

# 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 section also includes the 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 2022 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:

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## General Guidelines for Expected Service Life of Building Subsystems

<b><u>Electrical</u></b>		<b><u>Plumbing</u></b>	
Lighting	20 years	Pumps	15 years
Generators	25 years	Pipes and fittings	30 years
Service/Power	25 years	Fixtures	30 years
Fire Alarms	15 years		
<b><u>HVAC</u></b>		<b><u>Finishes</u></b>	
Equipment	20 years	Broadloom Carpet	7 years
Boilers	15 to 30 years	Carpet Tiles	15 years
Building Control Systems	7 years	Systems Furniture	20 to 25 years
<b><u>Conveying Systems</u></b>		<b><u>Site</u></b>	
Elevator	25 years	Paving	15 years
Escalator	25 years		
		<b><u>Roofs</u></b>	
		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.

The Board of Supervisors approved the establishment of the Capital Sinking Fund as part of the *FY 2014 Carryover Review*. To date, a total of 64,767,161 has been dedicated to capital sinking funds and allocated for infrastructure replacement and upgrades to the following areas: \$35,621,941 for FMD, \$12,953,433 for Parks, \$7,831,140 for Walkways, \$5,703,864 for County-owned Roads and \$2,656,783 for Revitalization. Projects have been initiated in all of these program areas from the sinking fund allocation. FMD has initiated several larger scale projects with the \$35,621,941 allocated to the Sinking Fund, including storm pipe and drains replacement at the Pennino Building Parking Garage and Herrity Building Parking Garage and replacement of the storm drainage piping, fittings and hangers at the Judicial Employee Parking Garage; HVAC system component replacement at the Chantilly Library, McLean Fire Station and Government Center; emergency back-

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up generator replacement at the Kingstowne Fire Station; fire alarm system replacement at the Hollin Hall Senior Center, Oakton Library and Burke Center Library; and replacement of the main entrance doors at the Pennino Building.

In addition, as discussed with the IFC, 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, there is no funding included in FY 2022 for Infrastructure Replacement and Upgrade projects. However, an amount of \$6,282,000, representing the top priority category F projects, is proposed to be funded as part of a future quarterly review. 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 repairs and waterproofing. The table on the following pages provides specific project details of the projects that are proposed to be funded as part of a future quarterly review.

## FY 2022 Infrastructure Replacement and Upgrade Program

(Projects proposed to be funded as part of a future quarterly review)

Priority	Project Type	Facility	Category	Existing Conditions/Deficiencies	Estimate
1	Fire Suppression	Pennino Building	F	<ul style="list-style-type: none"> <li>Increased maintenance required to keep system operational</li> <li>System has exceeded its useful life</li> <li>Unreliable critical building life safety equipment</li> </ul>	\$200,000
2	Fire Alarm	Reston Human Services Center	F	<ul style="list-style-type: none"> <li>Maintenance and repairs no longer feasible</li> <li>Parts difficult to obtain</li> <li>Disruption to building operations/end users</li> </ul>	\$302,000
3	Generator	Juvenile Detention Center	F	<ul style="list-style-type: none"> <li>Increased equipment failure</li> <li>Old technology</li> <li>Parts difficult to obtain</li> <li>Disruption to building operations/end users</li> </ul>	\$550,000
4	Plumbing	Courthouse and Courthouse Expansion	F	<ul style="list-style-type: none"> <li>Imminent failure</li> <li>Unreliable equipment</li> <li>Disruption to building operations/end users</li> </ul>	\$150,000

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Priority	Project Type	Facility	Category	Existing Conditions/Deficiencies	Estimate
5	Roof	North Point Fire Station	F	<ul style="list-style-type: none"> <li>Maintenance and repairs no longer feasible</li> <li>Disruption to building operations/end users</li> <li>Increased utilities costs</li> <li>Water leaks</li> </ul>	\$500,000
6	Roof	Garland Mental Health Center	F	<ul style="list-style-type: none"> <li>Maintenance and repairs no longer feasible</li> <li>Water leaks</li> <li>Disruption to building operations/end users</li> <li>Increased utilities costs</li> </ul>	\$100,000
7	HVAC/Plumbing (Two rooftop units, a water heater and a kitchen exhaust will be replaced.)	Bailey's Community Center	F	<ul style="list-style-type: none"> <li>Imminent failure</li> <li>Unreliable equipment</li> <li>Disruption to building operations/end users</li> <li>Increased costs and limited availability of parts</li> </ul>	\$775,000
8	Building Automation System (The BAS system will be upgraded/replaced, and the HVAC system will be retro-commissioned.)	Gerry Hyland Government Center (South County Human Services Center)	F	<ul style="list-style-type: none"> <li>Parts difficult to obtain</li> <li>Unreliable equipment</li> <li>Disruption to building operations/end users</li> <li>Increased utilities costs</li> </ul>	\$1,500,000
9	HVAC	Southgate Community Center	F	<ul style="list-style-type: none"> <li>Increased maintenance costs</li> <li>Imminent failure</li> <li>Unreliable equipment</li> <li>Disruption to building operations/end users</li> <li>Increased costs and limited availability of parts</li> </ul>	\$550,000
10	Roof	McLean Fire Station	F	<ul style="list-style-type: none"> <li>Maintenance and repairs no longer feasible</li> <li>Water leaks</li> <li>Disruption to building operations/end users</li> </ul>	\$535,000
11	Generator	Clifton Fire Station	F	<ul style="list-style-type: none"> <li>System has reached its useful life</li> <li>System no longer meets Virginia Department of Environmental Quality's requirements</li> <li>Disruption to building operations/end users</li> </ul>	\$120,000

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Priority	Project Type	Facility	Category	Existing Conditions/Deficiencies	Estimate
12	Site Work (Re-caulk and seal building, windows, and doors' joints; repair exterior steel staircase; replace windows and doors; address loose wires; and clean, paint, and seal exterior façade.)	Annandale Center	F	<ul style="list-style-type: none"> <li>Maintenance and repairs no longer feasible</li> <li>Disruption to building operations/end users</li> <li>Unsafe conditions for program participants and staff</li> </ul>	\$1,000,000
<b>Total</b>					<b>\$6,282,000</b>

In addition to the above projects identified as part of the FY 2022 plan, FMD has identified additional Category F projects in the amount of \$18,058,000. 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

- 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.
- Building Energy Management Systems (Countywide):** This is a continuing project to support the installation of Building Energy Management Systems (BEMS) within existing County facilities. BEMS 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.
- Capital Sinking Fund – FMD (Countywide):** \$35,621,941 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 maintenance.
- 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.
- 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.

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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.
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 County facility may shut down, suspending services to residents and disrupting County business. Although the County's emphasis on infrastructure replacement and 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.
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.
12. **MPSTOC County Support for Renewal (Springfield District):** \$2,529,403 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):** \$835,017 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

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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 Repairs (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

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(\$000's)

	Project Title Project Number	Source of Funds	Budgeted or Expended Through FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Total FY 2022 - FY 2026	Total FY 2027 - FY 2031	Total Project Estimate
1	ADA Compliance - FMD GF-000001	G	C		\$300	\$300	\$300	\$300	\$1,200	\$1,500	\$2,700
2	Building Energy Management Systems GF-000021	G	C		\$1,500	\$1,500	\$1,500	\$1,500	\$6,000	\$7,500	\$13,500
3	Capital Sinking Fund - FMD GF-000029	G	\$35,622						\$0		\$35,622
4	Carpet Replacement 2G08-003-000	G	C		\$500	\$500	\$500	\$500	\$2,000	\$2,500	\$4,500
5	Electrical System Upgrades and Replace. GF-000017	G	C		\$500	\$500	\$500	\$500	\$2,000	\$2,500	\$4,500
6	Elevator/Escalator Replacement GF-000013	G	C		\$1,000	\$1,000	\$1,000	\$1,000	\$4,000	\$5,000	\$9,000
7	Emergency Building Repairs GF-000008	G	C		\$500	\$500	\$500	\$500	\$2,000	\$2,500	\$4,500
8	Emergency Generator Replacement GF-000012	G	C		\$1,000	\$1,000	\$1,000	\$1,000	\$4,000	\$5,000	\$9,000
9	Emergency Systems Failures 2G08-005-000	G	C		\$1,000	\$1,000	\$1,000	\$1,000	\$4,000	\$5,000	\$9,000
10	Fire Alarm System Replacements GF-000009	G	C		\$500	\$500	\$500	\$500	\$2,000	\$2,500	\$4,500
11	HVAC System Upgrades and Replacement GF-000011	G	C		\$6,500	\$6,500	\$6,500	\$6,500	\$26,000	\$32,500	\$58,500



# Project Cost Summaries

## Infrastructure Replacement and Upgrades

(\$000's)

Project Number	Project Title	Source of Funds	Budgeted or Expended Through FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Total FY 2022 - FY 2026	Total FY 2027 - FY 2031	Total Project Estimate
12	MPSTOC County Support for Renewal 2G08-008-000	X	\$2,529						\$0		\$2,529
13	MPSTOC State Support for Renewal 2G08-007-000	X	\$835						\$0		\$835
14	Parking Lot and Garage Repairs 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
<b>Total</b>			<b>\$38,986</b>	<b>\$0</b>	<b>\$15,300</b>	<b>\$15,300</b>	<b>\$15,300</b>	<b>\$15,300</b>	<b>\$61,200</b>	<b>\$76,500</b>	<b>\$176,686</b>

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