

Infrastructure Replacement and Upgrades

Program Description

One of the primary roles for facility management in both government and private industry is to provide for the long-term needs of the organization's capital assets. This maximizes the life of the facilities, avoids their obsolescence, and provides for a planned program of repairs, improvements, and restorations to make them suitable for organizational needs. Infrastructure Replacement and Upgrades is the planned replacement of building subsystems such as roofs, electrical systems, HVAC systems and plumbing systems that have reached the end of their useful life. Major renewal investment is required in facilities to replace old, obsolete building subsystems that have reached the end of their life cycle. Without significant reinvestment in building subsystems, older facilities will fall into a state of ever deteriorating condition and functionality and the maintenance and repair costs necessary to keep them functional will increase. This reinvestment also includes upgrades associated with Americans with Disabilities (ADA) compliance at County facilities.

Program Initiatives

The Facilities Management Department (FMD) currently provides support for evaluating facilities, identifying problems, developing costs estimates, establishing priorities and performing required infrastructure replacement and upgrades. Some of the major work completed annually at County facilities includes the replacement of building subsystems such as roofs, electrical systems, heating, ventilation, and air conditioning (HVAC), plumbing systems, elevators, windows, carpets, parking lot resurfacing, fire alarms, fire suppression, building automation systems, and emergency generators that have reached the end of their useful life. Without significant reinvestment in building subsystems, older facilities can fall into a state of ever-decreasing condition and functionality, and the maintenance and repair costs necessary to operate the facilities increase. Fairfax County will have a projected FY 2023 facility inventory of over 12 million square feet of space (excluding schools, parks, and housing facilities). This inventory continues to expand with the addition of newly constructed facilities, the renovation and expansion of existing facilities and the acquisition of additional property. With such a large inventory, it is critical that a planned program of repairs and restorations be maintained. In addition, the age of a large portion of this inventory of facilities is reaching a point where major reinvestments are required in the building subsystems.

Many County facilities have outdated HVAC and electrical systems that are susceptible to failure or are highly inefficient energy users. Projects are prioritized based on maintenance reports and availability of parts. Roof replacement, repairs, and waterproofing are conducted in priority order based on an evaluation of maintenance and performance history. Repairs and replacement of facility roofs are considered critical to avoid the serious structural deterioration that occurs from roof leaks. By addressing this problem in a comprehensive manner, a major backlog of roof problems can be avoided. In addition, emergency generators and fire alarm systems are replaced based on equipment age, coupled with maintenance and performance history. Critical emergency repairs and renovations are accomplished under the category of emergency building repairs. These small projects abate building obsolescence and improve the efficiency and effectiveness of facilities and facility systems. The following table outlines, in general, the expected service life of building subsystems used to project infrastructure replacement and upgrade requirements, coupled with the actual condition of the subsystem component:

Infrastructure Replacement and Upgrades

General Guidelines for Expected Service Life of Building Subsystems

Electrical

Lighting	20 years
Generators	25 years
Service/Power	25 years
Fire Alarms	15 years

HVAC

Equipment	20 years
Boilers	15 to 30 years
Building Control Systems	7 years

Conveying Systems

Elevator	25 years
Escalator	25 years

Plumbing

Pumps	15 years
Pipes and fittings	30 years
Fixtures	30 years

Finishes

Broadloom Carpet	7 years
Carpet Tiles	15 years
Systems Furniture	20 to 25 years

Site

Paving	15 years
--------	----------

Roofs

Replacement	20 years
-------------	----------

Each year, the Facilities Management Department (FMD) prioritizes and classifies infrastructure replacement and upgrade projects into five categories. Projects are classified as Category F: urgent/safety related, or endangering life and/or property; Category D: critical systems beyond their useful life or in danger of possible failure; Category C: life-cycle repairs/replacements where repairs are no longer cost effective; Category B: repairs needed for improvements if funding is available, and Category A: good condition.

In April 2013, the County and School Board formed a joint committee, the Infrastructure Financing Committee (IFC), to collaborate and review both the County and School's Capital Improvement Program (CIP) and infrastructure upgrade requirements. One of the goals of the Committee was to develop long-term maintenance plans for both the County and Schools, including annual requirements and reserves. The committee conducted a comprehensive review of critical needs and approved recommendations to support the development of a sustainable financing plan to begin to address current and future capital requirements. The Committee found the analysis of financial policy, the review of the condition of hundreds of facilities, and the scarce options for financing to be challenging. A Final Report was developed and approved by the Board of Supervisors on March 25, 2014, and the School Board on April 10, 2014. The Report included support for conducting capital needs assessments, new policy recommendations for capital financing, including a capital sinking fund and increased annual General Fund supported funding, the adoption of common definitions related to all types of maintenance, support for County and School joint use opportunities for facilities, and continued support for evaluating ways to further reduce capital costs.

Infrastructure Replacement and Upgrades

In February 2020, the Board of Supervisors and the School Board established a joint CIP working group to allow for information sharing, prioritizations, and planning by both the County and Fairfax County Public Schools. The Committee spent its time reviewing the County's existing Financial Policies, considering the financing options available for capital projects, understanding the capital project requirements identified for both the County and Schools, and evaluating the current CIP Plan and processes. Following these discussions, the Committee arrived at a series of recommendations, which include gradually increasing General Obligation Bond Sale limits from \$300 million to \$400 million annually; dedicating the equivalent value of one penny on the Real Estate tax to the County and School capital program to support both infrastructure replacement and upgrade projects and debt on the increased annual sales; and increasing the percentage allocated to the Capital Sinking Fund at year-end, as well as including Schools in the allocation. Based on resource constraints, the Committee's recommendation to dedicate the value of one penny has not been included in the FY 2023 Adopted Budget Plan. An investment totaling \$5 million, split equally between the County and Schools, has been included, with the anticipation that this investment will grow in the coming fiscal years. When fully implemented, these recommendations will provide significant funding for infrastructure replacement and upgrades in the future.

The Board of Supervisors approved the establishment of the Capital Sinking Fund as part of the *FY 2014 Carryover Review*. To date, a total \$49,128,260 has been allocated to FMD for critical infrastructure replacement and upgrade projects. FMD has initiated several larger scale projects with funding from the Sinking Fund, including roof replacement at the Gerry Hyland South County Government Center and Juvenile Detention Center; HVAC system component replacement at the Herrity Building and Gerry Hyland South County Government Center; plaza deck drainage and concrete improvements at the Government Center; fire alarm system replacement at the Government Center and Fairfax County Courthouse; and elevator modernization at the Adult Detention Center.

The requirement for County infrastructure replacement and upgrades is estimated at \$26 million per year. This estimate is based on current assessment data, as well as industry standards (2 percent of the current replacement value). Based on current staffing levels, the complexity of many of the projects, and the timeline for completing replacement and upgrade projects, it is estimated that approximately \$15 million per year would be a good funding goal.

Due to budget constraints, in FY 2023, an amount of \$1,500,000 is included to address three of the top priority F projects. In addition, an amount of \$8,385,000 was funded as part of the *FY 2022 Third Quarter Review* for a total of \$9,885,000 to support the most critical FY 2023 identified projects. In recent years, it has been the Board of Supervisors' practice to fund some or all of the infrastructure replacement and upgrade projects using one-time funding as available as part of quarterly reviews. These projects, all Category F, will address generator replacement, site work, fire alarm system replacement, HVAC system upgrades and building automation, and roof replacement. The table below provides specific project details of the projects that are included in the FY 2023 Adopted Budget Plan and the projects that were approved as part of the *FY 2022 Third Quarter Review*.

Infrastructure Replacement and Upgrades

FY 2023 Infrastructure Replacement and Upgrade Program

Priority	Project Type	Facility	Category	Existing Conditions/Deficiencies	Estimate
Projects approved as part of the FY 2023 Adopted Budget Plan:					
1	Fire Alarm (design only)	Pennino Building	F	<ul style="list-style-type: none"> • Old legacy technology • Parts difficult to obtain • Proprietary system • Imminent failure 	\$250,000
2	HVAC	Fair Oaks Fire Station	F	<ul style="list-style-type: none"> • Maintenance intensive • System is nearing the end of its useful life • Imminent failure 	\$350,000
3	Building Envelope	Herrity Building	F	<ul style="list-style-type: none"> • Maintenance and repairs no longer feasible • Water leaks and air infiltration • Increased utilities costs 	\$900,000
Projects approved as part of the FY 2022 Third Quarter Review:					
4	Plumbing	Pennino Building	F	<ul style="list-style-type: none"> • Increased equipment failures • Reduced efficiency • Maintenance intensive • System is past the end of its useful life 	\$215,000
5	Building Envelope	Pennino Building	F	<ul style="list-style-type: none"> • Maintenance and repairs no longer feasible • Increased utilities costs • Water leaks and air infiltration 	\$1,650,000
6	HVAC	Fire Training Academy	F	<ul style="list-style-type: none"> • Increased equipment failures • Refrigerant not code compliant • Parts difficult to obtain • Imminent failure 	\$575,000
7	HVAC	Juvenile Detention Center	F	<ul style="list-style-type: none"> • Frequent failures impacting building occupants • Reduced energy efficiency • Maintenance intensive • System has reached the end of its useful life 	\$850,000
8	HVAC	Juvenile Court Shelter Care II	F	<ul style="list-style-type: none"> • Parts difficult to obtain • Reduced energy efficiency • Maintenance intensive 	\$300,000
9	Roof	Kingstowne Fire Station	F	<ul style="list-style-type: none"> • Maintenance and repairs no longer feasible • System is past its useful life • Frequent water leaks damaging interior finishes and impacting program operations 	\$1,150,000
10	Building Automation System	Fair Oaks Police and Fire Station	F	<ul style="list-style-type: none"> • Maintenance intensive • Old legacy technology • Reduced energy efficiency • Increased equipment failures 	\$275,000

Infrastructure Replacement and Upgrades

Priority	Project Type	Facility	Category	Existing Conditions/Deficiencies	Estimate
11	Generator	Gartlan Center	F	<ul style="list-style-type: none"> System has reached the end of its useful life Maintenance intensive Increased equipment failures Unreliable emergency system 	\$125,000
12	Miscellaneous (Develop a condition assessment and a 10-year renewal plan)	Fairfax County Courthouse and Expansion	F	<ul style="list-style-type: none"> Maintenance intensive 	\$200,000
13	Miscellaneous (Gate repairs, hot water heater replacements, roof repairs and replacement compressors)	Various Facilities	F	<ul style="list-style-type: none"> Critical operations and maintenance deficiencies Maintenance intensive Increased equipment failures Unreliable emergency system 	\$225,000
14	Building Automation System	Centreville Regional Library	F	<ul style="list-style-type: none"> Maintenance intensive Old legacy technology Reduced energy efficiency Increased equipment failures 	\$125,000
15	Building Automation System	Springfield Warehouse	F	<ul style="list-style-type: none"> Maintenance intensive Old legacy technology Increased equipment failures 	\$150,000
16	Building Automation System	Fairfax County Courthouse and Expansion	F	<ul style="list-style-type: none"> Maintenance intensive Old legacy technology Reduced energy efficiency Increased equipment failures 	\$1,500,000
17	Building Envelope	Gum Springs Community Center	F	<ul style="list-style-type: none"> Maintenance intensive Water leaks and air infiltration Reduced energy efficiency Damage to interior finishes and program elements 	\$870,000
18	Site Work	Michael R. Frey Animal Shelter	F	<ul style="list-style-type: none"> Site drainage issues at rear of building Rear building canopy structural beams have premature rusting The rear exterior stair rails do not meet ADA standards 	\$175,000
Total					\$9,885,000

In addition to the above projects identified as part of the FY 2023 plan, FMD has identified additional Category F projects. Analysis of these requirements is conducted annually, and projects may shift categories, become an emergency and be funded by the emergency systems failures project, or be eliminated based on other changes, such as a proposed renovation project.

Current Project Descriptions

- 1. ADA Compliance - FMD (Countywide):** This is a continuing project to support County compliance with the Americans with Disabilities Act at County-owned facilities. Funding for annual ADA projects to support the continuation of improvements is required, as buildings and site conditions age. For example, over time sidewalks or pavers may settle or erosion occurs changing the slope or creating gaps/obstructions, program usage changes can result in new physical barriers, or ADA entrance ramps for pedestrians can fail due to increased usage for the movement of bulk materials and equipment.
- 2. Building Automation Systems (Countywide):** This is a continuing project to support the installation of Building Automation Systems (BAS) within existing County facilities. BAS control facility lighting, HVAC, bay door interlocking, and negative pressure room systems. Older facilities are retrofitted with these systems in order to increase energy efficiency.
- 3. Capital Sinking Fund for Facilities (Countywide):** \$49,128,260 has been allocated to date for the capital sinking fund for FMD. The Capital Sinking Fund was established as a direct result of the Infrastructure Financing Committee (IFC). Funding for each sinking fund is approved annually as part of the Carryover Review and is allocated based on the following percentages: 55 percent for FMD, 20 percent for Parks, 10 percent for walkways, 10 percent for County maintained Roads and Service Drives, and 5 percent for revitalization areas.
- 4. Carpet Replacement (Countywide):** This is a continuing project for carpet replacement at various County facilities where the existing carpet has deteriorated beyond repair or is in an unserviceable condition.
- 5. Electrical System Upgrades and Replacements (Countywide):** This is a continuing project for the repair, renovation and upgrading of mechanical and electrical systems in various facilities throughout the County.
- 6. Elevator/Escalator Replacement (Countywide):** This is a continuing project for the replacement and repairs of elevators throughout the County.
- 7. Emergency Building Repairs (Countywide):** This is a continuing project to support minor, but critical repair, renovation, remodeling, and upgrading of various facilities throughout the County. Requirements include abatement of health or safety hazards and emergency or unanticipated repairs to building exteriors. Funding of \$900,000 for critical repairs to the Herrity Building exterior has been included in FY 2023.
- 8. Emergency Generator Replacement (Countywide):** This is a continuing project for generator replacements at various sites throughout the County. Requirements are programmed based on equipment age coupled with maintenance and performance history.
- 9. Emergency Systems Failures (Countywide):** This is a continuing project to support emergency repairs and replacements to County facilities in the event of a major systems failure, such as a large HVAC system or other unforeseen event. Currently, this is the County's only source to deal with potential emergency system failures. Infrastructure Replacement and Upgrades funding is encumbered quickly because it is earmarked for specific projects. As a result, specific project balances are unavailable for emergencies. If a system failure should occur, there is the potential that a facility may shut down, suspending services to residents and disrupting County business. Although the County's emphasis on infrastructure replacement and

Infrastructure Replacement and Upgrades

preventative maintenance is intended to ensure these kinds of interruptions are avoided, this funding will enable potential disruptions to be corrected immediately.

- 10. Fire Alarm System Replacements (Countywide):** This is a continuing project for the replacement of fire alarm systems based on age, difficulty in obtaining replacement parts, service, and overall condition assessment. This program provides for the replacement of fire alarm systems which are 15 to 30 years old, have exceeded their useful life and experience frequent failure when tested. Funding of \$250,000 for the design costs associated with the replacement of the fire alarm system at the Pennino Building is included in FY 2023.
- 11. HVAC System Upgrades and Replacement (Countywide):** This is a continuing project for the repair, renovation and/or upgrading of Heating Ventilation and Air Conditioning (HVAC) systems in various facilities throughout the County. In general, the useful life of HVAC systems is 20 years; however, some systems fail earlier due to wear and tear, and often emergency repairs are costly based on difficulty in obtaining parts and additional code requirements. Funding of \$350,000 to replace the chiller component of the HVAC at the Fair Oaks Fire Station is included in FY 2023.
- 12. MPSTOC County Support for Renewal (Springfield District):** \$2,856,004 is currently in reserve to begin to address future capital renewal requirements at the McConnell Public Safety Transportation Operations Center (MPSTOC). This funding is appropriated at the end of each year and supported by revenues received from the State. This revenue represents funding associated with the state reimbursement for their share of the operational costs at MPSTOC such as security, custodial, landscaping, maintenance, parking lot repairs and snow removal costs. The County pays for all operational requirements and the State reimburses the County annually for their share of these costs.
- 13. MPSTOC State Support for Renewal (Springfield District):** \$888,301 is currently in reserve to begin to address future capital renewal requirements at the McConnell Public Safety Transportation Operations Center (MPSTOC). This funding is appropriated at the end of each year and supported by revenues received from the State. This revenue represents the state's annual installment of funds for their share of future repairs and renewal costs in order to avoid large budget increases for capital renewal requirements in the future. This contribution is based on the industry standard of 2 percent of replacement value or \$3.00 per square foot.
- 14. Parking Lot and Garage Improvements (Countywide):** This is a continuing project for the repair and maintenance to parking lots and garages at various locations throughout the County. Parking lot surfaces are removed, the base re-compacted and a new surface course installed. In some cases, asphalt paving is milled down and resurfaced.
- 15. Roof Repairs and Waterproofing (Countywide):** This is a continuing project for the repair and replacement of facility roofs and waterproofing systems at County buildings. Typically, roofs at County facilities range in warranty periods from 10 to 20 years.
- 16. Window Replacement (Countywide):** This is a continuing project for the replacement or repair of windows where water is leaking into County buildings.

Project Cost Summaries

Infrastructure Replacement and Upgrades

(\$000's)

Project Number	Project Title	Source of Funds	Budgeted or Expended Through FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	Total FY 2023 - FY 2027	Total FY 2028 - FY 2032	Total
1	ADA Compliance - FMD	G	C		\$300	\$300	\$300	\$300	\$1,200	\$1,500	\$2,700
	GF-000001										
2	Building Automation Systems	G	C		\$1,500	\$1,500	\$1,500	\$1,500	\$6,000	\$7,500	\$13,500
	GF-000021										
3	Capital Sinking Fund for Facilities	G	\$49,128						\$0		\$49,128
	GF-000029										
4	Carpet Replacement	G	C		\$500	\$500	\$500	\$500	\$2,000	\$2,500	\$4,500
	2G08-003-000										
5	Electrical System Upgrades and Replacements	G	C		\$500	\$500	\$500	\$500	\$2,000	\$2,500	\$4,500
	GF-000017										
6	Elevator/Escalator Replacement	G	C		\$1,000	\$1,000	\$1,000	\$1,000	\$4,000	\$5,000	\$9,000
	GF-000013										
7	Emergency Building Repairs	G	C	\$900	\$500	\$500	\$500	\$500	\$2,900	\$2,500	\$5,400
	GF-000008										
8	Emergency Generator Replacement	G	C		\$1,000	\$1,000	\$1,000	\$1,000	\$4,000	\$5,000	\$9,000
	GF-000012										
9	Emergency Systems Failures	G	C		\$1,000	\$1,000	\$1,000	\$1,000	\$4,000	\$5,000	\$9,000
	2G08-005-000										
10	Fire Alarm System Replacements	G	C	\$250	\$500	\$500	\$500	\$500	\$2,250	\$2,500	\$4,750
	GF-000009										
11	HVAC System Upgrades and Replacement	G	C	\$350	\$6,500	\$6,500	\$6,500	\$6,500	\$26,350	\$32,500	\$58,850
	GF-000011										
12	MPSTOC County Support for Renewal	X	\$2,856						\$0		\$2,856
	2G08-008-000										

Project Cost Summaries

Infrastructure Replacement and Upgrades

(\$000's)

Project Number	Project Title	Source of Funds	Budgeted or Expended Through FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	Total FY 2023 - FY 2027	Total FY 2028 - FY 2032	Total
13	MPSTOC State Support for Renewal 2G08-007-000	X	\$888						\$0		\$888
14	Parking Lot and Garage Improvements GF-000041	G	C		\$1,200	\$1,200	\$1,200	\$1,200	\$4,800	\$6,000	\$10,800
15	Roof Repairs and Waterproofing GF-000010	G	C		\$600	\$600	\$600	\$600	\$2,400	\$3,000	\$5,400
16	Window Replacement 2G08-006-000	G	C		\$200	\$200	\$200	\$200	\$800	\$1,000	\$1,800
Total			\$52,872	\$1,500	\$15,300	\$15,300	\$15,300	\$15,300	\$62,700	\$76,500	\$192,072

Notes: Numbers in bold italics represent funded amounts. A "C" in the 'Budgeted or Expended' column denotes a continuing project.

Key: Source of Funds

B	Bonds
G	General Fund
S	State
F	Federal
X	Other
U	Undetermined