

Countywide Infrastructure Replacement Requirements

Program Description

This section provides a compilation of the Infrastructure Replacement and Upgrade requirements associated with the various program areas contained in the Capital Improvement Program (CIP). Infrastructure Replacement and Upgrades is the planned replacement of building subsystems, such as roofs, electrical systems, HVAC systems, plumbing systems, and other infrastructure, that has reached the end of its useful life. Without significant reinvestment in building subsystems, older facilities can fall into a state of deterioration and the maintenance and repair costs necessary to keep them functional will increase. One of the primary roles in facility management is to maximize the life of facilities, avoid their obsolescence, and provide for a planned program of repairs, improvements, and restorations. Infrastructure Replacement and Upgrades projects also include the reinvestment required for stormwater facilities and conveyance pipes, sewer lines, parks, trails, and bus shelters. It is important to support the reinvestment and maintenance of spaces, structures, and infrastructure in a routine, scheduled, or anticipated fashion to prevent failure and/or degradation. More importantly, this type of infrastructure replacement and upgrade work can reduce the potential for the exorbitant cost and inconvenience associated with unanticipated failures and safety concerns.

Link to the Comprehensive Plan

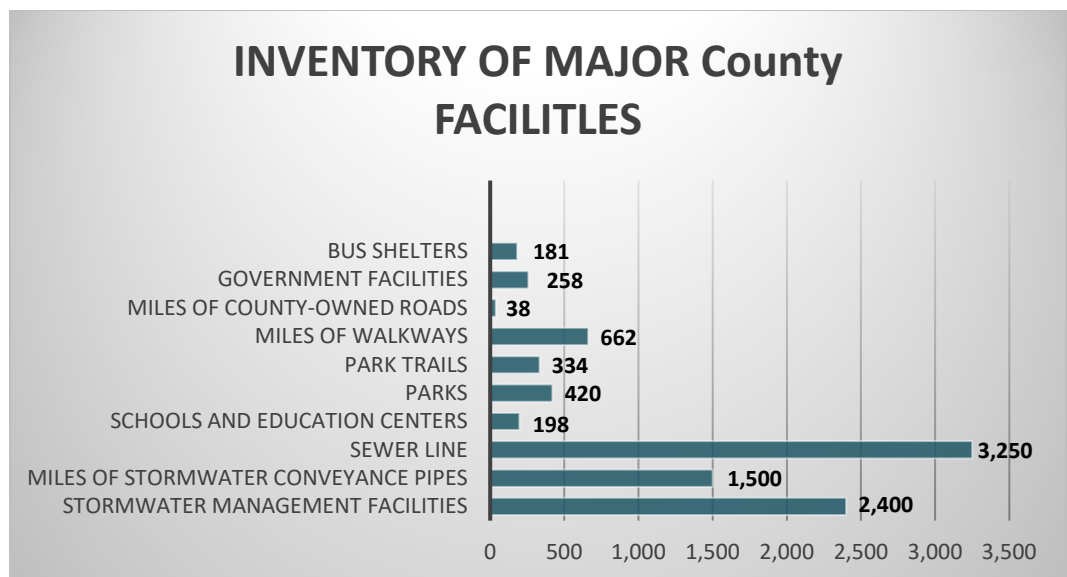
The Public Facilities Policy Plan within the Fairfax County Comprehensive Plan, includes the following established objectives:

- Construct and maintain facilities in accord with expected levels of service objectives and fiscal limitations.

Source: Fairfax County Comprehensive Plan, 2017 Edition; Policy Plan

Current Infrastructure Replacement Program

As the County infrastructure ages, more frequent replacement and upgrades are required. Fairfax County's inventory of infrastructure includes not only government buildings, but housing units, miles of walkways and sewer pipe, and many facilities, such as residential facilities and fire stations that operate 24/7, 365 days per year. Infrastructure replacement and upgrades are prioritized based on life safety concerns, repair history, and availability of replacement parts. The following chart displays some of the types of infrastructure that the County is responsible for maintaining.



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Infrastructure Replacement and Upgrades

In the spring of 2014, the Board of Supervisors and the School Board approved the Infrastructure Financing Committee's Final Report and Recommendations regarding long-term maintenance plans for both the County and Schools. The Report contained many recommendations, one of which was to develop standard definitions. The Joint Board definition approved for Infrastructure Replacements and Upgrades is stated below:

Infrastructure Replacement and Upgrades

Infrastructure Replacement and Upgrades refers to the planned replacement of building subsystems that have reached the end of their useful life. These systems, once replaced, will have an average life cycle of 20 years or more. Without significant reinvestment in facility 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. Currently these types of Infrastructure Replacement and Upgrades are funded within operational budgets or financed using municipal bonds. Examples of Infrastructure Replacement and Upgrades include:

- Roof Replacement
- Electrical System Replacement
- HVAC Replacements
- Plumbing Systems Replacements
- Replacement Windows
- Parking Lot Resurfacing
- Fire Alarm System Replacements
- Sprinkler Systems
- Emergency Generator Replacements
- Elevator Replacement

Infrastructure Life Cycles

For planning purposes, the County uses the following life cycle guidelines when projecting future replacement requirements. Some of the major work completed annually at County facilities includes the replacement of building subsystems: HVAC and electrical system repairs and replacement, roof repairs and waterproofing, carpet replacement, parking lot and garage repairs, window repairs/replacement, elevator/escalator repairs/replacement, fire alarm replacement, and emergency generator replacement. Replacement of these building subsystems is based on not only age and lifecycle, but on repair history, safety concerns, and availability of replacement parts. The following chart includes the expected lifecycle of building infrastructure.

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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
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Roofs

Replacement	20 years
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Program Area Requirements

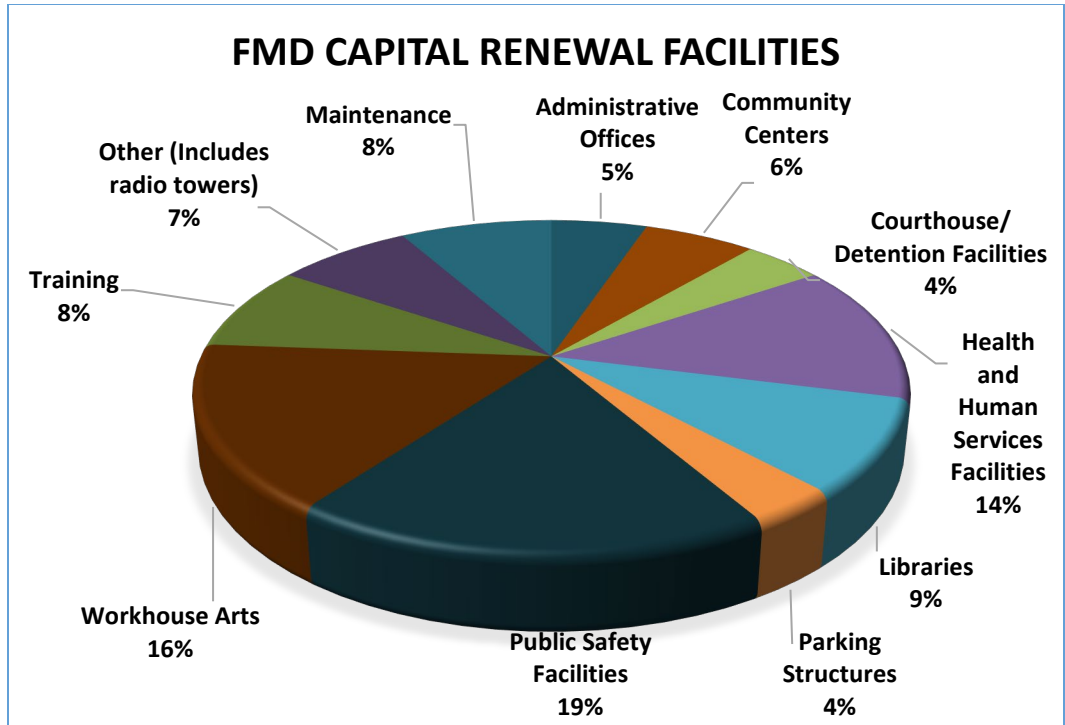
The sections that follow are grouped by specific capital program areas. Each program area has identified slightly different methodologies for categorizing projects, measuring the facility conditions and identifying funding sources. Many program areas are assessed on an annual basis and some have developed multi-year plans for maintaining infrastructure.

Each year, many County agencies prioritize and classify infrastructure replacement and upgrades 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. Other County organizations have other methodologies for prioritization of projects, including the Fairfax County Public Schools (FCPS). FCPS uses a Comprehensive Investment Capital Plan (CICP) which provides an assessment index (AI) to prioritize capital asset renewal projects, based on the capital asset's useful life and criticality.

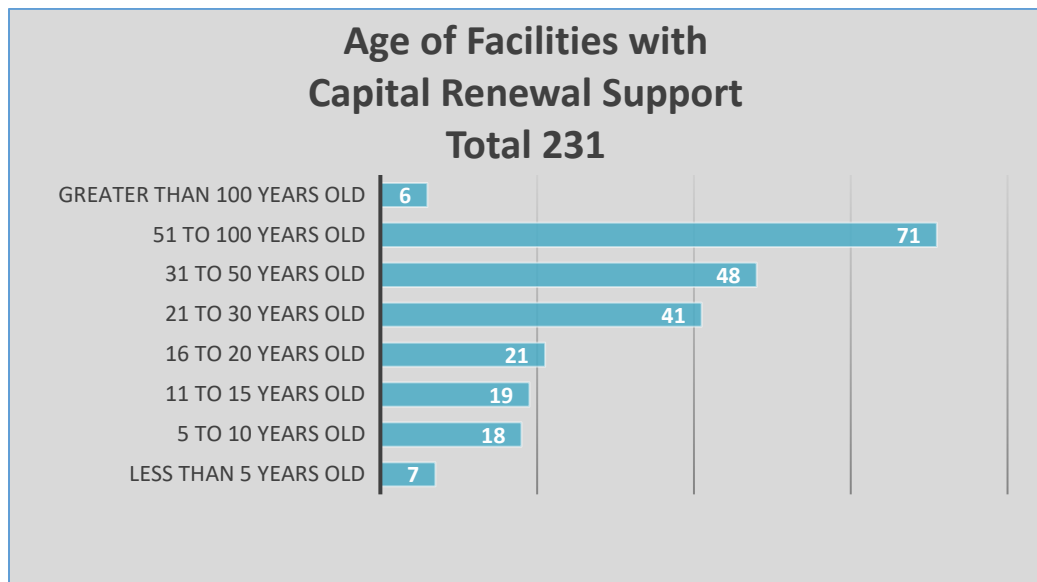
County Facility Infrastructure Replacement and Upgrades - FMD

The Facilities Management Department (FMD) currently provides support for evaluating facilities, identifying problems, developing costs estimates, establishing priorities, and performing the upgrades required to county-owned buildings. Fairfax County will have a projected FY 2023 facility inventory of nearly 12 million square feet of space throughout the County (excluding schools, parks, and housing facilities). This inventory is expanding both with the addition of newly constructed facilities and with 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 major portion of this inventory of facilities is reaching a point where major reinvestments are required in the building subsystems. The chart below includes the types of facilities managed by FMD.

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FMD is currently responsible for an inventory of 258 buildings. Of this amount, 27 facilities are maintained by FMD, but Infrastructure Replacement and Upgrade work is performed by another entity, such as the Department of Housing and Community Development. As the inventory of County facilities age, reinvestment in buildings and building equipment becomes critical. Currently, 81 percent of the buildings for which FMD has responsibility for infrastructure replacement and upgrades are over 20 years old. Per industry standards, most building systems require replacement at 20 to 25 years of age. Infrastructure replacement and upgrades extend the serviceability and life of a building and provide for the continued effective, efficient, and safe operation of a building. These needs vary by building size and type, the extent of facility use, and maintenance management.



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Many County facilities have outdated HVAC and electrical systems which are susceptible to failure or are highly inefficient energy users. Sites are identified and each individual project involves a two-step process normally requiring two years to complete design and construction. Roof repairs and waterproofing are conducted in priority order after an annual evaluation of the maintenance history. Based upon the results of that evaluation, critical requirements are prioritized and a plan is established. Repairs and replacement of facility roofs are considered critical to avoid serious structural deterioration caused by water leaks. By addressing this problem in a comprehensive manner, a major backlog of roof problems can be avoided. Carpet replacement and parking lot resurfacing are evaluated annually and prioritized, based on the most critical requirements for high traffic areas. In addition, emergency generators and fire alarm systems are replaced based on equipment age, coupled with maintenance and performance history. Minor repairs and renovations are also conducted in priority order. These projects, usually generated by customer requests, are small projects which abate building obsolescence, improve facility efficiency and effectiveness, and address major structural repairs.

Each year, FMD prioritizes and classifies infrastructure replacement and upgrades 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.

Acceptable levels of Infrastructure Replacement and Upgrades

For many years, the requirement for County infrastructure replacement and upgrades has been estimated at \$26 million per year. This estimate is based on collected 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.

The following chart includes both funded and unfunded infrastructure replacement and upgrade requirements identified to date at County owned facilities. This list totals approximately \$161 million, of which \$9.885 million will be considered for funding in FY 2022 or FY 2023. It should be noted that when facilities undergo full renovation, they are removed from this list reducing the outstanding requirements. In addition, this number is a moving target, as building systems and components can fail without notice and many buildings in the portfolio have not been assessed in over 15 years. In addition, many of facilities with category “F” and “D” upgrade projects identified may not be remediated for several years. The backlog requirements will continue to increase as capital components pass the end of their useful life.

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Category	FY 2023 Approved Program	Unfunded	Total
Asphalt and Paving	\$0	\$6,579,366	\$6,579,366
Building Envelope	\$3,420,000	\$15,460,385	\$18,880,385
Electrical	\$0	\$20,359,729	\$20,359,729
Elevators and Escalators	\$0	\$6,433,197	\$6,433,197
Fire Alarms and Fire Suppression	\$250,000	\$10,500,363	\$10,750,363
Generators	\$125,000	\$1,200,784	\$1,325,784
HVAC & Building Automation	\$4,365,000	\$63,682,215	\$68,047,215
Interior & Exterior Repairs	\$375,000	\$10,928,201	\$11,303,201
Parking Garage	\$0	\$1,914,000	\$1,914,000
Plumbing	\$200,000	\$8,625,259	\$8,825,259
Roof	<u>\$1,150,000</u>	<u>\$5,316,066</u>	<u>\$6,466,066</u>
Total	\$9,885,000	\$150,999,565	\$160,884,565

Emergency System Failures Project

In addition to the planned replacement of building systems, unplanned emergencies often occur. The Board of Supervisors periodically approves funding to support unexpected emergency system failures that occur at aging County facilities throughout the year. This project provides a source of funding for unforeseen emergency repairs and allows FMD to address projects not currently funded for which repairs are becoming more imminent. The Board makes every effort to replenish this fund annually as part of the Carryover Review in order to address emergency repairs at facilities in the event of a major systems failure. Some examples of Emergency System Failure projects include: the replacement of a failed Uninterruptable Power Supply at the Jennings Courthouse, replacement of failed piping in the Pennino Building child care center kitchen, replacement of electrical service at West Ox Department of Vehicle Services Garage to correct safety issues, structural repairs to the Government Center cooling towers and platforms, replacement of a failed roof top unit at the Kings Park Library, and replacement of the failed/leaking roof at the Jennings Courthouse

Fairfax County Public Schools (FCPS)

Fairfax County Public School (FCPS) maintains more than 27 million square feet of school buildings and office space. To date, FCPS has inventoried most major building systems, as well as the associated equipment, and developed analytics to identify life cycle expectations and optimize service by application of an effective maintenance and replacement strategy. Along with life cycle analysis, a process was established to assign a base condition and mission criticality rating to each asset. The base asset condition and criticality rating combine to provide an industry accepted asset assessment index (AI) value, which allows staff to prioritize resources for maintenance and replacement.

The core program provides the foundation to ensure proper Resource Stewardship but needs additional investment to engage a third party for comprehensive condition assessment of each asset. A recent review by the Office of the Auditor General recommended implementing a systemic assessment of all FCPS facilities over a 5-year period, or 20 percent of all facilities per year. FCPS

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met with the Facility Engineering Association (FEA) to review performing a comprehensive facility condition assessment and discuss similar programs that FEA provides to neighboring school divisions. For example, Montgomery County Public Schools initiated a program at the cost of \$.05 per square foot. Based on this pricing structure, it would cost an estimated \$1.35 million to implement at FCPS.

While critical building systems and components have been inventoried at most FCPS facilities, except for the schools currently under renovation there are other capital assets that remain to be inventoried such as; finished flooring, plumbing fixtures, building's exterior that will require capital investment to replace. Inventorying these assets will also increase existing financial requirements both in future needs and current deferred replacement backlog. Currently, the average asset age of capital assets inventoried is 17 years with 32 percent of these past their life cycle.

ASSET CATEGORY	TOTAL ASSETS	ASSET PAST USEFUL LIFE	AVG. LIFE EXPECTANCY (YEARS)	AVG. ASSET AGE (YEARS)	ESTIMATED REPLACEMENT COST
ADA ACCESSIBILITY	222	75	25	20	\$ 65,852,188
ASPHALT/PAVEMENT	1,284	428	22	17	\$ 52,062,936
ATHLETIC INFRASTRUCTURE	983	331	21	16	\$ 103,780,050
ELECTRICAL SYSTEMS	9,874	2,284	22	16	\$ 182,908,497
ENERGY MANAGEMENT SYSTEMS	213	68	17	14	\$ 167,214,924
ENVIRONMENTAL	89	35	30	31	\$ 1,395,878
FIRE SPRINKLER SYSTEMS	3,442	1,233	25	21	\$ 16,201,451
HEALTH/SAFETY	474	180	18	15	\$ 16,027,222
HVAC INFRASTRUCTURE	35,195	12,124	21	17	\$ 407,860,101
PLAYGROUND SYSTEMS	258	138	15	15	\$ 35,587,705
PLUMBING SYSTEMS	2,292	632	18	13	\$ 29,996,934
STRUCTURAL SYSTEMS	203	123	24	26	\$ 3,981,769
Grand Total	54,529	17,651	21	17	\$ 1,082,869,655

FCPS has a robust capital replacement program including renovations, new schools and capacity enhancements. Beginning in FY 2016, the County has transferred \$13.1 million annually to FCPS for capital infrastructure replacement in order to offset expenses previously funded by school bonds for facility infrastructure replacement. This \$13.1 million transfer supports infrastructure replacement in school system facilities such as HVAC, ADA, security, roof replacement, athletic infrastructure, life safety systems, and asphalt paving.

The following chart includes both funded and unfunded infrastructure replacement requirements throughout FCPS. Any renovation project that has been bid for construction has not been included below; however, infrastructure replacements associated with renovation projects planned over the 5-10-year period are included here as many of these building components will require replacement prior to scheduled renovations. FCPS' backlog requirements will continue to increase as capital components pass the end of their useful life.

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SUMMARY-FCPS FY 2023 REPLACEMENT AND UPGRADE REQUIREMENTS			
Fund	Funded	Unfunded	Total
ADA-Facilities	\$1,250,000	\$0	\$1,250,000
Asphalt Capital	\$1,784,966	\$7,018,149	\$8,803,115
Athletic Capital	\$2,825,000	\$5,639,429	\$8,464,429
Electrical Systems	\$0	\$22,371,045	\$22,371,045
Health-Safety-ADA Equipment	\$0	\$20,152,311	\$20,152,311
HVAC Capital	\$1,006,208	\$120,463,723	\$121,469,931
Information Technology	\$2,000,000	\$0	\$2,000,000
Plumbing Systems	\$0	\$6,957,126	\$6,957,126
Roofing	\$3,625,000	\$0	\$3,625,000
Safety and Security	\$600,000	\$0	\$600,000
Total	\$13,091,174	\$182,601,783	\$195,692,957

In FY 2022, FCPS will receive federal funding from the Elementary and Secondary School Emergency Relief (ESSER) grant. A total of \$84 million in ESSER II funds and \$188.7 million in ESSER III funds is for return to school (RTS) and other Covid-related expenses. ESSER II funds are expected to be spent in three primary areas:

- Supporting summer school activities
- Indoor Air Quality (IAQ) and facility infrastructure improvements
- Technology leasing costs and TSSpec positions

Funding of \$33 million is allocated toward facilities infrastructure for HVAC and air quality improvements but will require Virginia Department of Education pre-approval (VDOE).

Funding from ESSER II, for facilities, will primarily focus on IAQ improvements at several FCPS facilities by modifying/replacing HVAC system equipment that are past their useful life, not utilizing current air conditioning industry standards, or do not have enthalpy control (e.g., cannot manage humidity and moisture). The various HVAC systems that will be upgraded or replaced include make up air units (MAUs), chillers, boilers, cooling towers, roof top units (RTUs), and air handling units (AHUs). All of these are critical components that contribute to good air quality.

Additionally, with ESSER II funding FCPS will be able to replace obsolete and antiquated building automation systems that control all the HVAC systems within a facility. By controlling when and how heating, ventilating, and air conditioning systems operate, building automation systems save millions of dollars a year by reducing our energy consumption. They are also critical to ensure regular building ventilation for students, visitors, and staff from a central location, and provide good indoor air quality across the school division.

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With an HVAC backlog of \$128.3 million, one that is projected to reach \$205 million by FY 2027, Facilities Management is prioritizing projects for replacement based on the following criteria:

- Likelihood of imminent failure
- Greatest impact on facility indoor air quality (IAQ)
- System criticality
- Manufacturer's recommended life expectancy

Using this criteria FCPS' Office of Facilities Management (OFM) will work to utilize ESSER II funding to the greatest extent possible. One challenge, however, will be implementing planned infrastructure replacement projects, major maintenance projects, and ESSER-funded projects while simultaneously having the flexibility to adjust for unexpected equipment failures. All this work must be completed within the designated time frame set by the Federal Government of September 30, 2023.

County infrastructure funds that were previously identified for HVAC needs will be reallocated to other capital replacement projects as VDOE approves ESSER-funded HVAC projects.

The current capital infrastructure replacement backlog is at \$217M, and the projected 5-year capital asset End of Useful Life replacement requirements is an additional \$146M (see Table 2).

Table 2 - Infrastructure Replacement Backlog and Project Replacement Requirements

TYPE	BACKLOG	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	Total Value
HVAC Capital Requirements	\$128.3M	\$13.3M	\$9.0M	\$20.3M	\$11.2M	\$23.7M	\$205.7M
Athletic Capital Requirements	\$6.3M	\$1.0M	\$2.0M	\$1.4M	\$3.4M	\$2.7M	\$16.8M
Asphalt Capital Requirements	\$10.2M	\$.8M	\$2.9M	\$1.3M	\$.3M	\$1.0M	\$16.4M
Major Maintenance Requirements	\$72.4M	\$5.7M	\$8.7M	\$10.5M	\$13.0M	\$13.8M	\$124.0M
Total Requirements	\$217.1M	\$20.8M	\$22.6M	\$33.5M	\$27.8M	\$41.1M	\$363.0M

Lack of adequate funding for facilities maintenance is allowing systems to run past the useful life cycle, is inefficient, and introduces a myriad of other risks and higher maintenance costs. The lack of funding support for a capital asset replacement program significantly increases the risk of critical equipment failure, which can result in the potential disruption of instructional time, though OFM strives to minimize both factors.

According to the National Research Council (NRC) report titled Committing to the Cost of Ownership: The Maintenance and Repair of Public Building, the appropriate level of Maintenance and Repair spending should be, on average, in the range of 2 to 4 percent of Current Replacement Value (CRV). FCPS' CRV is estimated at \$6.5 billion, but only receives funding totaling 0.4 percent of the CRV. This pattern of under-funded maintenance requirements has increased FCPS' deferred backlog at an average rate of \$10 million annually – (\$110 million in FY 2016, \$128 million in FY 2017, \$142 million in FY 2018, \$157 million in FY 2019, \$162 million in FY 2020 and \$179 million for FY 2021). A review of FCPS 10-year cash flow of \$526,170,355 in End of Useful Life (EOUL) requirements, projects that FCPS will need an increase in the Infrastructure Replacement Funding and FCPS Major Maintenance allocation to keep pace and become good stewards of the capital asset program prior to renovations.

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Park Authority Infrastructure

The Park Authority has been working to address the backlog of reinvestment requirements at deteriorating facilities, athletic courts, pedestrian bridges, parking lots, and trails located throughout the County. The Park Authority is responsible for structures at 420 Parks with 58 percent of this total inventory over 30 years old. In addition, the Park Authority owns a total of 23,632 park acres which equates to over 9.4 percent of the land mass of Fairfax County. In 2016, Parks Count, which is the Park Authority Needs Assessment, was completed and provides recommendations for capital investments in the park system based on a body of data that the Park Authority will continue using for years. The total projected need for the ten-year period was \$939,161,000; that amount has been reduced to \$744,461,000 due to the approval of \$94,700,000 as part of the 2016 Park Bond Referendum and \$100,000,000 as part of the 2020 Park Bond Referendum. The remaining needs of \$744,461,000 are broken out into three strategic areas in five-year increments:

- Critical, “Repairing what we have” makes the most of existing resources with the primary goal being for FCPA to maintain services. The plan partially addresses deferred maintenance at existing parks and facilities. The Critical funding need is \$82,691,424 over the next five years.
- Sustainable, “Upgrade Existing” looks at enhancing existing programs, beginning new alternative programs, or making other strategic changes that would require additional operational or capital funding. The Sustainable need for years 1-5 is \$102,461,220 and the need for years 6-10 is \$164,282,756, for a total of \$266,743,976.
- Visionary, “New, Significant Upgrades” includes new and expanded facilities to fully meet needs desired by the community and ensure that the Park Authority remains a preferred provider of park and recreation amenities. The remaining Visionary need is \$395,025,600 over the 10-year period, and if funding is made available in 1-5 years, staff would accelerate visionary elements that include expansion and renovation of existing recreation centers and development of new athletic facilities.

In addition, the Park Authority completed a System-wide Sustainability Plan for Rec Centers in 2018 that identified strategies to maximize operational effectiveness, improve community responsiveness, and ultimately ensure the long-term financial sustainability of the Rec Center system through a series of capital improvements. The Park Authority’s Rec Center system has entered an era of aging infrastructure that requires lifecycle redevelopment and modernization to meet the continuing needs of the community and remain fiscally sustainable as an enterprise funded activity. The improvements are estimated at \$249,120,000 which includes escalation for a seven-year period with projects starting in 2022.

Based on continual facility condition assessments, growing and shifting community needs and expectations, an ever-increasing amount of funding will be needed for capital maintenance and replacement of aging park assets in order to maximize the life of the existing facilities and to develop new facilities. The following table includes a total of \$166,607,592 in estimated Park Authority Category “F” projects and Category “D” projects combined. In addition, the Park Authority realigned their renewal projects to the categories as defined by FMD, resulting in additional Category “C” items being reclassified as “Category D” based on many subsystems categorized as beyond their useful life or in danger of possible failure. The impact of failed/failing/beyond end of useful life includes higher cost of operations, difficulty to repair and maintain, availability of spare parts, unhappy visitors, inefficient energy usage, and deteriorated/compromised structural systems and elements.

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To further safeguard and align with County practices, the Park Authority established a Capital Sinking Fund within their Park Improvement Fund. To date, the Park Authority has identified approximately \$28 million in category D and F projects associated with 9 Rec Centers. This critical funding element of sustainability cannot be realized through charging of fees. It is anticipated that this sinking fund will assist with funding for lifecycle/capital renewal maintenance of the revenue facilities.

Category	Total
Building/Structures	\$65,732,464
Recreation/Playgrounds	\$24,411,300
Roads & Parking Lots	\$22,992,690
Athletic Fields	\$22,170,000
Trails	\$11,991,315
Vehicle Maintenance	\$9,955,607
Athletic Courts	\$5,438,716
Lighting and Irrigation Systems	\$3,330,500
Fire and Security	\$585,000
Total	\$166,607,592

Athletic Field Infrastructure

The Athletic Field Program facilitates the development, maintenance, and replacement of athletic fields, including synthetic turf fields, throughout the County. The maintenance of athletic fields includes field lighting, fencing, irrigation, dugout covers, infield dirt, aeration, and seeding. These maintenance efforts improve safety standards, enhance playing conditions, and increase user satisfaction. Athletic field maintenance is funded by the General Fund and is supplemented by an Athletic Services Fee. Annual funding of \$8,454,338 has been included for the athletic field maintenance and sports program in FY 2023. This level of funding is supported by a General Fund transfer of \$6,979,338 and revenue generated from the Athletic Services Fee in the amount of \$1,475,000. Of the Athletic Services Fee total, \$800,000 will be dedicated to the turf field replacement program, \$275,000 will be dedicated to custodial support for indoor sports organizations, \$250,000 will be dedicated to maintenance of school athletic fields, \$75,000 will be dedicated to synthetic turf field development, and \$75,000 will partially fund the Youth Sports Scholarship Program. The Athletic Service Fee revenue is based on a rate of \$5.50 per participant per season and \$15 for tournament team fees for diamond field users and indoor gym users and a rate of \$8.00 per participant per season and \$50 tournament team fees for rectangular fields users. The rate applied for rectangular field users specifically supports the turf field replacement fund.

Maintenance efforts include contracted services to improve the condition of 452 non-Park Authority athletic fields scheduled for community use at FCPS elementary schools, middle schools, high schools and centers; upgrades to athletic field lighting systems at middle and high schools; and the development and replacement of synthetic turf fields. A large portion of the program supports synthetic turf fields which allow for year-round use in most weather increasing playable hours, provide playing surfaces and conditions that are similar to grass fields, and eliminate the need for

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watering, mowing, and fertilizing. There are a total of 98 synthetic turf fields throughout the County, of which 24 are FCPS stadium fields, 73 are County Park/FCPS non-stadium fields, and one field is the replacement responsibility of the Town of Vienna. Increased annual funding has been provided to begin to address the growing need for field replacement and to establish a 10-year replacement schedule. The first turf field replacement efforts began in 2013 for the first two fields developed. Most manufacturers provide an eight-year warranty for a properly maintained synthetic turf field; however, it is a generally accepted practice to assume a life expectancy of the synthetic turf field of no more than 10 years.

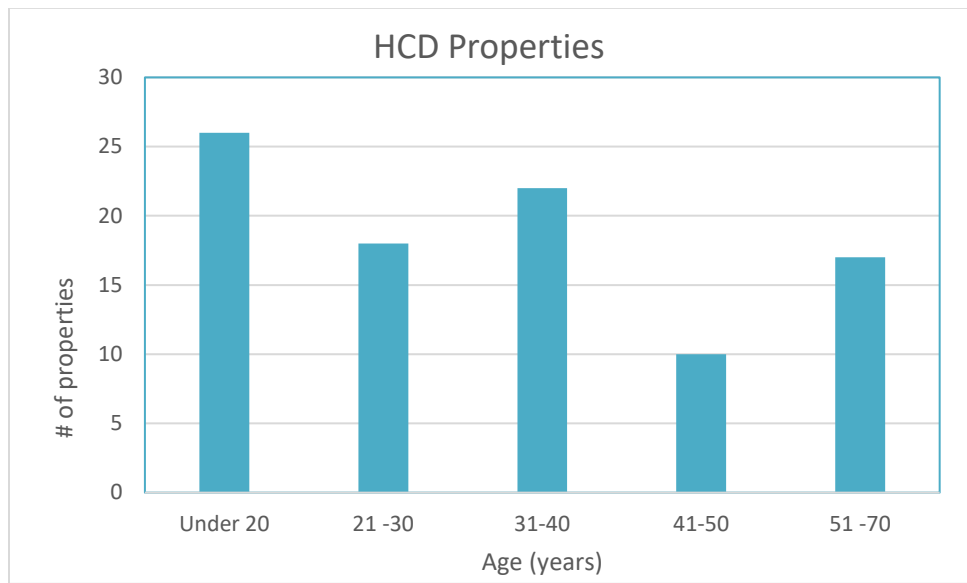
The following chart outlines the plan for turf field replacement at the current levels of both Athletic Service Fee revenue and General Fund support. The program includes the number of fields anticipated to be replaced per year and is fully funded through FY 2023. The level of funding support will need to be re-evaluated based on the projected unfunded balance starting in FY 2024. One-time budget allocations, as well as long-term funding increases, will be needed to keep the replacement plan fully funded.

NCS - Turf Field Replacement Plan (Current Funding)									
10 year Replacement cycle	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Fund - Beginning Balance	\$991,948	\$210,895	\$1,058,635	\$0	\$20,360	-\$1,565,600	-\$4,704,200	-\$4,934,160	-\$7,777,800
Replacement Fund Contribution	\$2,250,000	\$2,710,000	\$2,250,000	\$2,250,000	\$2,250,000	\$2,250,000	\$2,250,000	\$2,250,000	\$2,250,000
Transfer from Synthetic Field Development Fund			\$48,645						
Partner/Matching Funds	\$0	\$0	\$200,000	\$0	\$0	\$0	\$0	\$0	\$0
One-time Agency Contribution (from Application Fee)	\$75,000	\$0	\$0	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000
Total Available Funds	\$3,316,948	\$2,920,895	\$3,557,280	\$2,325,000	\$2,345,360	\$759,400	-\$2,379,200	-\$2,609,160	-\$5,452,800
Estimated # of FCPS Turf Field Replacements Required		2	4	2	3	5	3	2	3
Estimated # of FCPSA Turf Field Replacements Required	7	2	3	3	5	6	2	9	5
Fields to be replaced (Red= FCPS Fields)	Ossian Hall Pine Ridge Arrowbrook Luther Jackson MS Hemdon HS Centreville HS	Linway Terrace SpringHill #5 Robinson HS Graham Rd	Lake Braddock SS South Lakes HS Oakton HS #1 Oakton HS #3 Oak Marr #1 Oak Marr #2 Great Falls NIKE #4	Falls Church HS Woodson HS Lewinsville #2 Ken Lawrence #2	Edison HS Mt. Vernon HS West Potomac HS Loudale #1 SullyHighlands #1 SullyHighlands #2 EC Lawrence #2 EC Lawrence #3	South County MS South County MS Annandale HS Justice HS Waters Vienna ES Arrowhead #1 Arrowhead #3 Grist Mill #5 Ken Lawrence #1 Rolling Valley #2 McLean Police**	Hayfield SS South County HS Westgate ES** Mason District #3 Pine Ridge #6	Sandburg MS Thomas Jefferson HS** Lake Fairfax#1 Lake Fairfax#4 Braddock #7 Great Falls Nike #7 Poplar Tree #2 Poplar Tree #3 South Run #5 South Run #6 Wakefield #5	Bryant All HS Hutchison ES Marshall HS Franconia #4 Nottoway #4 Patriot #1 Spring Hill #2 Spring Hill #3
Estimated Cost	\$3,164,000	\$1,862,260	\$3,557,280	\$2,304,640	\$3,910,960	\$5,463,600	\$2,554,960	\$5,168,640	\$3,910,960
Actual Cost	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Year End Fund Balance	\$152,948	\$1,058,635	\$0	\$20,360	-\$1,565,600	-\$4,704,200	-\$4,934,160	-\$7,777,800	-\$9,363,760

Countywide Infrastructure Replacement Requirements

Housing and Community Development (HCD) Facilities

HCD's housing inventory includes ninety-three residential properties, ten group homes, one mobile home park covering 115 land lots leased by individual owners, and two office buildings. The inventory is significant, housing residents in approximately 2,959 apartments, 551 townhouses, 10 group homes, and 115 mobile home lots. As evidenced in the graph below, 53 percent of the properties are 31 years or older. Many infrastructure replacement and upgrade projects have been deferred due to increasingly less funding from HUD. Some of the major items that have been deferred include replacement of central boilers, HVAC systems, roofs, electrical systems, flooring, windows, and resurfacing of parking lots. Deferral of these items results in inefficient utility usage as well as higher future maintenance costs.



The following table identifies the top 13 Housing facility priorities including \$0.509 million category D projects, which are scheduled to be funded in FY 2022. In addition, Housing and Community Development staff have identified \$0.929 million category C projects that will require funding in FY 2023, totaling \$1.438 million.

Countywide Infrastructure Replacement Requirements

INFRASTRUCTURE REPLACEMENT AND UPGRADE REQUIREMENTS: HOUSING						
PRIORITY	PROJECT TYPE	FACILITY	CATEGORY	EXISTING CONDITIONS/DEFICIENCIES	ESTIMATE	Funding Status
1	Seal/stripe parking lot, Replace vanity cabinets and medicine cabinets, replace wood fascia and vinyl siding where needed	Westford Townhomes	D	-Critical Systems beyond their useful life	\$110,046	FY 2022
2	Seal/stripe parking lot	Rosedale Manor Apartments	D	-Critical Systems beyond their useful life	\$71,431	FY 2022
3	Seal/stripe parking lot, Replace HVAC's on the 1st floor	Greenwood Apartments	D	-Critical Systems beyond their useful life	\$327,157	FY 2022
Total					\$508,634	
4	Refurbish catwalks and garden area concrete, replace vanity cabinets and tub surrounds	The Atrium Apartments	C	Life cycle repairs where repairs are no longer cost effective	\$89,733	FY 2023
5	Replace sliding glass doors, paint exterior and balconies	Ragan Oaks	C	Life cycle repairs where repairs are no longer cost effective	\$106,838	FY 2023
6	Replace vinyl siding	The Park	C	Life cycle repairs where repairs are no longer cost effective	\$27,104	FY 2023
7	Replace metal fencing Replace balcony panels, replace brick veneer	Rosedale	C	Life cycle repairs where repairs are no longer cost effective	\$41,203	FY 2023
8	Replace 5 rear sliding glass doors and 9 front entrance doors and shingles	Waters Edge	C	Life cycle repairs where repairs are no longer cost effective	\$40,425	FY 2023
9	Replace cabinets, countertops, shingles and HVAC units	Westglade	C	Life cycle repairs where repairs are no longer cost effective	\$118,029	FY 2023
10	Replace 5 HVAC units	Colchester Condominiums	C	Life cycle repairs where repairs are no longer cost effective	\$40,000	FY 2023
11	Paint exterior, Replace asphalt shingles, replace common area heat pump, replace kitchen cabinets	Greenwood Apartments	C	Life cycle repairs where repairs are no longer cost effective	\$270,000	FY 2023
12	Replace bathroom vinyl sheet flooring, replace entrance doors	Kingsley Park Townhomes	C	Life cycle repairs where repairs are no longer cost effective	\$114,240	FY 2023
13	Replace vanity cabinets, replace vinyl siding where needed, medicine cabinets and refrigerators	Westford	C	Life cycle repairs where repairs are no longer cost effective	\$81,764	FY 2023
Total					\$929,336	
Grand Total					\$1,437,970	

Wastewater Infrastructure

There are 2 major infrastructure systems, within the Wastewater System: the Collection System consisting of sewer pipes, manholes, and pump stations, and the Noman Cole Pollution Control Treatment Plant. In any given year, the amount programed for infrastructure replacement and upgrades in each area may vary based on specific project schedules; however; staff is attempting to manage the system on a programmatic basis over a ten-year period.

The Collection system consists of approximately 3,250 miles of pipe, 94,000 manholes, and 63 wastewater pump stations. Approximately 70 percent of the system is 30 years or older. In the late 1990s, the County began a significant reinvestment program by relining existing pipes utilizing a trenchless technology called cured-in-place-pipe (CIPP). Approximately 20 percent of the system has been rehabilitated utilizing this technology, primarily on the smaller, 8" to 15" lines. In recent years, the program has been expanded to include inspection and rehabilitation of the larger trunk lines. Each of the System's 63 stations typically has multiple pumps for peak flows and emergency backup, motors associated with the pumps, a backup generator, a force main, electrical control equipment, communication equipment for monitoring and remote operation, and a building or other

Countywide Infrastructure Replacement Requirements

housing structure. County staff monitor the condition of each asset at each pump station and attempt to schedule rehabilitation or replacement before failure. Each pump station is also monitored as a unit, and prior to replacing a major component, an in-depth review is completed to determine if rehabilitation or replacement of other component systems are required at the same time. The 10-year financial plan (FY 2023 - FY 2032) includes a continual increase in funding for collection system rehabilitation with an average of \$71.5 million per year for reinvestment, rehabilitation, and expansion of these facilities. With this gradual ramp up and based on current information, this component of the system is currently fully funded. Failures in either the collection system, pump stations, or treatment plant will likely result in discharges of untreated raw sewage into basements or streams; therefore, all these systems are considered critical. As a result, the wastewater rates are reviewed each year and the 10-year financial plan is reviewed and updated to ensure adequate funds are programed to safely maintain and operate the systems.

At the Noman Cole Treatment Plant, there are over 4,000 assets monitored making up 32 major operating systems such as Odor Control, Primary Treatment, and others. Each operating system consists of many components, such as pumps and concrete tanks. Redundancy is built into all critical systems to allow for maintenance. The condition of each component is monitored during routine maintenance checks as well as by the age of system. Based on age and condition, reinvestment schedules are determined. Currently, in the 10-year plan, there is an average of \$82.3 million per year programmed for treatment plant capital improvements, the majority is for replacement and rehabilitation. Based on current information, the appropriate reinvestment amounts are being funded.

At this time, based on current information, there is not a funding gap to safely operate the wastewater systems. Annual infrastructure replacement and upgrades throughout the Wastewater system are reflected below:

INFRASTRUCTURE REPLACEMENT AND UPGRADE REQUIREMENTS: WASTEWATER FACILITIES						
PRIORITY	PROJECT TYPE	FACILITY	CATEGORY	EXISTING CONDITIONS/DEFFICIENCIES	ESTIMATE	Funding Status
1	Collection System	Countywide	C	Projected lifecycle is 30 years	\$71,470,000	Annual Requirement
2	Treatment Plant Improvements	Noman Cole Pollution Control Plant (NCPCP)	C	Projected lifecycle is 30 years	\$82,335,000	Annual Requirement
	Total				\$153,805,000	

It should be noted that the Sanitary Sewer System also has an established Capital Reinvestment Reserve which is intended to address both anticipated and unanticipated increases within the Capital Improvement Program. This reserve provides for significant rehabilitation and replacement of emergency infrastructure repairs. A reserve of 3.0 percent of the five-year capital plan is consistent with other utilities and is recommended by rating agencies. Based on the total five-year capital plan, an amount of approximately \$30 million would be required to reach 3.0 percent. The Sanitary Sewer System is currently maintaining a reserve of approximately \$50 million.

Countywide Infrastructure Replacement Requirements

Stormwater Infrastructure

There are two major infrastructure systems associated with the stormwater program: the Conveyance system including pipes, manhole inlets, and open channels, and the management facilities including bio retention, infiltration, wet and dry ponds, porous pavements, manufactured devices, and other items used to improve water quality or manage water quantity. There are currently 1,500 miles of pipes and improved channels, and approximately 69,000 manholes and inlets. The pipes range in size from 12 to 84 inches and are made with reinforced concrete, corrugated metal, or plastic. The life of the system varies with the material type and the original construction practices, but the general estimated lifecycle is 50-75 years. A study indicated the County should invest an estimated \$16 million per year in rehabilitating or replacing the existing system on about a 70-year cycle.

The County currently maintains approximately 7,900 stormwater management facilities ranging from small rain gardens to large flood control dams. Reinvestment projects vary in scope and size; many of them include replacement of plant materials as part of the treatment process for dredging the larger lakes and ponds. As the routine and life cycle operating procedures for many of these facilities are still being developed, a good life cycle cost model does not exist. The County has prepared estimates based on recent dredging experiences as well experiences with “green” infrastructure facilities and estimates an annual program expense of \$16.6 million. Because the plant material is an active component of the “green” infrastructure and because routine maintenance relates directly to the life and function of the facility, the \$16.6 million estimate includes both annual operating expenses as well as capital expenses, such as dredging and dam repair.

A rate of \$0.0400 per \$100 of assessed value has been estimated to be required to fully support the stormwater program in the future; however, staff is currently evaluating the long-term requirements for the program to address the growth in inventory and other community needs. Some of the additional community needs under evaluation include debt service to support the Board’s approval of the dredging of Lake Accotink, the anticipation of additional flooding mitigation requirements, and strengthening the role and financial support for the implementation of stormwater requirements associated with Fairfax County Public Schools sites under renovation. This enhanced program may require incremental changes to the rate over time and may result in a higher rate to fully support the program. Staff will continue to evaluate these requirements, as well as the staffing to support them, and analyze the impact of increased real estate values and revenue projections.

While staff continues to further evaluate the impact of recent initiatives and the long-term requirements for the Stormwater Program, the FY 2023 rate is proposed to remain the same as the FY 2022 Adopted Budget Plan level of \$0.0325 per \$100 of assessed value. Actual revenue collected in recent years has been higher than projected as a result of increases in property values throughout the County. Based on capital project costs and projected revenues, it is anticipated that in the next several years, incremental rate increases will be required based on continued growth of stormwater facilities and infrastructure that must be inspected and maintained by the County, the implementation of flood mitigation projects, and additional requirements in the forthcoming Municipal Separate Storm Sewer System (MS4) permit. On an annual basis, staff will continue to evaluate the program, analyze future requirements, and develop Stormwater operational and capital resource needs.

Annual infrastructure replacement and upgrades for the County’s Stormwater Facilities are reflected below:

Countywide Infrastructure Replacement Requirements

INFRASTRUCTURE REPLACEMENT AND UPGRADE REQUIREMENTS: STORMWATER FACILITIES						
PRIORITY	PROJECT TYPE	FACILITY	CATEGORY	EXISTING CONDITIONS/DEFFICIENCIES	ESTIMATE	Funding Status
1	Conveyance System	69,000 structures and 1,500 miles of pipes	D	Lifecycle is 50-75 years	\$16,000,000	Annual Requirement
2	Stormwater Management Facilities	2,400 county facilities including 20 state regulated dams and 5,500 private facilities	C	Projected lifecycle is 35 years	\$16,600,000	Annual Requirement
	Total				\$32,600,000	

Revitalization Infrastructure

The Board of Supervisors defines five geographical boundaries as Commercial Revitalization Districts (CRDs): Annandale, Baileys/Seven Corners, McLean, Route 1, and Springfield. The County implements an ongoing enhanced maintenance program in all CRDs to improve the economic vitality, appearance, and function of these revitalization areas. Routine maintenance includes mowing, weeding, edging, mulching, pruning, leaf removal, litter pick-up, sidewalk/street sweeping, and monthly inspections of approximately 821,000 square feet of landscaped areas. Non-routine maintenance projects include, but not limited to, replacing or repairing pavers, sidewalks, street furnishing, streetscaping, and bus shelters are completed as needed. Asset-based CRD projects such as sidewalk and bus shelter replacement utilize the sinking fund. Current projects include the Route 50 Pedestrian Bridge Stairwell Redesign to provide a safer, cleaner passage through a pedestrian bridge, the Springfield CRD Stormwater Pilot project evaluating the feasibility/options to implement a stormwater facility within the CRD streetscape, and replacing sidewalks in several CRDs.

The enhanced maintenance program is also implemented at assets constructed as part of Phases 1 and 2 of Metro Silver Line. Work includes plant maintenance, mowing, edging, mulching, weeding, and trash removal routinely performed at 27 bioretention facilities, 145 tree boxes, and Metro commuter facilities. Commuter facility maintenance also includes pavement replacement, striping, and snow removal.

Staff continues enhancing the appearance, functionality, and sustainability of CRD streetscape and infrastructure and continues supporting the long-term goal of expanding the enhanced maintenance program to all streetscape and walkways within the entirety of each CRD boundary.

Transportation Infrastructure

The County maintains an assortment of transportation infrastructure that has not been accepted into VDOT's system for maintenance. These infrastructure items include bus shelters, street name signs, trails, sidewalks, and pedestrian bridges. The trails and sidewalks provide pedestrian access to commuter facilities or are constructed for the recreational use of County residents and visitors. The County also maintains various roadways that have not accepted into VDOT's secondary roadway system.

Countywide Infrastructure Replacement Requirements

Bus Shelters

The County maintains approximately 181 bus shelters. The focus of the infrastructure replacement and upgrade program is to complete repairs to damaged shelters. A fully funded program would include cleaning, trash collection, and reinvestment. Some of the cleaning and trash collection is provided by the Office of the Sheriff's Community Labor Force. Annual funding is used to address safety related issues. If there is not adequate funding to perform these tasks, damaged shelters are removed until funding is identified. Some shelters are in need of replacement and a sustainable program to replace shelters on a 20-year cycle estimating \$20,000 per shelter, is \$208,000. This level of funding would replace approximately 10 shelters per year.

Street Signs

As part of the 911 emergency system, all roads are required to have a name and street sign to assist emergency response personnel. These signs are not maintained by VDOT and are the responsibility of the County. There are approximately 40,000 signs at 20,000 intersections in the current inventory. The County currently replaces street signs only when they are damaged beyond repair. Over time, signs lose their reflectivity and become more difficult to read at night. It is estimated that if the signs are replaced on a 20-year cycle, the average annual capital cost would be \$665,000.

Walkways

The County manages the infrastructure replacement and upgrades of 662 miles of walkways and 78 pedestrian bridges valued at an estimated \$220 million, based upon an assessment and study performed by Rinker Design Associates in 2013. Projects are prioritized based on condition as well as pedestrian usage. The Rinker Study was conducted in order to build an accurate inventory and condition assessment of County walkways and revealed that there were approximately 10 miles of trails in extremely poor condition requiring \$3 million in initial reinvestment. The Sinking Fund allocation has provided \$10.3 million to date for reinvestment in these most critical trail needs and continues to provide for trails that have since been identified as deteriorating. The Rinker Study did not include an assessment of pedestrian bridges and sinking fund allocations have enabled some progress in this area. However, pedestrian bridges are being inspected in accordance with National Bridge Inspection Standards to determine repair needs. Since 2013, sidewalk and trail repair and replacement has been on going. A re-assessment of trails and sidewalks is in the planning stages, using current technology and computer software. It is anticipated that this re-assessment of walkways will commence in FY 2023. In addition, a 5-year plan was developed identifying annual emergency funds to increase over time to a level of \$800,000. Annual critical repairs include the correction of safety and hazardous conditions, such as damaged trail surfaces, retaining wall failures, handrail repairs, and the rehabilitation of bridges. FY 2023 funding of \$1,000,000 has been included for both reinvestment efforts and the updated assessment study. Assuming an average service life of 50 years for concrete sidewalks and 25 years for asphalt and bridges, a fully funded reinvestment program is estimated at \$5.4 million annually. In the last several years, the sinking fund program has more than doubled the amount being invested in walkways and bridges.

Countywide Infrastructure Replacement Requirements

County-Owned Roads

The County is responsible for emergency safety and road repairs to 38 miles of County-owned roads, service drives, and County-owned stub streets which are currently not accepted in the Virginia Department of Transportation (VDOT) highway system for maintenance. This infrastructure is valued at over \$230 million. In 2015, a Rinker Study was conducted in order to build an accurate inventory and condition assessment of County-owned roads and service drives and identified an amount of \$4 million in reinvestment funding required for the roadways with the most hazardous conditions. The Sinking Fund allocation has provided \$8.2 million to date for reinvestment in the most critical needs and continues to provide for roads that have been identified as deteriorating. In addition, a 5-year plan was developed identifying annual emergency funds to increase over time to a level of \$900,000. Annual funding supports pothole repair, drive surface overlays, subgrade repairs, curb and gutter repairs, traffic and pedestrian signage repairs, hazardous tree removal, grading, snow and ice control, minor ditching and stabilization of shoulders, and drainage facilities. Based on the pace of spending to date and project requirements, funding of \$500,000 has been included for this program in FY 2023. A fully funded reinvestment program is estimated at \$6.2 million annually.

Summary of Transportation Infrastructure	
Program Area	Annual Amount
Bus Shelters	\$208,000
Street Signs	\$665,000
Walkways	\$5,400,000
County-owned Roads	\$6,200,000
Total	\$12,473,000

Capital Sinking Fund

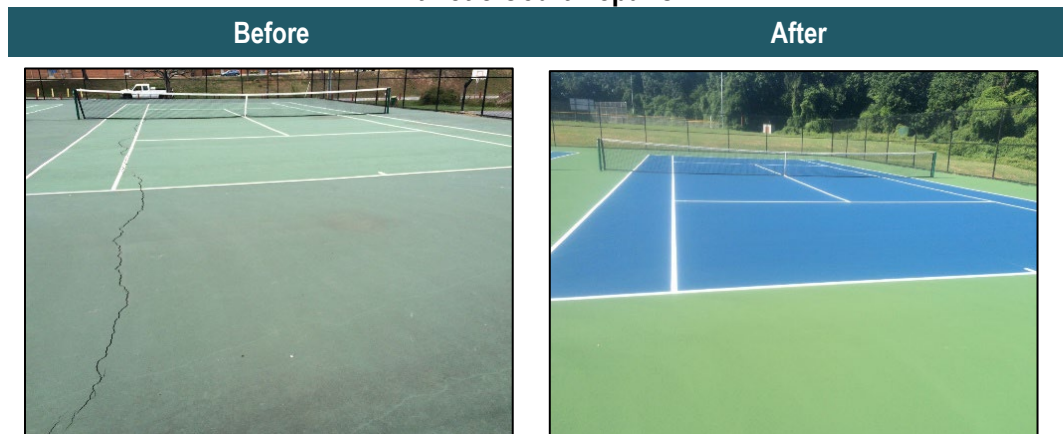
In April 2013, the County and School Board formed a joint committee, the Infrastructure Financing Committee (IFC), to collaborate and review both the County and School's Capital Improvement Program (CIP) and infrastructure upgrade requirements. One of the goals of the Committee was to develop long-term 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. One of the components of the Final IFC Report included support for a capital sinking fund which would be populated each year as part of the Carryover Review based on 20 percent of the available year end balances. Funding was to provide for infrastructure replacement and upgrades, such as replacement roofs, electrical systems, HVAC, and other facility requirements. The Board of Supervisors first approved the establishment of the IFC recommended Capital Sinking Fund as part of the *FY 2014 Carryover Review*. The Board of Supervisors also approved the allocation of the total sinking fund based on specific percentages for each infrastructure area, including: 55 percent for FMD, 20 percent for Parks, 10 percent for walkways, 10 percent for County roads and service drives, and 5 percent for revitalization. On December 7, 2021, the Board of Supervisors approved the recommendations of a new Joint Board of Supervisors/School Board CIP Committee which includes a recommendation to increase the year end allocation to the Sinking Fund to 30 percent and include FCPS in the distribution of funds. It is anticipated that this change will go into effect as part of the *FY 2022 Carryover Review*. The following table includes the allocation of Capital Sinking funds to date.

Countywide Infrastructure Replacement Requirements

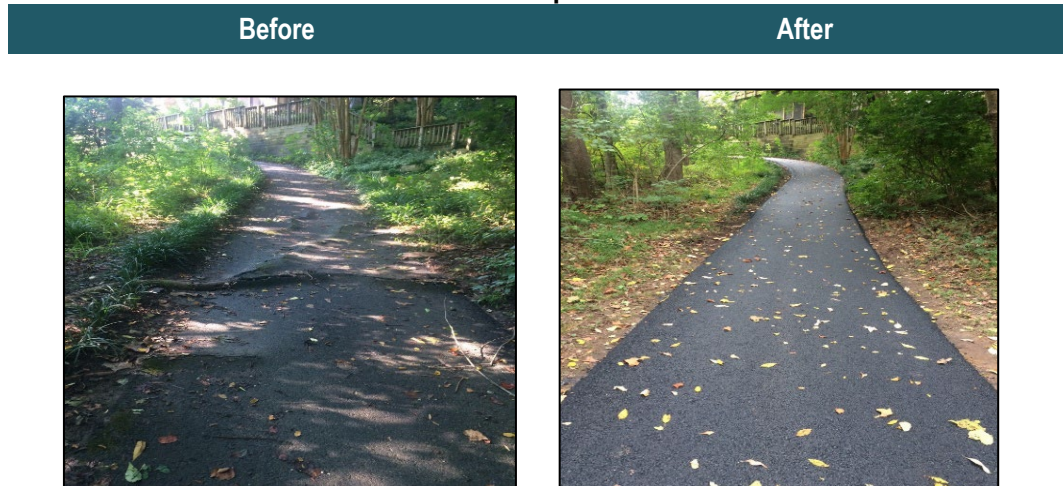
Program Area	Total Allocated to Date
FMD	\$49,128,260
Parks	\$17,864,821
Walkways	\$10,286,834
County Roads	\$8,159,557
Revitalization	\$3,884,630
Total	\$89,324,102

The breadth of the infrastructure upgrades and benefits of the sinking fund allocations can be seen in significant accomplishments throughout the County. Many projects have been initiated or completed in all of the program areas. Below are some examples of Capital Sinking Fund projects:

Athletic Court Repairs



Trail Repairs



Countywide Infrastructure Replacement Requirements

Roof Replacement

Before



After



Generator Replacement



Road Repairs

Before



After

