds and vibration.
2. Safety: Make sure machines are properly shut down before performing maintenance and/or systems check. Proper isolation is important not only for electrical systems, but for hydraulic systems as well. Practice lock out / tag out. When the work is complete, remove lock and tag from electrical supply.
3. Mechanical Inspection:
   a. Check that the mounting points are secure.
   b. Inspect mechanical seal and packing. Adjust packing gland if needed. A properly adjusted packing gland should have a drip per second for packing lubrication.
   c. Inspect the pump flanges for leaks.
   d. Inspect the couplings for secure connections and alignment.
   e. Inspect and clean filters and strainer basket if installed.
4. Lubrication: Lubricate the motor and pump bearings per manufacturer's guidelines. Be sure not to over lubricate. More bearing damage occurs as a result of over greasing than under greasing. If the bearing has a vent cap, remove the cap and run the pump for 30 minutes before reinstalling cap. This will allow excess grease to work its way out of the bearing
5. Electrical/Motor Inspection:
   a. Check that all terminations are tight
   b. Inspect motor vents and windings for dust/dirt build-up and clean according to manufacturer's guidelines
   c. Inspect starter/motor controller for arcing, overheating, etc.
   d. Use a megohmmeter on the windings to check for insulation failure
6. Replace Damaged Seals and Hoses: If any hoses, seals, or O-rings show wear or damage, replace immediately. Using a temporary rubber assembly lubricant will ensure a tight fit and prevent leaks or slips.

Source: https://www.pumpsandsystems.com/sponsored/pump-maintenance-7-easy-steps

4 Grounds Maintenance/Landscaping Services

4.1 G1010-M - Monthly Grass Cutting and Grounds Cleaning

Contracted (to total ten cuts per year)

1. Remove brush and weed growth adjacent to building walls.
2. Remove dead shrubs and excessive overgrowth.
    a. Remove and dispose of dead shrubs and excessive overgrowth. Fallen tree limbs should be removed anytime they are found on campus.
3. Remove vegetation along perimeter fence lines.
    a. Remove vegetation growing along and on perimeter fence lines, causing damage to fencing.
4. Remove debris.
    a. Remove rocks, tree leaves, seeds, fruits and limbs, trash, etc. by raking and picking up before mowing.
5. Mow, trim and edge grass.
    a. Mow, trim and edge grass.
    b. Remove grass clippings.
6. Reseed worn lawn areas and fertilize lawn.

4.2 D2040 - Grounds Maintenance

To facilitate proper drainage, culverts, inlets, storm drains, gutters, retention basins, and swales need to be maintained.

4.2.1 D2040-Q - Quarterly Inspection and Maintenance of Storm Drains, Inlets, Gutters, and Downspouts

Inhouse

1. Remove any vegetation, dirt, and debris in storm drains, inlets, gutters, and downspouts.
2. Inspect storm drains, inlets, and gutters for deterioration. Submit service request if repairs are required.
3. Ensure landscapers adequately cut vegetation in swales and remove debris to prevent clogging storm drains.
4. Cut back or use pesticide on weeds growing on/around fence line. Submit service request if fence repairs are required.

4.2.2 D2040-A - Annual Inspection of Swales, Culverts, and Retention Basins

Inspections will be overseen by VIDE facility managers and conducted by DPW under a Memorandum of Understanding (MOU). Repair work identified during inspections will be addressed as work orders as needed.

Inhouse with inspection by DPW (MOU)
Scope of work for repairs by contractors if needed will include:

1. Clean and regrade existing swales and ditches to ensure proper direction of flow and capacity of drainage routes.

2. Regrade surrounding areas to match bottom elevation of culverts and flushing of culverts to ensure proper culvert function.
3. Clear and regrade retention basins to remove silt and overgrown plant material and restore basins to its original depth to ensure proper basin function.

4.3 G1012 - Annual Tree Inspection and Trimming

4.3.1 G1012-IH – In-house Annual Tree Inspection

Inhouse – Tree Inspection

1. Inspect trees for any hazards.
2. Inspect trees for weak, dead, diseased, or broken limbs/branches.

4.3.2 G1012-C – Contracted Annual Tree Trimming

Contracted (landscapers for pruning/grooming; DPW for tree removal if needed)
It is recommended that tree maintenance be informed by a certified arborist.

1. Notify management personnel and/or occupants as necessary.
2. Gather tools and materials.
3. Load onto vehicle and move to work area.
4. Deploy appropriate safety equipment and measures.
5. Install “visitor caution" signs or tape.
6. Flush cut weak, dead, diseased, or broken limbs/branches.
    a. Trim and prune shrubs and trees.
    b. Prune back tree branches growing over buildings.
    c. Tree removal or relocation is recommended if it is growing too close to buildings, utility lines, drainage systems and walkways.
    d. Remove all growing plants/vines from building walls, monuments and fences.
    e. Submit service request for trees that need to be removed (to be executed by DPW)
7. Clean work areas, and bag debris.
8. Place tools and debris in vehicle and return to shop.
9. Clean and stow tools and equipment, check for damage.
10. Dispose of debris properly.

4.4 G2047-Q-I - Quarterly Track & Field and Ball Court Inspection

Inhouse for Inspection

The primary focus of athletic field maintenance is to ensure safe and uniform playing surfaces. Track and field wear and unsafe surface conditions are to be reported when observed for repair. Top-dressing, rolling, and reseeding are performed as needed, with standards identified by the Department of Housing Parks & Recreation.

1. Inspect track and field surfaces at the beginning and end of each semester.

4.5 G2047-Q-M - Quarterly Track & Field Maintenance

Contracted for Maintenance

The primary focus of athletic field maintenance is to ensure safe and uniform playing surfaces. Track and field wear and unsafe surface conditions are to be reported when observed for repair. Top-dressing,

rolling, and reseeding are performed as needed, with standards identified by the Department of Housing Parks & Recreation.

1. Inspect track and field surfaces at the beginning and end of each semester.
2. Fill and tamp all divots and holes.
3. Edge grass - Remove unwanted vegetation from the warning track and skinned infields once per month on premier and game fields.
4. Replace damaged nets, base anchors, toe-plates, and home-plates as needed if safety or functionality is compromised.
5. Check warning track material and add as needed prior to each season's games, and after heavy rain. If damage is evident, drag and back fill warning track areas.
6. Aerate track & game fields with a core aerator.
7. Treat playing fields with fertilizer, herbicide, pesticide, or fungicide each year as needed.

4.6 G2049-Q - Quarterly Playground Inspection

Inhouse

1. Inspect playground equipment and submit service requests for repair as needed.

5 Fire System

5.1 D4031 - Annual Fire Extinguisher Inspection and Servicing

Contracted

Certification/Refilling/Replacement

1. Check all portable fire extinguishers for obvious damage, corrosion, or leakage.
2. Make sure the safety seals are not broken or missing.
3. Ensure that there are no obstructions to access or visibility.
4. Check that operating instructions are legible and outward facing.
5. If equipped with a gauge, ensure that it is in operable range. Otherwise ensure proper weight.

5.2 D5037 - Fire Alarm Services/Suppression Systems

5.2.1 D5037-SA Semi-Annual Fire Alarm Inspection

Contracted

1. Inspect batteries.
    a. Inspect batteries for fuming, leakage and corrosion.
    b. If applicable, verify that battery charger is operating.
    c. Check status lights and that there are proper meter readings.
2. Inspect/test primary/secondary power supplies.
3. Inspect/test flame/beam and other detectors.
4. Inspect fans.
    a. Inspect fans for cleanliness, blade cracks or chips, lubrication, vibration mounts, noise and electrical connections.
    b. Observe status lights or LCD display to verify operating condition of CPU or master control unit.
    c. Check cleanliness of heat sinks, if applicable.
5. Inspect electrical connections.
    a. Inspect electrical connections for snugness, corrosion, and heat discoloration.
    b. Inspect wire routing for wear signs and fraying.
    c. Verify that cover plates are in place, if applicable.
6. Verify accessibility and operation.
    a. Check that access areas are clean and free from debris.
    b. Check valves, switches, breakers and access panels for accessibility and operation.
7. Check that cabinets, housings and boxes are secured to the mounting surface.
    a. Check lock and hinge operation, if applicable.
8. Check devices.
    a. Verify that all devices that comprise a system are working, mounted securely and are clean.
    b. Devices should be free from leaks, corrosion, frayed wiring and damaged housings or enclosures.
9. Test each system for proper operation per manufacturer specifications or NFPA regulations.
    a. Qualified personnel should conduct tests and log results.

   b. Notify central station of test, place system into test mode and verify that the station received the test.
   c. Observe any status lights for communication line status.
10. Check status lights.
   a. Observe status lights on uninterrupted power supply (UPS) unit.
   b. Perform unit self-test procedure and note when batteries were last changed.
11. Look for evidence of water entry.
   a. Inspect conduit systems, j-boxes, building penetrations and outside devices for evidence of water entry.
   b. Inspect gaskets and penetration seals for water tightness.

5.2.2 D5037-A Annual Fire Alarm System Testing/Servicing

Contracted

1. Clean and calibrate sensors.
   a. Clean and calibrate sensors such as smoke, duct, heat and motion detectors per NFPA standards, if applicable.
   b. Clean and calibrate temperature, enthalpy and other EMS sensors per manufacturers' recommendations.
2. Inspect operations of the system.
   a. Inspect/test fire alarm panel.
   b. Inspect and verify condition of elevator, corridor doors, and lighting control interlocks in conjunction with fire alarm, when applicable.
   c. Check condition and adjustment of switches for wear and contact condition.
   d. While in test mode, verify operation of fan shutdown, damper control and lighting shutdown in conjunction with fire alarm when applicable.
3. Verify supports are secured, inspect fasteners and bracing and see that wires or cables are not frayed or cut.
4. Verify accessibility.
   a. Check that access areas are clean and debris free and that valves, switches, breakers, access panels, control valves and control panels are accessible.
5. Check devices.
   a. Check the end devices such as smoke and heat detectors, security contacts, speakers, emergency lights, thermostats and sensors, sprinkler heads, computer drops, and lighting instruments are functional and in good repair.
   b. Check for stable and secure mounting of devices such as smoke and heat detectors, security contacts, speakers, emergency lights, thermostats and sensors, sprinkler heads and lighting instruments.
6. Adhere to National Fire Protection Association (NFPA)
   a. Some building systems must be certified by qualified personnel or a licensed contractor.
   b. Various inspections and verifications make up the certification process and must adhere to National Fire Protection Association (NFPA) guidelines.

5.2.3 D4010-SA Semi-annual Sprinkler System Inspection/Servicing

Contracted

1. Inspect/test heat detectors.
2. Inspect/test water flow alarm switches.

5.2.4 D4010-A Annual Sprinkler System Inspection/Servicing

Contracted

1. Inspect supports, fasteners, and bracing.
    a. Verify supports are secured, inspect fasteners and bracing and see that wires or cables are not frayed or cut.
2. Inspect access areas.
    a. Check that access areas are clean and debris free and that valves, switches, breakers, access panels, control valves and control panels are accessible.
3. Check end devices.
    a. Check the end devices such as smoke and heat detectors, security contacts, speakers, emergency lights, thermostats and sensors, sprinkler heads, computer drops and lighting instruments are functional and in good repair.
4. Inspect nature of device mountings.
    a. Check for stable and secure mounting of devices such as smoke and heat detectors, security contacts, speakers, emergency lights, thermostats and sensors, sprinkler heads and lighting instruments.
5. Conduct a flow test at the inspector's test valve.
    a. Verify there is a head orifice attached to the test pipe for accurate alarm initiation. (Notify monitoring company that you are testing.)
6. Be sure applicable building systems are certified by qualified personnel or a licensed contractor.
    a. Some building systems must be certified by qualified personnel or a licensed contractor.
    b. Various inspections and verifications make up the certification process and must adhere to National Fire Protection Association (NFPA) guidelines.

5.3 D5030 - Security Systems

Contracted

5.3.1 D5030-Q Quarterly Maintenance of Security Equipment

1. Inspect/test primary/secondary power supplies.
2. Inspect/test supervisory signal devices.

5.3.2 D5030-SA Semi-Annual Maintenance of Security Equipment

1. Inspect/test manual stations.
2. Inspect/test tamper switch.

5.3.3 D5030-A Annual Maintenance of Security Equipment

1. Inspect/test battery sealed lead acid.
2. Inspect/test remote annunciator.
3. Inspect/test audible and visible trouble signals.

4. Inspect/test zone disconnect switches, trouble signal.
5. Inspect/test ground fault monitoring circuit.
6. Inspect/test smoke detectors.
7. Inspect/test audible, bells, horns, or others.
8. Inspect/test visual devices.
9. Inspect/test emergency evacuation control panels.
10. Inspect/test speakers/voice alarm.

6 C1090 - Extermination and Pest Control

6.1 C1090-M - Monthly General Pest Control Services for Kitchens

General pest control services include servicing of rodent bait stations, and treatment services for termites.

Contracted

1. Inspect and replace bait/traps as needed.
2. Inspect buildings for possible access points for pests.
    a. Inspect buildings for possible access points for rodents or insects. Inspect utility conduits, cracks or gaps in building seal.
3. Seal and fill cracks or gaps.
    a. Seal any small cracks and crevices with a silicone-based caulk.
    b. Use steel wool, wire mesh, or expanding foam to fill larger gaps to eliminate possible access points.
    c. Inspect and repair water leaks and seals around pipes and electrical entries into buildings.
4. Trim trees and vegetation that touches the building.
    a. Inspect trees and vegetation to be sure that they don't touch buildings. Trim if needed.
5. Ensure dumpsters are placed away from buildings.
    a. Verify that dumpsters and food disposal containers are placed away from buildings.
6. Clean work areas, bag debris, and relocate animal nests.
7. Treat pests.
8. Weed areas.

6.2 C1090-Q-IH – Quarterly Termite Inspection

Inhouse

[Task description pending]

6.3 C1090-5YR - 5-Year Termite Treatment Services

Contracted

[Task description pending]

Contractor Requirements

1. Engage only licensed, certified, and qualified vendor(s) to provide these services.
2. Ensure that all retained vendors comply with and conform with all Environmental Protection and Safety regulations (Standard Operation and Maintenance Procedures) in effect.
3. Require vendor to prepare and submit a list of all products used and its conformance to/with all regulations currently in effect.
4. Require vendor to prepare and furnish written reports on each application of products used; including quantity, and area treated.
5. Require contract with vendor to contain provisions for independent certification and inspection by Third Party regulatory agency or certified third-party inspectors.

6. Require vendor to provide all minimum safety standards (prior too, during and after application of treatment) per OSHA; EPA; DPNR; Division of Environmental Health; and/or manufacturer's specifications, etc.
7. Require vendor to provide a plan for addressing all emergencies, including accidental spills, etc.
8. Institute an internal system for vendor to report and correct all deficiencies.
9. Require contract to include warranty provisions - (specify period).
10. Require contract to require Vendor Extended General Liability Insurance (specify period) holding VIDE, its managers, staff, facility occupants hold harmless against future liability.
11. Require vendor to comply with periodic monitoring and inspection of its facilities, equipment, etc.

6.4 C1090-Q-C – Quarterly Servicing of Rodent Bait Stations

Contracted

[Task description pending]

7 Furniture, Fixtures, and Equipment

7.1 E1095-SA - Semi-annual Kitchen Equipment Service

Contracted

(Oven Hood, Stoves-Gas/Electric; Freezers-Walk-In, etc.)

1. Follow equipment manufacturer's recommendation.
2. Clean parts and components per manufacturer's recommendations.
3. Check, repair or replace electrical components (switches, cords, plugs, etc.).
4. Check fuel lines for leaks, bends, breaches etc.
5. Check, repair and or replace gas or fuel lines (only use licensed and certified vendors).
6. Thoroughly inspect exhaust system to ensure functionality.
7. Check and Lubricate components per manufacturer's recommendations.
8. Purchase, order and maintain stock of replacement components.
9. Replace damaged components or replace entire system when deemed appropriate, if required.
10. Purchase, stock and maintain a duplicate (redundant) piece of each equipment.

Appendix 2 - Preventive Maintenance Work Plan and Resource Needs

The work plan shown in this appendix lists the preventive maintenance tasks and associated UNIFORMAT codes presented in Appendix 1. The work plan identifies which tasks are required at which locations, the required frequency, and the total resources required to execute the work.

The estimated contract cost for each maintenance task is shown in the rightmost column. Trade skill levels required to complete the tasks are also shown to assist with contract scoping.

Contents:

St. Croix

Location	System	Asset	Task	Contracted or In-House	Trade / Skill Level	Frequency	Time (Mins)	Time (Hr)	Mob/ Demob (Hr)	Freq/Yr	Time (Hr/Yr)	Total Schools/ Bldgs or Units	Labor Hours for In-house Work (Hr/Yr)	Unit Cost	Rate $/Hr	Est. Cost	Total Schools/ Bldgs or Units Contracted	Avg Cost per School/Yr (Contracted)	Contracted Maint Cost Est.	Annual Contract Cost	Assumptions or Questions
Building Exterior	Water Quality	Domestic Water Quality	Coliform Bacteria Testing	C		M				12							12	$ 960	$ 11 520	$ 11 520	Bacteria testing also at: JE Tuitt J. Sprauve Raphael Wheatly Skills Center but not water purifcation.
Building Exterior	Water Quality	Domestic Water Quality	Annual Chemical/Lead Copper Testing	C		A				1							4	$ 1 665	$ 6 660	$ 6 660	
Building Exterior	Water Quality	Domestic Water Quality	UV Lights/Chlorine Injector/Filter Services	C		Q				4							12	$ 800	$ 9 600	$ 9 600	
Building Exterior	Plumbing	Domestic Water - Cistern	Weekly visual cistern inspections and maintenance	IH	1	W		0.50	0.50	52	52.00	12	624		$ 34	$ 21 216					
Building Exterior	Water Quality	Domestic Water - Cistern	Monthly cistern inspection and maintenance	C		M				12							12	$ 800	$ 9 600	$ 9 600	
Building Exterior	Water Quality	Domestic Water - Cistern	Full cistern cleaning - every 5 years (secondary water source)	C		Every 5 years				0.2				$0.100			1 528 548	$ 30 571	$ 152 855	$ 30 571	(11) Locations Units in gallons
Site/Outdoors	Waste Disposal	Sewage	Quarterly septic system maintenance	C		Q				4											VIDE to secure maintenance MOU with VIWMA
Site/Outdoors	Waste Disposal	Sewage	Quarterly sewer lift station inspection	C		Q				4											VIDE to secure maintenance MOU with VIWMA
Building Interior	Plumbing	Grease Trap	Monthly kitchen grease trap servicing	C		M											10	$ 6 240	$ 62 400	$ 62 400	
Building Exterior	Electrical	Emergency Generators	Generator General Monthly & Annual Servicing	C		M				12							6	$ 3 400	$ 20 400	$ 20 400	
Building Interior	Mechanical	Air Conditioning	Quarterly air conditioning maintenance (</=5 tons)	IH	2	Q		1.50	1.00	4	10.00	240	2 400		$ 34	$ 81 600					
Building Interior	Mechanical	Air Conditioning	Quarterly air conditioning maintenance - large units (>5 tons)	C		Q				4							8	$ 18 885	$ 151 077	$ 151 077	
Building Interior	Plumbing	Pumps	Semi-annual pump maintenance (domestic water sump etc.)	IH	2	SA		1.00	1.00	2	4.00	13	52		$ 34	$ 1 768					
Building Interior	Plumbing / Fire Sprinklers	Pumps (Jockey)	Semi-annual Pump Maintenance (Jockey)	C		SA				2							11	$ 336	$ 3 700	$ 3 700	
Site/Outdoors	Grounds	Grass/Lawns	Monthly grass cutting and grounds cleaning - contracted to ten total cuts per year	C	1	M	90			10				$380			205		$ 780 833	$ 780 833	Derived from Guam landscaping costs/acre; does not inlcude major tree pruning or removal units=acres
Site/Outdoors	Grounds - Drainage System	Inlets Storm Drains Gutters Downspouts	Quarterly inspection and maintenance of storm drains inlets gutters downspouts	IH	1	Q	60	2.00	1.00	4	12.00	13	156		$ 34	$ 5 304					
Site/Outdoors	Grounds - Drainage System	Swales Culverts Retention Basins	Annual inspection and repairs of swales culverts and retention basins	IH	2	A	255	2.00	1.00	1	3.00	13	39		$ 34	$ 1 326					Addressed via MOU with DPW
Site/Outdoors	Trees/Vegetation	Trees/Vegetation	In-house annual tree inspection	IH	1	A	600	4.00	1.00	1	5.00	13	65		$ 34	$ 2 210					
Site/Outdoors	Trees/Vegetation	Trees/Vegetation	Contracted annual tree trimming	C	1	A	120			1							13	$ 24 833	$ 322 833	$ 322 833	
Building Exterior	Play/Sport Facilities	Track & Field	Quarterly track and field and ball court inspection	IH		Q		2.00	1.00	4	12.00	13	156		$ 34	$ 5 304					To be inspected by the Department of Housing Parks and Rec
Building Exterior	Play/Sport Facilities	Track & Field	Quarterly track and field maintenance	C		Q											2	$ 47 000	$ 94 000	$ 94 000	
Site/Outdoors	Play/Sport Facilities	Playground Inspection	Quarterly playground inspection	IH	1	Q	30	0.50	1.00	4	6.00	13	78		$ 34	$ 2 652					
Building Interior/Exterior	Fire Protection	Fire Extinguishers	Annual fire extinguisher inspection and servicing	C		A	150			1							12	$ 1 000	$ 12 000	$ 12 000	National Fire Protection Association recommends inspection annually at $40/unit (appox) Confirm number of buildings
Building Interior	Fire Protection	Fire Alarm System	Semi-annual fire alarm inspection	C	1	SA	50			2							11	$ 336	$ 3 700	$ 3 700	
Building Interior	Fire Protection	Fire Alarm System	Annual fire alarm system testing/servicing	C	2	A/Q	80			4							11	$ 336	$ 3 700	$ 3 700	
Building Interior	Fire Protection	Sprinkler System	Semi-annual sprinkler system inspection/servicing	C	1	SA	55			2							11	$ 336	$ 3 696	$ 3 696	
Building Interior	Fire Protection	Sprinkler System	Annual sprinkler system inspection/servicing	C	2	A	180			1							11	$ 336	$ 3 696	$ 3 696	
Building Interior	Fire Protection	Security System/Fire Alarm	Quarterly maintenance of security equipment	C		Q				4							12	$ 3 000	$ 36 000	$ 36 000	
Building Interior	Fire Protection	Security System/Fire Alarm	Semi-annual maintenance of security equipment	C		SA				2									$ -		Assume cost is covered by quarterly maintenance

Appendix 2 Preventive Maintenance Work Plan and Resource Needs

St. Croix

Location	System	Asset	Task	Contracted or In-House	Trade / Skill Level	Frequency	Time (Mins)	Time (Hr)	Mob/ Demob (Hr)	Freq/Yr	Time (Hr/Yr)	Total Schools/ Bldgs or Units	Labor Hours for In-house Work (Hr/Yr)	Unit Cost	Rate $/Hr	Est. Cost	Total Schools/ Bldgs or Units Contracted	Avg Cost per School/Yr (Contracted)	Contracted Maint Cost Est.	Annual Contract Cost	Assumptions or Questions
Building Interior	Fire Protection	Security System/Fire Alarm	Annual maintenance of security equipment	C		A				1									$ -		Assume cost is covered by quarterly maintenance
Building Exterior	Pest Control	Pest Control	Monthly general pest control services for kitchens	C	1	M				12							12	$ 4 481	$ 53 772	$ 53 772	
Building Exterior	Pest Control	Pest Control	Quarterly Termite Inspection	IH	1	Q		1.00	1.00	4	8.00	12	96		$ 34	$ 3 264					
Building Exterior	Pest Control	Pest Control	5-year termite treatment services	C	1	Every 5 years				0.20							12	$ 1 575	$ 18 900	$ 18 900	
Building Exterior	Pest Control	Pest Control	Quarterly Servicing of Rodent Bait Stations	C		Q				4							12	$ 2 042	$ 24 500	$ 24 500	
Building Interior	Mechanical	Kitchen Equipment	Semi-annual kitchen equipment service	C		A/SA				1							10	$ 6 700	$ 67 000	$ 67 000	
												Total:	**3,666**			**$ 124,644**				**$ 1,730,158**	

Appendix 2 Preventive Maintenance Work Plan and Resource Needs

St. Thomas and St. John

Locat on	System	Asset	Task	Contracted or In-House	Classif cat on	Trade / Skill Level	Frequency	Time of Year	Time (Mins)	Time (Hr)	Mob/ Demob (Hr)	Freq/Yr	Time (Hr/Yr)	Total Schools/ Bldgs or Units (In-house)	Labor Hours for In-house Work (Hr/Yr)	Unit Cost	Rate $/Hr	Est. Cost	Total Schools/ Bldgs or Units (Contracted)	Avg Cost per School/Yr (Contracted)	Contracted Maint Cost Est.	Annual Contract Cost	Assumptions or Questions
Building Exterior	Water Quality	Domestic Water Quality	Coliform Bacteria Testing	C	G3010-BT		M					12							11	$ 960	$ 10 560	$ 10 560	Bacteria testing also at: JE Tuitt J. Sprauve Raphael Wheatly Skills Center but not water purification.
Building Exterior	Water Quality	Domestic Water Quality	Annual Chemical/Lead Copper Testing	C	G3010-LT		A					1							10	$ 1 200	$ 12 000	$ 12 000	
Building Exterior	Water Quality	Domestic Water Quality	UV Lights/Chlorine Injector/Filter Services	C	G3016-Q		A					1							8	$ 875	$ 7 000	$ 7 000	
Building Exterior	Plumbing	Domestic Water - Cistern	Weekly visual cistern inspections and maintenance	IH	G3011-W		W			0.5	0.50	52	52.00	12	624		$ 34	$ 21 216					
Building Exterior	Water Quality	Domestic Water - Cistern	Monthly cistern inspection and maintenance	C	G3011-M		M					12							12	$ 800	$ 9 600	$ 9 600	
Building Exterior	Water Quality	Domestic Water - Cistern	Full cistern cleaning - every 3 years (primary water source)	C	G3011-3		Every 3 years					0.3				$0.100			1 167 000	$ 38 900	$ 116 700	$ 38 900	(2) Locations: Joseph Sibilly Bowskey Units in gallons
Building Exterior	Water Quality	Domestic Water - Cistern	Full cistern cleaning - every 5 years (secondary water source)	C	G3011-5		Every 5 years					0.2				$0.100			5 681 500	$ 113 630	$ 568 150	$ 113 630	(24) Locations Units in gallons
Site/Outdoors	Waste Disposal	Sewage	Quarterly septic system maintenance	C	G3025-Q		Q					4							1				VIDE to secure maintenance MOU with VIWMA
Site/Outdoors	Waste Disposal	Sewage	Quarterly sewer lift station inspection	C	G3024-Q		Q					4							2				VIDE to secure maintenance MOU with VIWMA
Building Interior	Plumbing	Grease Trap	Monthly kitchen grease trap servicing	C	E1095		M												9	$ 7 467	$ 67 203	$ 67 203	
Building Exterior	Electrical	Emergency Generators	Generator General Monthly & Annual Servicing	C	G4092-M/A		M					12							7	$ 2 914	$ 20 398	$ 20 398	
Building Interior	Mechanical	Air Conditioning	Quarterly air conditioning maintenance (</=5 tons)	IH	D3063-Q-IH		Q			1.50	1.00	4	10.00	317	3 170		$ 34	$ 107 780					
Building Interior	Mechanical	Air Conditioning	Quarterly air conditioning maintenance - large units (>5 tons)	C	D3063-Q-C		Q					4							26	$ 20 583	$ 535 167	$ 535 167	
Building Interior	Plumbing	Pumps	Semi-annual pump maintenance (domestic water sump etc.)	IH	G3015-SA		SA			1.00	1.00	2	4.00	11	44		$ 34	$ 1 496					
Building Interior	Plumbing / Fire Sprinkler	Pumps (Jockey)	Semi-annual Pump Maintenance (Jockey)	C	G3015-SA-J		SA					2							9	$ 633	$ 5 700	$ 5 700	
Site/Outdoors	Grounds	Grass/Lawns	Monthly grass cutting and grounds cleaning - contracted to ten total cuts per year	C	G1010-M	1	M		90			10				$380		$ -	42		$ 159 600	$ 159 600	Derived from Guam landscaping costs/acre; does not inlcude major tree pruning or removal Units=acres
Site/Outdoors	Grounds - Drainage System	Inlets Storm Drains Gutters Downspouts	Quarterly inspection and maintenance of storm drains inlets gutters downspouts	IH	D2040-Q	1	Q		60	2.00	1.00	4	12.00	12	144		$ 34	$ 4 896					
Site/Outdoors	Grounds - Drainage System	Swales Culverts Retention Basins	Annual inspection and repairs of swales culverts and retention basins	IH	D2040-A	2	A		255	2.00	1.00	1	3.00	11	33		$ 34	$ 1 122					Addressed via MOU with DPW
Site/Outdoors	Trees/Vegetation	Trees/Vegetation	In-house annual tree inspection	IH	G1012-IH	1	A		600	4.00	1.00	1	5.00	11	55		$ 34	$ 1 870					
Site/Outdoors	Trees/Vegetation	Trees/Vegetation	Contracted annual tree trimming	C	G1012-C	1	A		120			1							11	$ 36 173	$ 397 900	$ 397 900	
Building Exterior	Play/Sport Facilities	Track & Field	Quarterly track and field and ba l court inspection	IH	G2047-Q-I		Q			2.00	1.00	4	12.00	12	144		$ 34	$ 4 896					To be inspected by the Department of Housing Parks and Rec
Building Exterior	Play/Sport Facilities	Track & Field	Quarterly track and field maintenance	C	G2047-Q-M		Q												1	$ 84 000	$ 84 000	$ 84 000	
Site/Outdoors	Play/Sport Facilities	Playground Inspection	Quarterly playground inspection	IH	G2049-Q	1	Q		30	0.50	1.00	4	6.00	12	72		$ 34	$ 2 448					
Building Interior/Exterior	Fire Protection	Fire Extinguishers	Annual fire extinguisher inspection and servicing	C	D4031		A		150			1							11	$ 875	$ 9 625	$ 9 625	National Fire Protection Association recommends inspection annually at $40/unit (appox)
Building Interior	Fire Protection	Fire Alarm System	Semi-annual fire alarm inspection	C	D5037-SA	1	SA		50			2							9	$ 633	$ 5 700	$ 5 700	
Building Interior	Fire Protection	Fire Alarm System	Annual fire alarm system testing/servicing	C	D5037-A	2	A		80			1							9	$ 633	$ 5 700	$ 5 700	
Building Interior	Fire Protection	Sprinkler System	Semi-annual spr nkler system inspection/servicing	C	D4010-SA	1	SA		55			2							9	$ 633	$ 5 697	$ 5 697	
Building Interior	Fire Protection	Sprinkler System	Annual sprinkler system inspection/servicing	C	D4010-A	2	A		180			1							9	$ 633	$ 5 697	$ 5 697	
Building Interior	Fire Protection	Security System/Fire Alarm	Quarterly maintenance of security equipment	C	D5030-Q		Q					4							11	$ 3 909	$ 43 000	$ 43 000	
Building Interior	Fire Protection	Security System/Fire Alarm	Semi-annual maintenance of security equipment	C	D5030-SA		SA					2									$ -		Assume cost is covered by quarterly maintenance
Building Interior	Fire Protection	Security System/Fire Alarm	Annual maintenance of security equipment	C	D5030-A		A					1									$ -		Assume cost is covered by quarterly maintenance
Building Exterior	Pest Control	Pest Control	Monthly general pest control services for kitchens	C	C1090-M	1	M					12							11	$ 2 891	$ 31 800	$ 31 800	
Building Exterior	Pest Control	Pest Control	Quarterly Termite Inspection	IH	C1090-Q-IH	1	Q			1.00	1.00	4	8.00	11	88		$ 34	$ 2 992					
Building Exterior	Pest Control	Pest Control	5-year termite treatment services	C	C1090-5YR	1	Every 5 years					0.20							11	$ 1 364	$ 15 000	$ 15 000	
Building Exterior	Pest Control	Pest Control	Quarterly Servicing of Rodent Bait Stations	C	C1090-Q-C		Q					4							11	$ 2 718	$ 29 900	$ 29 900	
Building Interior	Mechanical	Kitchen Equipment	Semi-annual kitchen equipment service	C	E1095-SA		A/SA					1							11	$ 7 667	$ 84 333	$ 84 333	
														Total:	4,374			$ 148,716				$ 1,698,110	

Appendix 3 – List of Schools

St. Croix	**St. Thomas and St. John**
Alexander Henderson School	Bertha C. Boschulte MS
Alfredo Andrews School	Charlotte Amalie HS
Claude O Markoe School	Edith L. Williams Alternative Academy
CTEC	Ivanna Eudora Kean HS
Eulalie E Rivera K-8	Jane E. Tuitt ES
John H Woodson JHS	Joseph Gomez ES
Juanita Gardine K-8	Julius E. Sprauve
Lew Muckle School K-8	Leonard Dober ES
Pearl B Larsen K-8	Lockhart ES
Positive Connections Alternative ED	Lockhart EX
Ricardo Richards School	Ulla F. Muller ES
SPED Office/Maintenance Shop	Yvonne E. Milliner-Bowsky ES
St. Croix Central High School	
St. Croix Educational Complex HS	