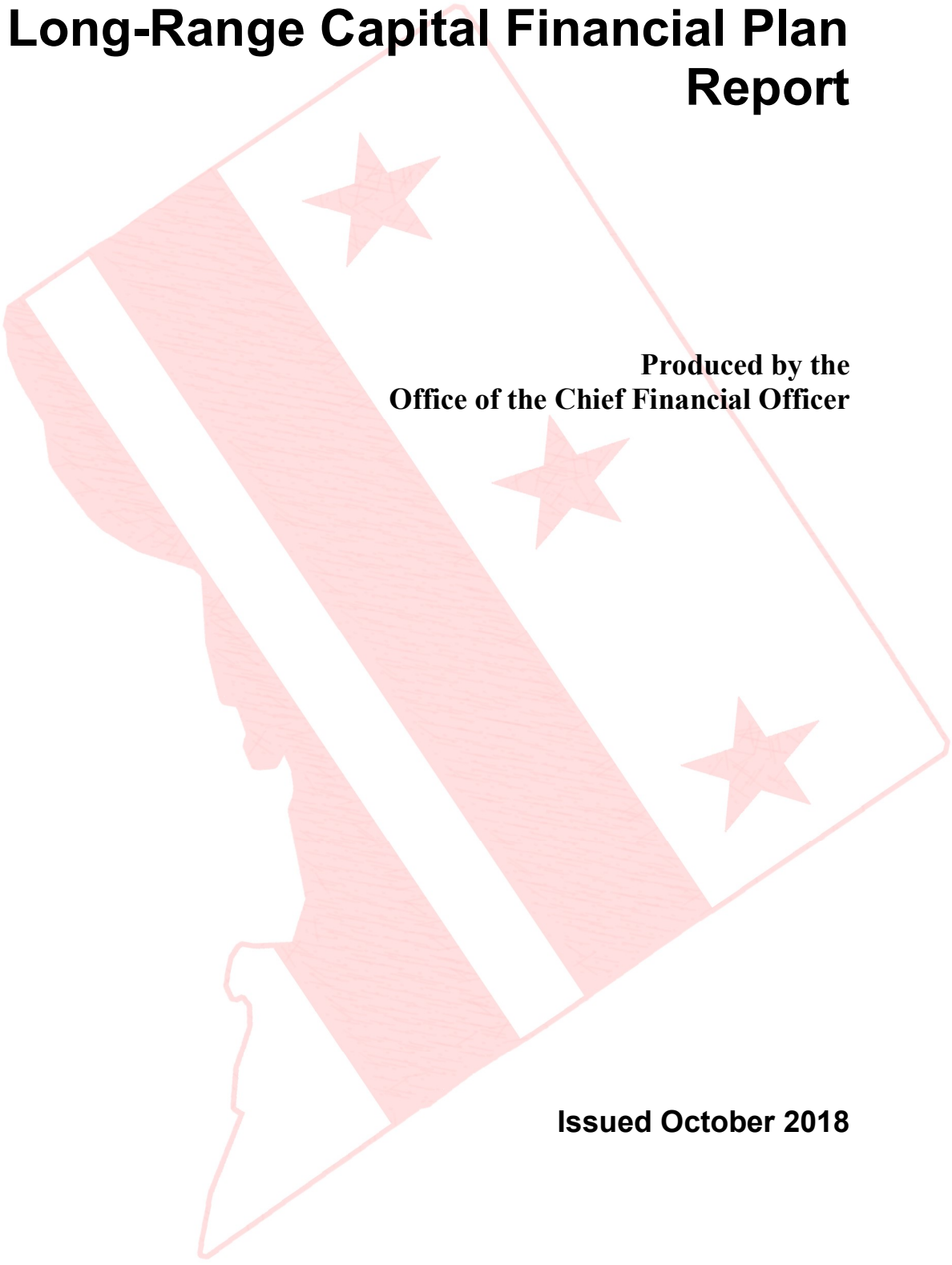
Government of the
District of Columbia

District of Columbia Long-Range Capital Financial Plan Report



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District of Columbia: Long-Range Capital Financial Plan Report

Executive Summary

As part of the Fiscal Year (FY) 2015 Budget Support Act, the Council of the District of Columbia included a requirement for the Office of the Chief Financial Officer (OCFO) to develop a replacement schedule for capital assets and report its status in October of each year. As a result, the OCFO developed a long-range capital financial plan for the District that includes capital asset replacement needs beyond the normal six-year capital planning period. This report is intended to assist the Mayor, Council, agency directors, other policymakers and the public in understanding the size of the District's capital infrastructure funding gap, and how this funding gap might be addressed over time using new long-range financial planning tools developed for capital planning. This report serves as an update on the progress of the long-range capital financial plan since the prior report issued in October 2017.

Infrastructure Financing Gaps

Funding for critical infrastructure and deferred maintenance has increasingly become a greater priority for state and local governments across the country. However, given the growth in legacy costs, coupled with tepid revenue growth and lackluster participation from the federal government, the ability to fully address this issue has not usually existed. In fact, in order for many states to remain in compliance with their statutory requirements for balanced budgets, many governments have deferred critical capital maintenance in favor of more immediate financial needs such as pension obligations or labor costs. As a result of this long-term trend of state and local governments to defer asset maintenance, in 2017 the American Society of Civil Engineers (ASCE) published its most recent *Infrastructure Report Card*: A Comprehensive Assessment of America's Infrastructure, which grades the current state of the nation's infrastructure. While some progress has been made towards greater investment in the nation's infrastructure since the group's last report four years earlier, it has not been sufficiently adequate to address the years of chronic underinvestment. In fact, much like in 2013, the nation's infrastructure earned an overall grade of D+ on an "A to F" scale. The District of Columbia, like the rest of the nation, faces challenges in maintaining its critical infrastructure, and in 2016 the ASCE issued its Report Card for D.C.'s Infrastructure. The report concluded that while the District earned a slightly higher overall grade (C-) than the nation at large, the District's infrastructure was also in need of greater investment in basic maintenance and increased innovation to bring the infrastructure of the nation's capital to a state of good repair.

Public infrastructure is a critical responsibility of governments at all levels. Whether it is new facilities to meet the needs of residents or maintaining current assets such as roads, streets, schools, libraries and other public buildings, infrastructure is critical to quality of life and economic prosperity. Over the six-year capital planning period, the District plans to fund more than $8.2 billion in capital projects, with approximately $5.3 billion of that amount funded from selling municipal bonds (debt financing). However, the District's overall need for new or replacement facilities and maintenance of existing facilities far exceeds this funding level. Like any other enterprise, the District has limits on how much it can borrow and must strike an appropriate balance between funding its on-going operations (programs and services) versus capital assets.

Fortunately, the District's strong financial condition puts it in a far better position to address these issues than most other cities and states. Due to prudent financial management practices over the

last twenty years, the District has fully funded pensions, strong reserves and strong credit ratings that afford it access to low-cost financing. Strong local and regional economic growth has also provided additional financial capacity over time, as tax and fee revenues have grown. Finally, a significant portion of past borrowings can be refinanced in the coming years, providing additional capacity to support capital needs.

The infrastructure needs of the District, which serves as a city, state, county and school district, are substantial. In order to develop a better understanding of the costs for the District to maintain its assets in a state of good repair, a comprehensive asset management planning system was developed for all of the District's assets. The Capital Asset Replacement Scheduling System, or CARSS, is an asset management planning solution that delivers a comprehensive view of the District's capital asset health and provides information on each project or asset. CARSS was designed to answer four fundamental questions:

1. What assets does the District own?
2. What is the condition of those assets?
3. How should the District prioritize its capital needs?
4. How much funding is available to address those needs?

To determine the District's total capital needs, a comprehensive review of all governmental agencies' capital and asset maintenance requirements was completed utilizing CARSS, with each project scored and ranked to ensure that the highest priority projects were funded first. Since the first Long-Range Capital Financial Plan Report was published in 2016, the percentage of assets inventoried in CARSS has increased from 14% to 100% of all District assets. In addition, facility condition assessments have been either completed, or are in progress, on all assets captured in CARSS. ***Arguably, CARSS is the most comprehensive and detailed capital asset management system of any city or state government in the country.*** *Please refer to* ***Appendix A*** *for a more detailed discussion of the development of CARSS.*

In conjunction with the development of CARSS, the District also developed a separate long-range financial forecasting model, which can determine the optimal capital funding mix, within certain financial constraints, including debt capacity, pay-as-you-go (paygo) or cash funding, as well as federal or other grant funding. Capital projects were also analyzed to determine where the private sector may assist in addressing future infrastructure challenges through public-private partnerships, or P3s. Separate but similar modeling tools were developed to determine the long-term capital funding needs of the Washington Metropolitan Area Transit Authority (Metro), which was crucial in developing a regional consensus to provide additional, dedicated funding to Metro that was subsequently approved by all of the compact jurisdictions in 2018.

As previously discussed, the District is able to fund approximately $8.2 billion of its capital needs through 2024. During that same time period, however, there is an additional $3.3 billion in capital projects that exceed the District's financial capacity. Roughly 38% of this gap is related to infrastructure maintenance, or re-investment in currently owned assets. Although it remains sizable, tremendous progress has been made over the past year in closing the gap. Last year's long-range capital financial plan report identified a capital funding gap of $4.2 billion, which did not include the anticipated capital funding gap for Metro ($2.3 billion) or other District capital projects expected to be structured as P3s ($1 billion to $1.5 billion). This would have made the *actual* total funding gap in last year's report closer to $7.5 billion to $8 billion. With the significant increase in the FY2019-2024 CIP over the prior year, along with additional funds generated from new revenues dedicated to capital funding for Metro to return the system to a state of good repair, the *actual* capital funding gap was reduced to approximately $3.3 billion during the current CIP period

Table 1 below summarizes the primary capital funding needs gap, which averages approximately $542 million per year, or roughly seven percent (7%) of the District's Local Fund revenues.

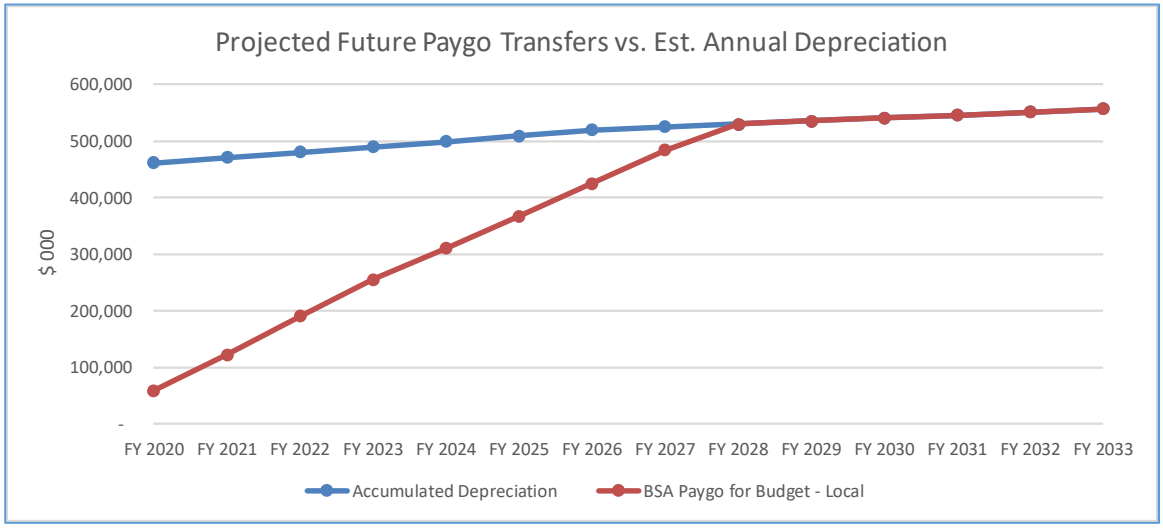
Table 1.

(in $ millions)

Fiscal Year	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	6 Year Total
Unfunded Capital Maintenance Projects	285.30	272.66	269.20	212.94	100.64	78.88	1,219.61
Unfunded New Capital Projects	236.01	253.16	320.80	706.38	360.18	154.01	2,030.54
Total Unfunded Capital Needs	$521.3	$525.8	$590.0	$919.3	$460.8	$232.9	$3,250.2

In Fiscal Year 2017, the District Council adopted legislation to increase the amount of paygo provided to support capital program needs as part of the FY 2018 Budget Support Act *(see the "Paygo Funding" section of this report for more details)*. Under the new law, the amount of additional funding contributed to paygo would rise annually from a base year in 2020, until it is eventually capped at the amount of annual depreciation, as can be seen in *Figure 1* below, which illustrates the prescribed, anticipated increases in paygo compared to annual depreciation, which is forecast to grow at two percent (2%) annually. Based on the September 2018 quarterly revenue estimates, over the fifteen-year period studied in this report, that would result in average transfers to paygo of nearly $369 million annually. The District's current financial plan, which extends through FY 2022, includes the impact of the increased paygo levels as a result of this new legislation.

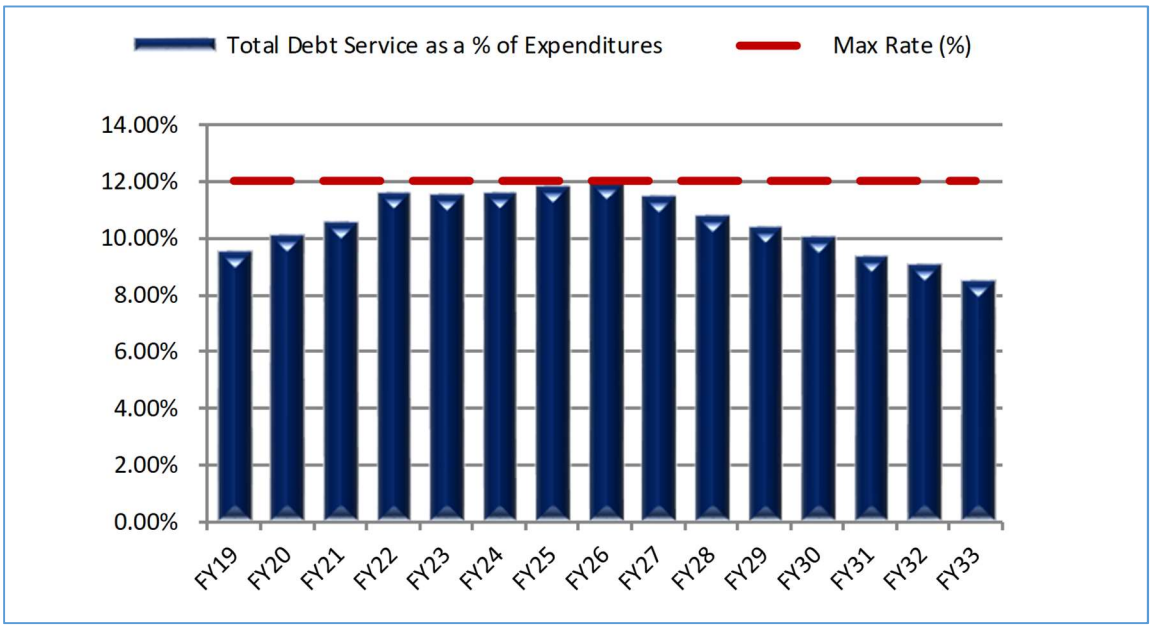
Figure 1.



The increased paygo levels, coupled with additional debt capacity as existing debt is retired, as well as a growing economy, would enable the District to fund all identified and unmet capital needs by FY 2028. As stated earlier, while the current six-year CIP greatly increases funding over the prior CIP, there still remains $3.3 billion of identified, unfunded capital needs during the current CIP period. These unfunded capital needs would remain outstanding through FY 2024, since the current six-year CIP is at full capacity. However, beginning in FY 2025, assuming no new capital projects are added to the CIP until all identified unfunded capital needs are met, the District could begin

paying down the identified unfunded capital needs fairly rapidly, and stay on course to meet its goal of funding all unmet capital needs by FY 2028. If the projected amounts of paygo spending on capital are reached, it would considerably change the mix of how the District funds its capital improvement program. In fact, by FY2027, nearly 50% of all CIP funding would come from paygo to complete the backlog of CIP projects. This funding of deferred maintenance needs, largely from current resources, would allow future debt capacity to be redirected to new capital projects needed to support the District's growing population. In fact, as can be seen in *Figure 2* below, total debt service as a percentage of expenditures is expected to begin decreasing in 2027 and thereafter, which should produce substantial additional borrowing capacity for future capital projects needed in a growing and vibrant city.

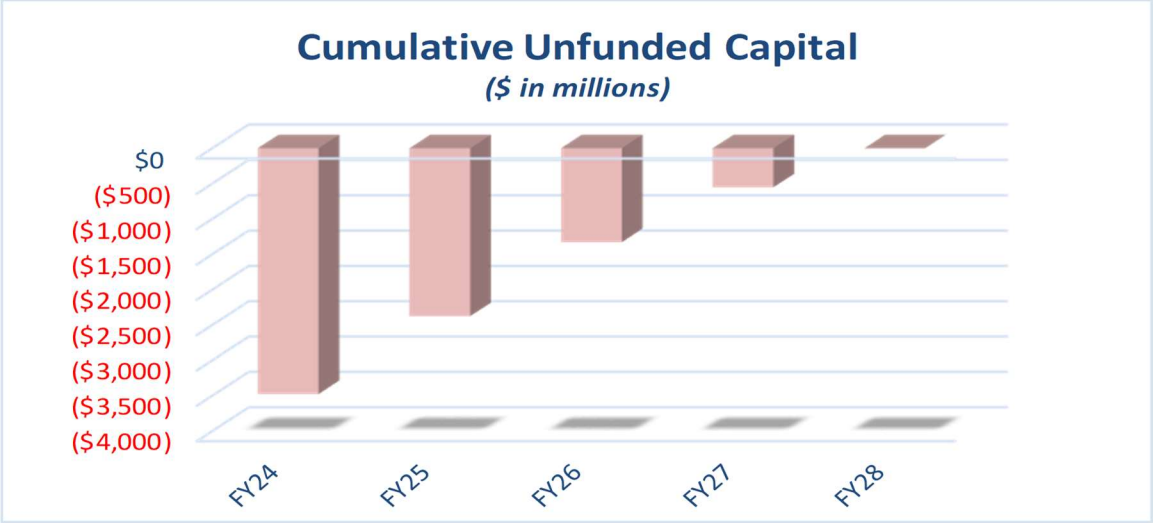
Figure 2.



It is important to note that the estimated increases in paygo from local funds shown in *Figure 1* represent significant portions of the projected local funds revenue growth of the District. Allocating this level of additional paygo funding is not without challenges, since capital projects compete with programmatic priorities for funding, however, properly maintained equipment and facilities will, over the long-term, result in lower life-cycle costs and increased resources for other District programs. Other options to increase paygo, such as additional federal funding or a new dedicated funding source, might also assist in addressing the District's unfunded capital needs. It is important to remember, however, that a large portion of the growth in paygo funding represents amounts now dedicated to Metro under legislation passed by the District in 2018. The addition of these new revenues should allow the District to meet its increased commitment to funding capital while allowing reasonable program growth.

Given the substantially-higher projected amounts of paygo funding for capital *(as seen in Figure 1)*, as well as fully utilizing the District's borrowing capacity *(as seen in Figure 2)*, the long-range capital financial plan model now estimates that the District will be able to "catch up" and fund all existing unfunded capital projects identified in CARSS, while continuing to maintain current assets, by FY 2028.

Figure 3



This would allow all District assets to reach a state of good repair, while also addressing new unfunded capital projects needed to support a growing city. In other words, the $3.3 billion of capital needs not funded in the six-year CIP could be funded by 2028 with the increased paygo levels required in legislation, as well as borrowing up to the 12% statutory debt cap limit. Funding of the gap could be further accelerated through additional paygo resources or other monies, such as federal funds, that might become available, as well as through the use of non-traditional funding structures, such as P3s.

This long-range capital financing plan provides information that can inform policy discussions regarding long-term capital needs and the strategies to address these needs. The District has taken a leadership role in the region by responsibly funding its portion of the new, dedicated funding for Metro, which is an important economic engine for the Washington Metropolitan region. This act alone has effectively solved a significant portion of the capital funding gap previously identified in the 2017 report. In addition to the agreed upon funding for Metro, public-private partnerships should also be prudently pursued for those projects where cost-effective. Finally, over the next several years, funding from federal sources, reallocation of District resources, and/or new revenue sources need to be directed to paygo funding to fully address needed infrastructure, including maintenance of existing District assets. This would place the District in an enviable position compared to other cities and states in addressing long-term infrastructure needs that are a challenge throughout the country.

District of Columbia: Long-Range Capital Financial Plan Report

Introduction

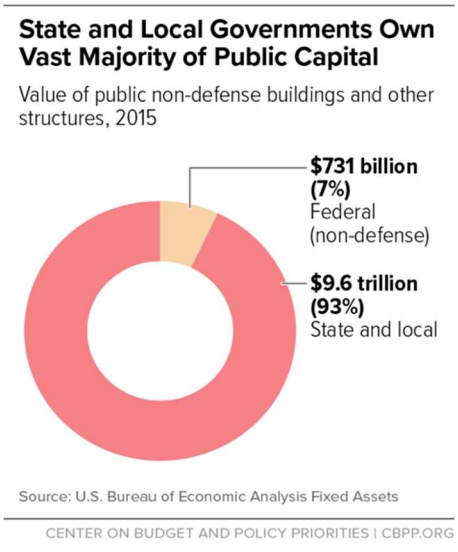
As part of the Fiscal Year (FY) 2015 Budget Support Act, the Council of the District of Columbia (Council) included a requirement for the Office of the Chief Financial Officer (OCFO) to develop a replacement schedule for capital assets and report on its status in October of each year. This report meets this requirement by reporting on the development of a long-range capital financial plan for the District of Columbia ("District") that includes capital asset replacement needs. This report also satisfies an initiative included in the OCFO's strategic plan, released in August 2014, which called for the development of a long-range capital financing plan for the District. Therefore, the legislative requirement introduced by the Council coincided with, and is complementary to, the necessary work in support of the OCFO's strategic initiative that had already begun. In addition, this report serves as an update on the progress of the Capital Asset Replacement Scheduling System (CARSS), which now includes more detailed information on the individual assets of the District.

Purpose of the Report

This report is intended to assist the Mayor, Council, other policymakers and the public in understanding the size and scope of the challenges facing the District in identifying its capital infrastructure funding gap during the current CIP period and beyond, as well as to present potential funding solutions through the development of a long-range capital financial plan. In addition, the development of a long-range capital financial plan will also allow the District to have a truly data-driven and more transparent CIP process. Finally, the long-range capital financial plan will help policy makers understand the true costs of maintaining the District's current assets, as well as the costs of deferring maintenance, so that capital budgeting decisions can be better informed and justified.

Background

State and local governments own the vast majority of public infrastructure in the United States, and therefore, bear the lion's share of responsibility for maintaining these critical assets. In fact, a report from the Center on Budget and Policy Priorities, which analyzed data from the U.S. Bureau of Economic Analysis, showed that as of 2015, state and local governments owned $9.6 trillion (or 93%) of all public non-defense buildings and other structures in the U.S. This fact highlights the scope of the challenge facing state and local governments as they are charged with maintaining this vast array of assets, all while federal spending on infrastructure has continued to decline.



Further reinforcing the primary role of state and local governments in funding and maintaining the nation's infrastructure, a report published by S&P Global Market Intelligence in May 2018, stated that, *"There has been no shortage of studies and statistics that quantify the gap in spending needed for the U.S. to regain its status as a nation with world-class infrastructure. But the policy*

discussion on the woeful condition of U.S. infrastructure often overlooks that much of it is owned and operated by state and local governments."[1] Further, the report states that, *"Deferred maintenance is a symptom of the general crowding out of government budgets by fixed obligations and of the reality that, following the Great Recession, GDP growth has been sluggish."* In fact, *"State and local governments across the country acknowledge that in tight fiscal times, deferring maintenance can help close budget shortfalls—but it is supposed to be a temporary tool."*[1]

Given limited resources due to sluggish revenue growth and growing legacy obligations such as employee pensions and retiree healthcare liabilities, many state and local governments have chosen the path of least resistance and decided to defer needed infrastructure investments. In fact, the American Society of Civil Engineers (ASCE) published its most recent *Infrastructure Report Card* in 2017, which graded the current state of the nation's infrastructure as D+ (or poor) due to many of these very practices. Over the long term, the lack of adequate investment in infrastructure by federal, state and local governments threatens to harm both the local and national economies.

A 2017 report from The Volcker Alliance further stated that, *"Even the nation's third-longest economic recovery since 1858 has not been powerful enough to ward off fiscal crises for many states. Weak revenue growth is making it ever harder for states to pay the bills being run up for neglected infrastructure, education, and public worker pensions and retiree health care, among other obligations. These unpaid bills almost certainly exceed the $2.2 trillion in states' annual revenues, and states may opt for pushing such debts to future generations in order to keep their annual or biennial budgets balanced in accordance with constitutions, statutes, or traditions."*[2] The report goes on to state that, *"Declaring a budget balanced while omitting the long-term costs of maintaining infrastructure is not unlike a failure to fund promised pensions. Unless a state ends up closing its roads and bridges, it eventually will be forced to come up with the money to maintain its assets."*[2]

Fortunately, the District does not face the large pension and retiree health care liabilities facing many other state and local governments, but the District mirrors the experience of other jurisdictions in its deferral of necessary investment in capital infrastructure in favor of other competing priorities. In 2016, the ASCE released an infrastructure report card focusing solely on the infrastructure of the District, and while its overall grade (C-) was slightly better than the national grade (D+), it is still far from adequate. The District faces significant challenges in being able to balance the need to maintain and repair aging, existing infrastructure, while also making needed investments to keep pace with the demand for new infrastructure brought on by continued population growth with the need to direct limited resources to critical programs.

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[1] "Between a Budget and a Hard Place: The Risks of Deferring Maintenance for U.S. Infrastructure," S&P Global Market Intelligence. May 15, 2018.

[2] "Truth and Integrity in State Budgeting," The Volcker Alliance. November 2, 2017.

Estimate of Capital Funding Gap

There were several challenges in accurately assessing the size and scope of the capital infrastructure funding gap of the District, including creating an accurate inventory of the number and condition of all District-owned assets; estimating their related costs of repair or replacement; assessing future capital infrastructure needed to support continued growth of the city; understanding which capital projects might be funded through the use of public-private partnerships or other non-traditional financing sources; and determining the future capital needs of the Washington Metropolitan Area Transit Authority (Metro). Working closely with agencies within District government to gather information on the District's assets, the OCFO was able to estimate the total potential capital infrastructure needs of the District (both capital maintenance and new projects) to be approximately $14 billion over the next decade. A significant portion of this amount represented the District's share of additional projected funding needed for Metro, which has subsequently been addressed through new dedicated revenues that were approved by the District in 2018. Although the amounts needed to properly address all of the infrastructure needs of the District are substantial, in general, for the District, the issue is less one of affordability, but more the period of time over which these capital needs will be funded.

The District's Approach to Asset Management

In the attempt to develop a better understanding of the costs of maintaining the District's critical capital infrastructure, a comprehensive asset management planning system had to be developed for all of the District's assets. The Capital Asset Replacement Scheduling System, or CARSS, was developed to address this need. In determining how to go about structuring CARSS, the District set out to answer four fundamental questions:

1. What assets does the District own?
2. What is the condition of those assets?
3. How should the District prioritize its capital needs?
4. How much funding is available to address those needs?

The first, and possibly most critical, step the District took in beginning this process was to establish a centralized database, or asset registry, of all District-owned assets. Given the extremely large number of assets the District owns, inventorying them all at once would have been impossible. Therefore, a decision was made to proceed with a more methodical approach, and to first develop a proof of concept model involving a few discreet asset types to test the validity of building a centralized, enterprise-wide asset database. After the successful completion of the proof of concept, the District began building out a comprehensive asset registry by adding the assets of all District agencies. This process took a little more than two years, but as of the publication of this report, the District has 100% of its assets inventoried in CARSS.

The next phase in developing a comprehensive asset management system was a thorough understanding of the condition of all the District's assets. Initially, certain assets, such as new school facilities recently built, certain road segments and fleet assets, had current condition and maintenance data available. However, many of the District's assets did not have that detailed level of condition assessment data. Therefore, the OCFO, is working with the District Department of General Services (DGS) and other relevant agencies to complete detailed facility condition assessments on all municipal buildings, as well as condition assessments for other assets, over the next 12-18 months. In the intervening time, certain assumptions were made on the condition of assets based on industry standards on the useful life of assets, as well as any relevant maintenance data that existed. The combination of a detailed asset inventory and condition assessments of those

assets allowed the District to have a much more precise idea on the costs to maintain or replace its critical capital infrastructure. *For more detailed information about the development of the asset registry and condition assessments, please see the discussion on the Approach to Developing CARSS in **Appendix A** of this report.*

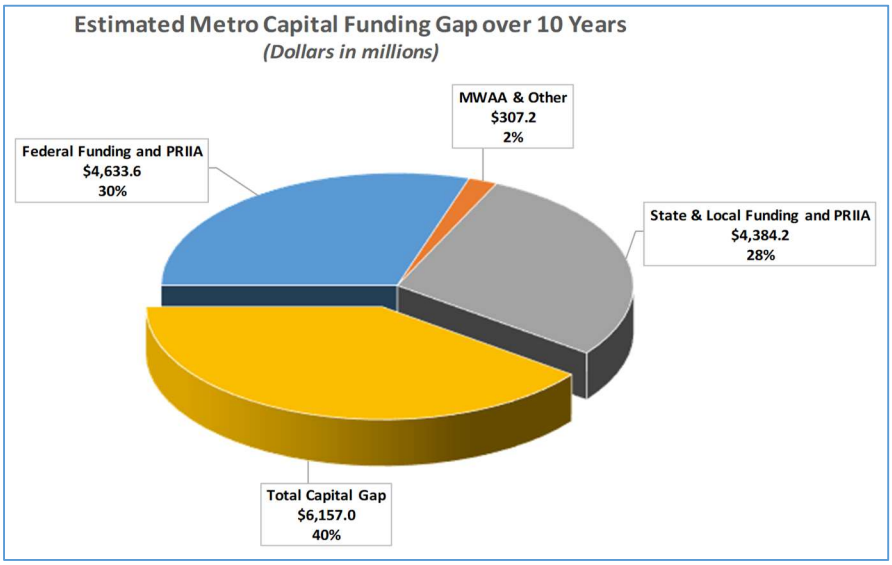
The OCFO worked closely with the Executive Office of the Mayor (EOM) to build a methodology to score, rank and prioritize all capital projects, to build a more data-driven approach to asset maintenance. Capital projects were classified into one of four asset types: horizontal infrastructure, vertical infrastructure, fleet, and information technology and equipment. Projects were then further grouped as either capital maintenance projects (deferred maintenance) or new capital projects. A scoring methodology was then established within CARSS based on several different elements and criteria that coincided with policy priorities of EOM. Those scoring criteria were then weighted to ensure that all capital projects could be fairly and objectively compared, scored and ranked across all different asset types. Using these scoring criteria, the District's Capital Budget Team (CBT) and other subject matter experts spent several weeks individually scoring each capital project. The scores were reviewed several times to assess consistency, a genuine sense of logic and to ensure the process was done as objectively as possible. The final criteria and scores were then applied to the CARSS model, which in turn created a project ranking, which largely determined the capital projects that were included in the six-year CIP. *For more information on the classification and scoring of capital projects please see **Appendix E**, and for more discussion of the prioritization of capital projects, please see **Appendix F** of this report.*

Finally, the OCFO created a long-term capital financial plan model that incorporated the District's outstanding debt, along with anticipated future borrowings, all while remaining compliant with the District's federal and local statutory debt limitations. The model further incorporated certain levels of paygo funding based on legislation enacted as part of the FY 2018 Budget Support Act, as well as all other potential sources of funding including grants and other federal funding. This model determined the amount of available funding during the current CIP period that was available to address the capital funding priorities identified in CARSS. In addition, the model also identified available funding outside of the current CIP to address unmet capital needs in the shortest possible time period outside of the current CIP. *For more information on the development of the long-range capital financial plan model see **Appendix D** of this report.*

Washington Metropolitan Area Transit Authority (Metro)

Given the sheer size of the District's financial contributions to Metro for its capital program, it was critical to estimate Metro's potential future funding needs and their potential impact on the District. Beginning in 2016, the OCFO conducted a comprehensive financial analysis of the long-term capital and operating position of Metro based on publicly available financial information and in consultation with Metro staff. This analysis was then shared with, and thoroughly vetted by, all of the other jurisdictions in the Metro compact through the Metropolitan Washington Council of Governments (MWCOG), as well as with various other stakeholders throughout the region. This analysis identified a backlog of critical capital needs of approximately $15.5 billion to return the system to a state of good repair (SGR) over the next decade.

A key assumption in the analysis assumes that current levels of federal funding for Metro remain constant into the future. This would include continued federal funding of the Passenger Rail Investment and Improvement Act of 2008 (PRIIA), which is due to expire after FY 2019. Federal PRIIA funding represents $150 million annually provided by the federal government, which is matched at $50 million each by the District, the State of Maryland and the Commonwealth of Virginia, for Metro capital projects. Further, the analysis assumes that the local jurisdictions in the Metro compact would increase their capital funding contributions to Metro by three percent (3%) annually over the FY 2017 base amount, which was agreed upon by the jurisdictions at various MWCOG meetings as being affordable. At these assumed funding levels, the analysis identified a remaining capital funding gap over the next decade of approximately $6.2 billion *(as illustrated in the graph above)*. The District's share of this estimated shortfall would be approximately $2.3 billion over that ten-year period. The District would not have been able to fund this shortfall from current resources without very significant impacts on other infrastructure priorities. In fact, $2.3 billion is significantly larger than any capital program in the current CIP. It is nearly as much as the amount of the locally-funded portion of the entire capital budget for the District Department of Transportation (DDOT) and the entire capital budget for DC Public Schools (DCPS) in the current six-year CIP combined.



As a result of this comprehensive analysis from the OCFO, and working through the Metropolitan Washington Council of Governments, a regional consensus was reached on the need to provide Metro with additional funding to meet their critical capital needs to help return the system to a state of good repair. After extensive consultations with various financial advisors and other capital markets participants, the participating jurisdictions agreed that the source of funding for Metro would need to be stable, cash (i.e. not debt funded), dedicated, and of sufficient credit quality to allow Metro to leverage those funds in the capital markets at reasonable borrowing costs. After extensive consultation with Metro staff, and the jurisdictions through MWCOG, it was determined that additional funding of approximately $500 million per year was needed by Metro in order to be able to debt finance its capital funding gap to achieve a state of good repair within a decade. While no consensus could be reached on a universal approach to providing this funding, such as a regional sales tax, it was ultimately agreed upon by the District, the State of Maryland and the Commonwealth of Virginia to provide an additional $500 million annually to Metro beginning in FY 2020 from a variety of sources determined by each respective jurisdiction. The District, for its part, has dedicated a portion of its sales tax base, growing at three percent (3%) annually, as its source for this new dedicated funding for Metro. This regional agreement on new, dedicated funding for Metro's capital program, which had been thought impossible to achieve for decades, should help to solve a looming problem for the region by allowing Metro to address its critical infrastructure needs, thereby keeping this economic growth engine for the region from falling into

further disrepair. For a summary of the complete analysis that the OCFO prepared on Metro's funding needs, please see ***Appendix B***.

Public Private Partnerships (P3s)

While there is no singular definition of a public-private partnership (P3), the World Bank generally defines a P3 as, *"A long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance."*

In attempting to assess which capital projects might be funded using P3s, or other less-traditional means of financing, the OCFO has held extensive discussions with the Mayor's Office of Public Private Partnerships (OP3) over the last several years. During that time, certain capital projects were identified as high priorities for the District, including street light modernization, a replacement of the Henry J. Daly building (which houses the headquarters of the Metropolitan Police Department), a new correctional facility, and several other high-cost facilities and projects. These projects, although rated high in importance, are unlikely to receive the full amount of funding needed to bring them to fruition in the normal CIP process. Both the Henry J. Daly building and a new correctional facility are conservatively estimated to cost between $400 and $500 million each to replace. These types of projects might provide an excellent opportunity for public-private partnerships. In prior years' reports, those projects identified as highly likely to be structured as P3s, such as new correctional facility or a replacement of the Henry J. Daly building, were removed from the CARSS analysis to determine unmet capital needs due to the expectation of private funding. However, the 2018 CARSS analysis no longer excludes those capital projects identified as likely to be structured as P3s from the overall calculation of total unmet needs. Given the uncertainty of when, or even if, the P3 procurements might take place for certain capital projects, a decision was made to include those projects in the overall calculation of unmet capital needs for now. When greater certainty arises about individual projects being procured as P3s, they can be removed from the analysis. It is important to note, however, that any capital needs that are eventually financed as a P3, either through the use of an availability payment by the District, or some other payment mechanism, where at least some portion of the payment stream will likely be considered as a long-term obligation of the District, or debt, will almost certainly be subject to the District's statutory borrowing limitations. A list of P3 projects currently in procurement or under consideration, as well as a discussion of the advantages and challenges of P3s, can be found in ***Appendix C*** of this report or on the website of the Office of Public-Private Partnerships (https://op3.dc.gov).

Status Update on the Capital Asset Replacement Scheduling System (CARSS)

Substantial progress has been made in the further development of CARSS over the last year, both in the number of assets included in the system (now over 100,000), as well as in the quality of data on the individual assets inventoried. For example, two years ago, when the 2016 Long-Range Capital Financial Plan Report was published, only 14% of District-owned assets were captured in CARSS and had a full and detailed inventory and needs assessment. Over the past two years, an extensive campaign was undertaken to more fully build out the District's asset inventory, or registry, as well as to develop a comprehensive asset management planning system to gather and house detailed data on all District-owned assets. ***As of the publication of this report, the OCFO estimates that 100% of District-owned assets are now inventoried in CARSS***, including over the past year, the addition of equipment and information technology assets, data on the District's bridges, as well as data on the District's streetcar system. Another important step in the development of CARSS is having detailed condition assessments on all assets. Such condition

assessments have already been completed for fleet assets, streets and sidewalks, as well as many schools. DGS is currently in the process of conducting facility condition assessments on all District-owned buildings, or vertical infrastructure. Improvements over the course of the last year have greatly enhanced the analysis, and future efforts will continue to improve CARSS. The District now has the most comprehensive inventory of assets it has ever possessed, and almost assuredly *the most comprehensive asset registry of any state or local government in the nation*. This will allow Agency Directors, the Administration and the OCFO to perform much more detailed, and data-driven, capital asset planning for all future capital budgets.

In addition to those assets directly owned by the District, the OCFO has also added to CARSS those assets not directly owned by the District, but rather by its component units, such as the District of Columbia Housing Authority, the University of the District of Columbia, and the Washington Convention and Sports Authority. Over the next year, the District plans to add the assets of its last remaining major component unit, United Medical Center. While the assets of these component units are separately maintained and funded by those entities, and not from the District's general fund, their addition will allow for a more complete picture of the health of all of the District's assets. Also, as part of a more ambitious project, the OCFO continues to work with the District's Office of Planning to try to develop the capability to integrate forecasts of future population and development trends throughout the city to better anticipate the location and costs of new capital assets that will be needed to support future growth. This project will most likely be more fully integrated into CARSS sometime in 2021, after the completion of the next national census in 2020. ***Bond rating agencies, institutional investors and other bond market participants have noted that CARSS is the most comprehensive and detailed capital asset management system of any state or local government in the country.*** *The reader is encouraged to review a more detailed discussion of the development of the asset management system in* ***Appendix A***.

During the FY 2019-2024 capital budget formulation process period covered by this report, detailed, granular-level data was compiled for all District-owned assets in CARSS. This allowed, for the first time in the District's history, the ability to build capital budgets using a "bottom up" approach. *This represented a significant improvement in the District's ability to build more detailed and data-driven capital budgets over prior years*. This approach synthesized the much greater level of detailed data now available on each of the District's assets into capital projects that corresponded directly to the calculated need as determined in CARSS. This approach was used for all ongoing capital maintenance projects, as well as for all new capital projects for schools. Over the next year, as further enhancements are built into CARSS, the capital budgets for all new capital projects will also be built using a "bottom up" approach. In instances where complete detailed information was not available on new capital projects, a decision was made to utilize a "top down" or project-level approach, like that used in prior years just for those projects. This approach was based on a scoring and ranking process for each new capital project in order to provide a reasonable estimate of all new capital project's needs. These estimates for new capital projects, as well as the detailed data for ongoing capital maintenance of existing assets represented all known capital needs of each agency. Those capital projects for both capital maintenance projects, as well as for new projects, were then compared to the projects that actually received funding as part of the FY 2019-2024 CIP. The unfunded projects represent the extent of the District's capital infrastructure funding gap.

Total Capital Funding Gap

The CARSS model determined that the total capital infrastructure needs of the District, as identified as part of the FY 2019-2024 CIP budget formulation, is approximately $11.5 billion. The District has identified approximately $8.2 billion of funding, from a mix of debt, paygo capital, federal loans and grants, and other funds, over the next six years, in its FY 2019-2024 capital budget for the highest-priority capital projects. This results in a remaining total capital infrastructure funding shortfall of approximately $3.3 billion over the six-year CIP period, which includes both unfunded new capital projects needed to support the growing population of the District, as well as unfunded capital maintenance projects for existing assets. Through the use of the District's long-range capital financial plan model, the OCFO estimates that these currently unfunded capital projects can be reasonably addressed within the next ten years, depending on the level of paygo funding, federal funds or other sources that the District commits to its CIP.

The following chart shows the annual estimated funding needed, beyond the current six-year CIP, broken into the two categories of capital projects: capital maintenance projects (deferred maintenance) and new capital projects. The six-year funding gap for capital maintenance projects is approximately $1.22 billion, or about $203 million annually, and the six-year funding gap for new capital projects is about $2 billion, or approximately $333 million annually. Combined, the annual funding gap is approximately $536 million, which is equivalent to roughly 6.8% of total local funds General Fund expenditures.

(in $ millions)

Fiscal Year	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	6 Year Total
Unfunded Capital Maintenance Projects	285.30	272.66	269.20	212.94	100.64	78.88	1,219.61
Unfunded New Capital Projects	236.01	253.16	320.80	706.38	360.18	154.01	2,030.54
Total Unfunded Capital Needs	$521.3	$525.8	$590.0	$919.3	$460.8	$232.9	$3,250.2

As seen in the following chart, the total capital funding gap represents projects across key sectors of the District's capital infrastructure program. These amounts represent actual capital projects that cannot be delivered during the current six-year CIP with current funding levels and sources. For example, the $2.2 billion in unfunded facilities projects includes approximately nine elementary schools, the Henry J. Daly building replacement, a new correctional facility and New Communities housing investments totaling nearly $1.1 billion. Similarly, approximately $266 million of the nearly $542 million shortfall in unfunded horizontal infrastructure relates to DDOT repair of local streets. It is important to note that the long-range capital financial plan analysis assumes that the costs of deferred capital projects beyond the six-year CIP period grow at three percent (3%) annually until those projects are funded. In addition, CARSS incorporates cost curves for various assets in the database to more accurately measure the cost of repair or replacement as these assets deteriorate. For example, if potholes are not filled on a particular street segment in a timely manner, the asset deterioration curve for street and roads may cause CARSS to accelerate the timing of a more expensive repair event, such as a complete street scraping. This could have the effect of making the overall cost of the deferred project grow at a greater than three percent annual cost. Finally, operating costs are also incorporated into CARSS as part of the overall outlook of asset health, so if capital maintenance, or asset replacement, is delayed beyond what is prescribed in CARSS, then annual operating and maintenance costs for that asset are escalated the following year and subsequent years until the repair or replacement is completed.

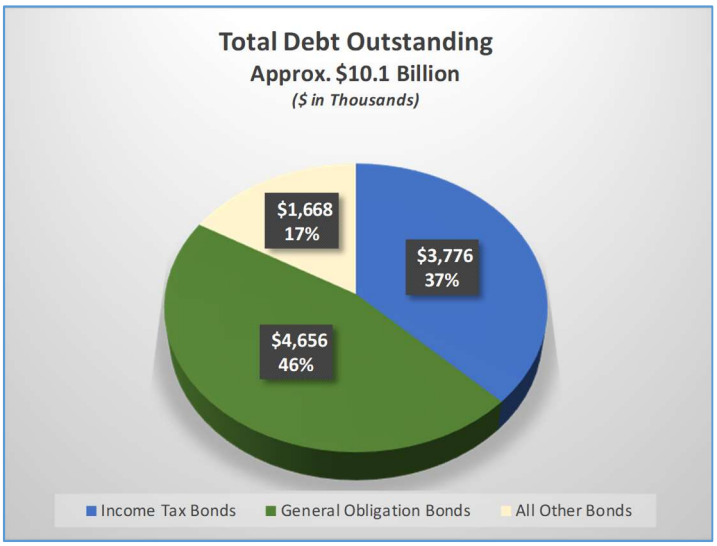
Annual Capital Funding Gap by Asset Type							
(in $ millions)							
Asset Classifications	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	6 Year Total
IT Projects & Systems							
Capital Maintenance Projects	34.3	50.7	27.9	13.6	9.8	1.8	$ 138.2
New Capital Projects	55.9	33.6	29.1	15.5	10.7	11.0	$ 155.7
Total	$ 90.2	$ 84.3	$ 57.0	$ 29.1	$ 20.5	$ 12.8	$ 293.9
Equipment & Regulatory							
Capital Maintenance Projects	10.3	22.6	22.7	18.4	9.8	1.0	$ 84.7
New Capital Projects	5.0	3.2	4.1	3.4	4.0	7.9	$ 27.7
Total	$ 15.3	$ 25.8	$ 26.8	$ 21.8	$ 13.7	$ 8.9	$ 112.4
Fleet							
Capital Maintenance Projects	23.6	5.0	14.7	12.0	8.0	21.4	$ 84.8
New Capital Projects	-	-	-	-	-	-	$ -
Total	$ 23.6	$ 5.0	$ 14.7	$ 12.0	$ 8.0	$ 21.4	$ 84.8
Horizontal Infrastructure							
Capital Maintenance Projects	65.6	72.9	70.1	85.0	47.1	41.0	$ 381.7
New Capital Projects	10.8	54.7	64.2	29.9	0.1	0.1	$ 159.9
Total	$ 76.4	$ 127.5	$ 134.3	$ 114.9	$ 47.2	$ 41.2	$ 541.5
WMATA							
Capital Maintenance Projects	-	-	-	-	-	-	-
New Capital Projects	-	-	-	-	-	-	-
Total	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Facilities							
Capital Maintenance Projects	151.5	121.4	133.8	84.0	26.0	13.6	$ 530.3
New Capital Projects	164.3	161.7	223.4	657.5	345.4	134.9	$ 1,687.3
Total	$ 315.8	$ 283.1	$ 357.1	$ 741.5	$ 371.4	$ 148.6	$ 2,217.6
Grand Total	$ 521.3	$ 525.8	$ 590.0	$ 919.3	$ 460.8	$ 232.9	$ 3,250.2

Funding Sources

Although the District relies on a variety of sources to finance its capital infrastructure program, including paygo financing, federal grants, local highway trust fund monies, local transportation funds, Grant Anticipation Revenue Vehicles (GARVEE bonds) from the Federal Highway Administration, sale of assets and other typical municipal sources of revenues, like most other state and local governments in the United States, the District has traditionally relied on debt financing as the primary source of funding for capital infrastructure investments. According to a 2016 issue brief, Support Cities: Protect Municipal Bonds from the National League of Cities,

"Municipal bonds are the primary way local and state governments finance infrastructure and have been for over a century. More than two thirds of U.S. public infrastructure projects are financed by municipal bonds."

Outstanding Debt



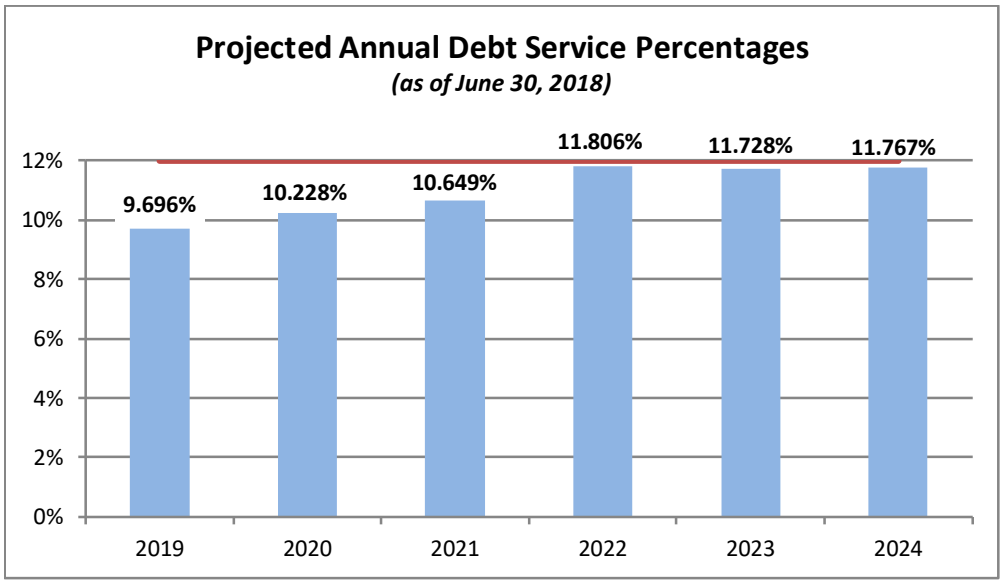
The District has utilized debt financing, primarily General Obligation (G.O.) bonds and Income Tax Secured Revenue (ITSB) bonds, as the primary sources of funds for capital infrastructure investments. As of September 30, 2018, the District has an estimated $10.1 billion of total outstanding debt, of which roughly $8.4 billion (or approximately 83%) are either G.O. bonds or ITS bonds.

While G.O. and ITS bonds will remain a key source of funds for infrastructure investments into the future, the key challenges for the District will be to ensure that the total debt burden remains at a sustainable level and does not overburden the city's budget. The District's debt must be structured in such a way as to maintain our strong credit ratings, thereby keeping the overall cost of borrowing as low as possible. This is particularly important given the fact that the District's current capital improvement plan anticipates increasing outstanding debt by more than an additional fifty percent (50%), or approximately $5.3 billion in additional G.O. or Income Tax Secured bonds over the next six years.

Debt Capacity Limitations

The District must operate within both federal and local statutory debt limits. Under the federal Home Rule Act, annual debt service on the District's General Obligation bonds must be no more than 17% of General Fund revenues. In 2009, the Council passed local legislation to further restrict the amount of debt outstanding. The local Debt Ceiling Act limits the annual debt service on all tax and fee supported debt to no more than 12% of the District's General Fund expenditures. This locally-imposed limit is the true constraint under which the District's borrowing must operate. Compared to other state and local governments, the District has a relatively high debt per capita ratio. Staying below the 12% debt limit allows the District to maintain its strong credit ratings (Aaa/AA+/AA+ from Moody's Investors Service, Standard and Poor's and Fitch Ratings, respectively) and a relatively low cost of borrowing.

The OCFO measures the projected annual debt service as a percentage of anticipated General Fund expenditures during the current CIP period, in order to confirm compliance with the 12% locally-mandated debt limit. The following chart illustrates the District's projected annual debt service percentages given the amount of debt projected to be issued to support the FY 2019-2024 CIP. It is important to note that the chart does not reflect the impact of future debt refinancings or restructurings, which are likely to further increase the District's borrowing capacity.



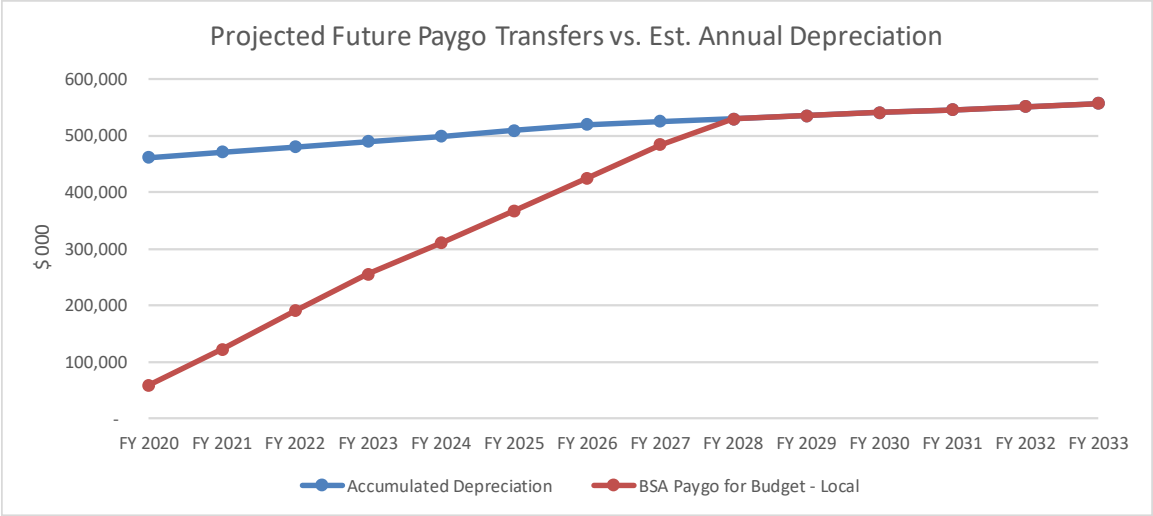
The 12% statutory debt limit is on the higher end as compared to other state and local governments across the country, but reflects our unique requirement to fund state, county, city and school district infrastructure needs. This debt limit has been extensively discussed with the credit rating agencies, and coupled with our strong reserve policies, provides the maximum borrowing capacity to fund infrastructure at the lowest possible cost. If the debt limit were raised or reserves reduced (for example to 2009 levels), the District's credit ratings would likely be reduced from the 'Aaa' or high 'AA' category to the single 'A' category, resulting in approximately 15% higher borrowing costs. In order to maintain the same level of debt service payments, the District would need to reduce the bond funded capital budget by roughly 15% (approximately $750 million), thereby causing even fewer capital projects to be funded and further increasing deferral of necessary capital maintenance.

New Paygo Funding Mechanism Through Legislative Action

The other key source of funding for the District's CIP is paygo funding, which is a transfer of cash from the operating to the capital budget. Given the statutory limits on the amount of debt that can be issued, these transfers from the General Fund to the CIP program are the most flexible source of funding for addressing the identified, unfunded capital needs.

The Budget Support Act of FY 2018 included an amended provision for the use of paygo as part of the Capital Infrastructure Preservation and Improvement Fund. The new provision specifies that for FY 2020 the financial plan shall include a minimum local funds total transfer of paygo to the CIP of $58,950,000. Then, beginning in FY 2021, and for each subsequent fiscal year thereafter, the financial plan shall include a minimum local fund transfer for paygo of the $58,950,000 plus twenty five percent (25%) of the increase in local fund revenues over the FY 2020 base year. The amount of local fund revenues transferred to the CIP is capped, so as to not exceed annual depreciation as reported in the District's most recent Comprehensive Annual Financial Report (CAFR).

As shown in the graph below, under the new approved legislation future local funds transfers to the CIP for paygo would be roughly equivalent to total annual depreciation by 2028, at which point the calculation to determine future local funds transfers would be capped at the amount of annual depreciation, which is currently forecast to grow at 2% annually.



If these amounts of paygo spending on capital are reached, it would considerably change the funding mix of the District's capital improvement program. In fact, by FY2027, nearly 50% of all CIP funding would come from paygo to complete the backlog of CIP projects. This funding of deferred maintenance needs, largely from current resources, would allow future debt capacity to be redirected to new capital projects needed for the District's growing population.

It is important to note that the estimated increases in paygo from local funds represent significant portions of the projected local funds revenue growth of the District. In fact, if the formula in the law remains in place, and revenues do not grow faster than are currently projected, other expenditures may need to be reprioritized, or additional funding sources implemented, to fund the prescribed paygo amounts. Allocating this level of additional paygo funding is not without challenges, since capital projects compete with programmatic priorities such as affordable housing, homeless services, and the general growth and expansion of services for residents, for funding. However, properly maintained equipment and facilities will, over the long-term, result in lower life-cycle costs and increased resources for other District programs. Other options to increase paygo, such as additional federal funding or a new dedicated funding source, might also assist in addressing the District's unfunded capital needs. It is important to remember that a large portion of the growth in paygo funding represents amounts now dedicated to Metro under legislation passed by the District in 2018. The addition of these new revenues should allow the District to meet its increased commitment to funding capital without having to cut District programs, although growth in these programs needs to be maintained at reasonable levels.

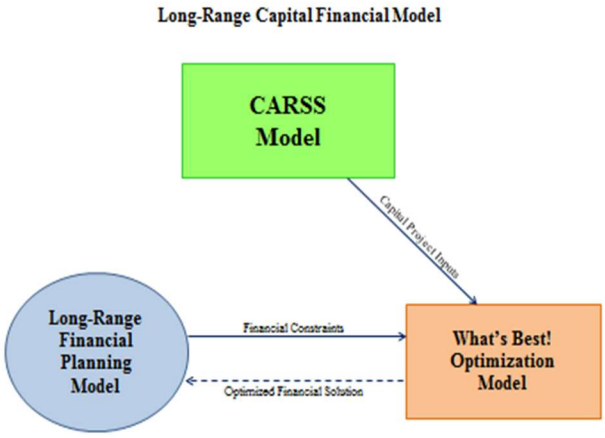
Additionally, District legislation requires that once the 60-day operating reserve level is reached for the federally and locally-mandated cash reserves, 50% of all surpluses in a given fiscal year go to paygo funding. This additional funding will further assist the District in achieving paygo levels that approach ongoing capital asset maintenance needs.

Approach to Developing Long-Term Funding Solutions

In order to properly maintain the value and functionality of existing capital assets, and to minimize life-cycle costs, the establishment of a time frame for 'catching up' on deferred maintenance is a best practice of any long-range capital financial plan. To address this complex financing challenge over the shortest period of time, while remaining within the various constraints imposed by the District's borrowing limits, a financial planning model was developed. This model will assist the

District in identifying financial strategies to fund the identified capital needs gap in the earliest year possible given various constraints.

The long-range capital financial model is actually a combination of three discreet models that work in conjunction to identify the optimal financial result. The long-range capital financial model is comprised of CARSS, and a long-range financial planning model that utilizes a linear optimization tool to generate the optimal financial solution for a given time period. A diagram of how the long-range capital financial model works is shown at right. A more detailed description of the model, and its various components can be found in ***Appendix D***.



CARSS was used to prioritize, score and rank all of the District's various capital projects. Then, under certain capital budget constraints and with a specific priority ranking assigned to each project, CARSS determines which projects can be funded in the CIP each year, and which projects will not receive funding (due to their lower priority ranking). The unfunded capital projects are then analyzed in the financial planning model utilizing linear optimization that funds the highest priority projects first, along with certain debt and source assumptions, to solve for the optimal solution to finance the unfunded capital gap as soon as possible.

The model also allows the District to optimize and project the maximum amount of debt that can be issued in each fiscal year (under the 12% cap), while simultaneously determining the earliest possible fully-funded year of all unfunded capital projects. The District will also be able to quantify the amount of paygo, federal funding, or other revenues needed to address the entire backlog of unfunded capital needs over various time periods. This information is then used to present a complete long-term capital financing plan for the District over the forecasted 15-year period.

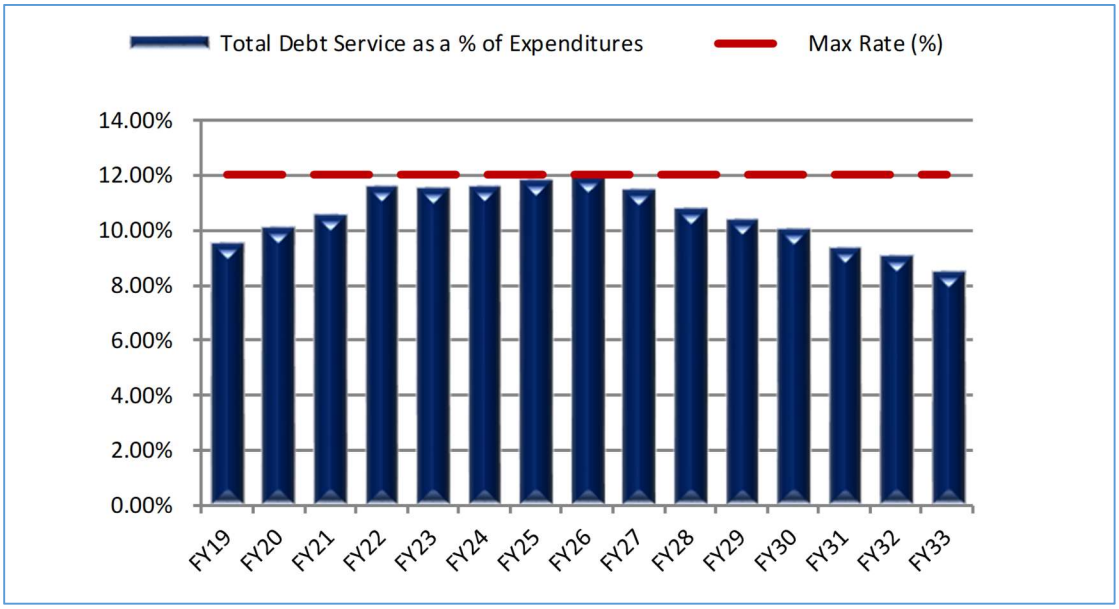
A detailed description of methodology used to classify and score the various capital projects, along with the scoring criteria used, can be found in ***Appendix E***. In addition, a detailed description of how projects were prioritized in CARSS can be found in ***Appendix F***.

Model Assumptions

The long-range capital financial model makes several assumptions in analyzing funding solutions for the backlog of unfunded capital needs. These include the estimated borrowing costs for future debt issuances, the level of future funding from other non-debt sources for capital projects, and that General Fund expenditures of the District continue to grow at approximately 3% into the future through FY 2024, and only decline to 2.5% in years thereafter. In addition to those assumptions, there are three key assumptions in the model, which drive how the model optimizes various funding solutions. These include:

1. Optimization of debt issuances:

   The model is structured to maximize the amount of debt issued in each fiscal year immediately outside of the current CIP period, while remaining within statutory debt limits, until paygo amounts have increased significantly, and thereafter lowering the amount of debt issued annually to achieve a more balanced overall mix of funding to meet the District's capital needs. This also provides substantial borrowing capacity after 2027 to fund future new capital projects.



2. Varying levels of paygo or additional federal funding drive the gap:

   The major variable that drives the incremental increase in the amount of unfunded capital projects is the amount of annual paygo, additional federal funding, or other additional revenues assumed.

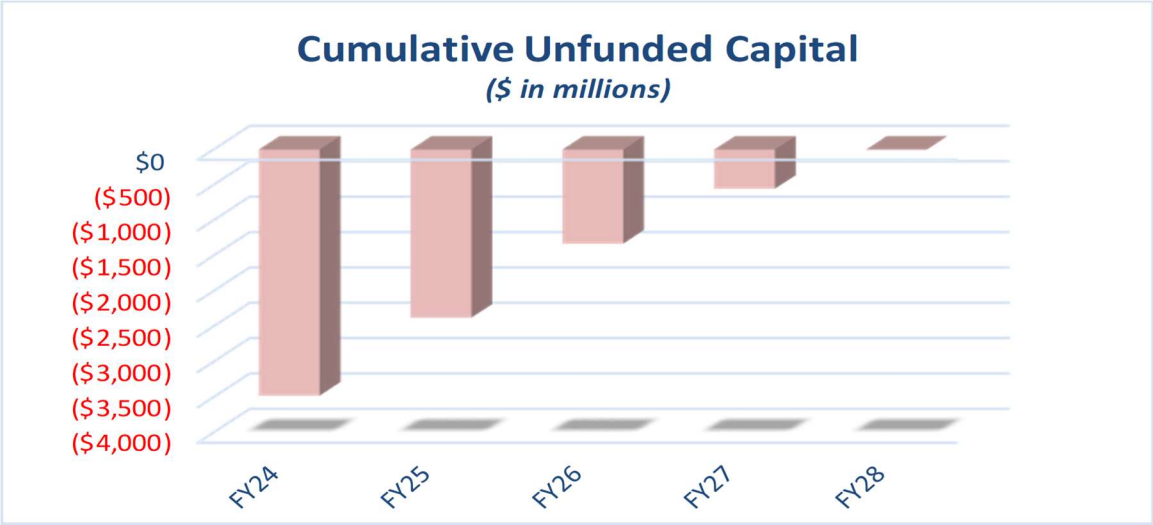
3. No additional new capital projects:

   As the model factors all of the many variables in solving for the best solution to fund the backlog of unfunded capital needs, it assumes that ***no new capital projects, outside of those that were part of the FY 2019-2024 capital needs assessment, are added to the list of capital projects in future years prior to existing unfunded needs being met***, unless they are completely funded from additional paygo, federal funds, or other additional resources from private sources.

The Results of Paygo Legislation and Long-Term Asset Management

As was mentioned previously, the District has taken a proactive approach to dealing with its capital maintenance backlog through passage of the FY2018 Budget Support Act legislation in FY 2017, that created a paygo funding requirement. This new legal requirement is analyzed to determine its impact on addressing the capital funding gap.

Given these projected amounts of paygo funding for capital, as shown on page 10 of this report, as well as utilizing the District's bonding capacity, the long-range capital financial model now estimates that the District will be able to "catch up" and fund all existing unfunded capital projects identified in CARSS, while continuing to maintain current assets, by FY 2028. This would allow all District assets in the General Fund to reach a state of good repair, while also addressing new unfunded capital projects. In other words, the $3.3 billion of capital needs not funded in the six-year CIP could be funded by 2028 with the paygo levels required in legislation and borrowing up to the 12% statutory debt cap limit. Funding of the gap could be further accelerated through additional paygo resources or other monies, such as federal funds, that might become available, as well as through the use of non-traditional funding structures, such as P3s.



The chart above illustrates that unfunded capital needs, which remain nearly $3.3 billion through FY 2024 since sufficient funding is not available in the current CIP, begin to be rapidly paid down starting in FY 2025. This is possible due to the greatly increased levels of paygo per the new legislation, as well as the District's increasing borrowing capacity outside of the current CIP period.

Summary and Conclusions

Quality infrastructure is critical to the quality of life and growth of the District's and the region's economy. In fact, the American Society of Civil Engineers states in their 2017 Infrastructure Report Card that, *"Infrastructure is the foundation that connects the nation's businesses, communities, and people, driving our economy, improving our quality of life, and ensuring our public health and safety. Now is the time to renew, modernize, and invest in our infrastructure to maintain our international competitiveness. The longer we wait, the more it will cost."*

Continuing to defer capital maintenance or build needed facilities will ultimately result in much higher costs in the long term, as assets must be replaced rather than repaired or necessary service levels are not met. The large amount of capital required to rebuild the District's schools is one example. Metro is another, highly visible example of the costs of deferred maintenance. Had the jurisdictions adequately funded the costs to maintain the capital infrastructure of Metro over the past twenty to thirty years, it would arguably cost much less than the estimated $15.5 billion just

to return the system to a state of good repair. That is just the estimated cost, over the next decade, to make the system adequate, and does not include the costs of tackling certain major system repairs or expansion that could easily add another $10 billion or more to the total cost.

Nearly every local or state government, businesses and certainly the Federal government, has capital or infrastructure needs that exceed their short-term resources, with deferred maintenance projects the most common. As a result, needs must be prioritized, and resources allocated accordingly. The District has gone a step further by identifying the unfunded capital projects, as well as recommended capital maintenance needs, in this long-range capital financial plan. The tool to inventory all assets, prioritize projects, and determine options to fund all needs over time provides an analysis that does not exist for most governmental entities. This analysis provides much-needed insight into options and strategies that can be considered in the coming years to ensure our residents live in a city with high quality infrastructure, whether it is Metro, schools, streets, buildings, fleet vehicles for public safety, or technology and equipment.

The District is in an enviable financial position. Through the prudent financial decisions of policymakers over the past 20 to 25 years, it has fully-funded pensions and retiree health care trusts, has reserves that provide flexibility to deal with uncertain future events and bond ratings that provide very low borrowing costs to finance infrastructure needs. Many U.S. cities spend all or most of their growth in revenue merely funding severely underfunded pension liabilities, leaving little for programs or infrastructure. The District enjoys, and is expected to continue to enjoy, economic growth that increases the tax base over time, providing the capacity to fund additional needs. Cities that are stagnant or decreasing in population and economic development do not enjoy such benefits.

This report demonstrates that not all capital projects, or recommended maintenance needs, can be funded in the District's six-year capital planning period. Although the District is able to fund $8.2 billion through FY 2024, approximately $3.3 billion in capital needs (slightly less than forty percent related to maintenance), require funding in the future.

Through the District's leadership, the region has agreed to provide new, dedicated funding to Metro to fund critical capital needs related to the safety and reliability of the system. The District's share of this dedicated funding is approximately $2.3 billion over the next decade, which will be funded from new revenues generated by certain increased taxes and fees. Although these numbers are large, the growth of the District's tax base, and the capacity that occurs as previously-issued bonds are retired, coupled with additional funds that can be directed to paygo, as mandated in the FY 2017 paygo legislation, fully address the unfunded capital needs over the next decade.

The amounts of local funds revenue transfers to paygo capital currently prescribed in the law, coupled with the increased debt capacity that becomes available each year, allows for the entire $3.3 billion gap to be funded by 2028, only four years beyond the normal six-year planning period. Once paygo funding reaches a level that equals annual depreciation, and is maintained at that level, ongoing maintenance and all identified, unfunded capital projects will be funded into the future. In the event of slower than anticipated economic growth, or a downturn in the economy, lower levels of paygo funding for capital may be available to address these issues. While the District would likely still be able to address all of its unmet capital needs, albeit requiring a longer period of time, it would run the risk of other unplanned capital needs or events occurring during that time, which could further delay the ability to meet these needs. Finally, the credit rating agencies have taken note of the District's aggressive approach to addressing its deferred maintenance and critical infrastructure needs and cited it as one of the key factors in the recent round of ratings upgrades enjoyed by the District. Any significant delays, or deviations, from the District's prescribed plan

to address these critical infrastructure needs could potentially jeopardize the District's newly enjoyed status as one of the top-ten highest rated large cities in the nation.

To put these funding needs in perspective, while the increase in paygo per the new legislation increases over time to a level equal to projected annual depreciation, a level until now not achieved by the District, the average annual paygo contribution over the long-range capital financial plan time period is roughly $369 million. This amount of paygo funding is roughly equivalent to 4.6% of the local funds portion of the FY2019 General Fund budget. However, properly maintained and improved equipment and facilities will, over time, result in lower life-cycle costs and ultimately more resources for programs.

In fact, a 2018 report published by KPMG International titled, Emerging Trends in Infrastructure nicely summarizes the difficult nature of the choices that will need to be made. The report states, *"Governments recognize that increased infrastructure investment can help solve many of the long-term challenges they now face. But they are also prudent enough to know that there will be many short-term obstacles to overcome before they can get there. Tough decisions will need to be made: Do you fund healthcare for the boomers and mobility for the millennials? Should you prioritize better transport to help those with jobs or social infrastructure to also help those without? Do you invest into ports and airports to encourage globalization or do you build walls and barriers to hold it at bay? What is clear is that making sound decisions in this environment will require better data, more sophisticated analytics and much more reliable projections."* Through the build-out and implementation of CARSS, the District now almost uniquely enjoys the capability of better data, more sophisticated analytics and more reliable projections that are called for in the previously mentioned report from KPMG.

This long-range capital financial plan report provides information to support policy discussions regarding the District's long-term capital needs and strategies to address these needs. As an even higher degree of asset condition detail is gradually gathered on all District-owned assets, and the cost of repair versus replacement can be further refined, the bigger picture policy discussions of funding will not change. While the critical issue of dedicated funding for Metro to allow it to finance its large infrastructure needs has now been addressed, constant monitoring by the various jurisdictions will be needed to ensure that Metro effectively executes its capital program and delivers on the promises made to the region. Additionally, aggressive outreach for public-private partnerships should be pursued for prudent, cost-effective capital projects that lower the costs of not only construction, but crucially of long-term maintenance, of those projects to the District. Finally, over the next several years, funding from federal sources, reallocation of District resources, and/or new revenue sources needs to be directed to paygo funding to fully address needed infrastructure, including proper maintenance of District assets. This path would place the District in an enviable position as compared with other cities and states across the nation in addressing its long-term capital infrastructure needs. Over the last several years the District has emerged as a national leader in asset management and long-term infrastructure financial planning. It is crucial that the District remain on this course in order to address issues of sustainability and to deliver to its residents the high-quality infrastructure expected of the nation's capital.

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Appendix A

Approach to Developing the Capital Asset Replacement Scheduling System (CARSS)

Approach to Developing CARSS

In the attempt to develop a better understanding of the costs for the District of Columbia of maintaining its critical capital infrastructure, it was determined that there was a need to develop a comprehensive asset management plan for all of the District's assets. The approach that was developed to address this need led to the creation of the District's Capital Asset Replacement Scheduling System, or CARSS. CARSS is a comprehensive asset management planning tool created by the District in conjunction with our software solutions partners at PowerPlan. PowerPlan is assisting the District with building an asset management planning solution that delivers a comprehensive view of District's capital asset health, and provides the information and control needed to align asset strategy with the overall organizational goals of the District.

In developing CARSS, a critical first step is to create a centralized database, or asset register, of all District-owned assets and their respective condition, so that a calculation of the costs to maintain or replace those assets can be performed. This asset register will provide for the first time a detailed inventory of all District-owned assets on an enterprise-wide basis. The District must have an inventory of these assets, and an understanding of the maintenance and replacement costs, at not just an agency level, but also at an enterprise-wide level, in order to have a full understanding of the scope of the challenge in financing the District's capital infrastructure needs. It is also worth noting that maintaining an asset inventory and conducting condition assessments are best practices in asset management promulgated by the Government Finance Officers Association. *A system for assessing assets is prerequisite to appropriately planning and budgeting for capital maintenance and replacement needs, in turn ensuring that assets are in conditions necessary to provide expected service levels.*[1]

Given the inherent complexities of this task, the process of developing CARSS, while being led by the OCFO, has been a collaboration between this office and the Executive Office of the Mayor. One of the first steps that occurred in this process was the creation of a steering committee to manage the development and implementation of CARSS. The steering committee is comprised of various members from critical agencies with expertise in capital planning, information technology and finance.

Phase 1: Recap of the District's Implementation of CARSS: Proof of Concept

Proof of Concept: Development of the CARSS model initially began in June of 2015 with a Proof of Concept (POC) using three different asset types; fleet, facilities, and horizontal infrastructure. During the POC, information from three agencies that owned some of these three asset types were loaded into static Microsoft Excel files. These agencies were the Office of State Superintendent of Education (OSSE) for the special education school bus fleet; District of Columbia Public Schools (DCPS) for school facilities and their construction; and the District Department of Transportation (DDOT) for their data on streets representing horizontal infrastructure assets. The POC was successfully completed in October of 2015, having confirmed that it was possible to create an asset replacement model across multiple asset types that would successfully predict asset investment needs, and develop annual budgets for an extended period of time. A status report on the successful

[1] Government Finance Officers Association, *Best Practice: Asset Maintenance and Replacement*, approved by the GFOA Executive Board, March, 2010. Retrieved from: http://www.gfoa.org/asset-maintenance-and-replacement on 9/26/15.

completion of the POC was submitted to the Mayor and Council in October 2015, per a legislative requirement.

Phase 2: Recap of Where the District was in 2016 and 2017

Development of a comprehensive "top down" 15-year capital financial plan:

Development of a robust asset replacement model entails calculating the needs from the "bottom up", individual asset by asset. This solution is neither quick nor easy to implement, therefore as an interim step, the process began with a focus on a capital projects' needs basis. Agencies provided their complete set of capital needs, project-by-project, for FY 2018 through FY 2023 as part of budget formulation in November 2016.

For the CARSS project data, the Capital Budget Team (CBT) carefully reviewed the submissions from agencies, along with those projects receiving budget in FY 2017, and created a file set of 508 current and proposed capital projects. These capital projects were carefully categorized into one of four different asset types; horizontal infrastructure, facilities (vertical infrastructure), fleet, and information technology and equipment.

Below is a breakdown of the various asset classes and some of the project classifications that were used in this phase of the CARSS project.

Asset Class	Classification Examples
Horizontal Infrastructure	• Streets • Sidewalks • Alleys • Bridges
Vertical Infrastructure	• General Support Facilities • School Facilities • Parks, Playgrounds, Athletic Fields • Public Libraries
Fleet	• School Buses • Fire & EMS vehicles • Police Vehicles • Passenger Vehicles
Information Technology	• Computer Hardware • Software Purchase • IT Development • Communication Equipment

Phase 3: Recap of Where the District is Now: Full Implementation

Development of a Detailed "Bottom-up" Approach to Building the Capital Budget

While the top-down, capital projects based approach was used in the near-term, the development of a much more granular, asset-by-asset level needs assessment approach using data from the already existing databases across all District agencies has essentially been completed. With the exception of certain types of new facility projects, the bottom up approach has been used for all horizontal infrastructure, fleet, building components and all public schools in creating the FY 2019-2024 CIP.

There are three distinct advantages of developing a "bottom-up" budget driven by individual assets in CARSS:

1. An alignment is created between asset and resource decisions to better meet strategic objectives,

2. It removes subjectivity, and improves transparency, by using evidence and a common framework for prioritization,

3. It enables the District to optimize constrained resources/budget with clear visibility to the impact of tradeoffs.

Phase 4: Where the District is Going

Over the next 12 months the District will complete significantly more facility condition assessments, update the condition assessments on all horizontal infrastructure (roads, sidewalks, alleys, etc.), as well as expand the use of the new project cost estimation tool for all facilities and building systems. The project cost estimation tool will allow the District to develop more accurate estimates for all future facilities, thereby providing a greater degree of certainty on the impact to the capital budget, as well as a greater measure of accountability for the particular agency that owns the asset.

Significant progress has been made in gathering detailed asset data from virtually all agencies in the District since the 2016 Report. At the time the 2016 Report was published, approximately 14% of total District assets were contained in CARSS. As is seen in the following chart, nearly all District-owned assets are now housed within CARSS, along with many of the assets owned by component units of the District, such as the University of the District of Columbia (UDC), Washington Convention and Sports Authority (WCSA), and the District of Columbia Housing Authority (DCHA). Over the course of the next year the District also expects to add the capital assets of United Medical Center (UMC) to CARSS as well. The following table *(Figure 1)* shows a breakdown of the various asset types that are currently housed in CARSS.

Figure 1: Asset Inventory

Assets and Their Value in CARSS

	Number of Assets*	Percentage of Total Asset Classification	FY 2017 CAFR Book Value of Asset Type ($000)*	% of Assets Captured
Horizontal Infrastructure				
Ramps	564	100%	3,234,045	100.0%
Service Roads	124	100%		
Streets (segments)	13,593	100%		
Sidewalks (linked to street segments)	26,936	100%		
Trails	90	100%		
Alleys (Segments)	9,578	100%		
Bridges	378	100%	211,379	100.0%
Bikeshare Terminals/Racks	272	100%	12,240	100.0%
Street Car Rail (Track Segments)	41	100%	195,691	100.0%
Total	**51,576**	**100.0%**	**$ 3,653,355**	**100.0%**
Facilities				
Buildings	642	100%	6,688,396	100.0%
Building Components	30,531	100%		
Amenities (Pools, courts, Playgrounds etc)	569	100%		
Total	**31,742**	**100.0%**	**$ 6,688,396**	**100.0%**
Equipment and IT				
Fleet	5,316	100%	441,446	100.0%
Circulator Buses	74	100%		
Street Cars	6	100%		
Street Car System Equipment	143	100%		
Equipment (>$5K)	1,246	100%		
IT and Furniture	624	100%		
Total	**7,409**	**100.0%**	**$ 441,446**	**100.0%**
Land				
Land (count by parcel)	**4,153**	**100%**	**$ 964,016**	**100.0%**
Grand Total**	**94,880**	**100.00%**	**$ 11,747,213**	**100.00%**

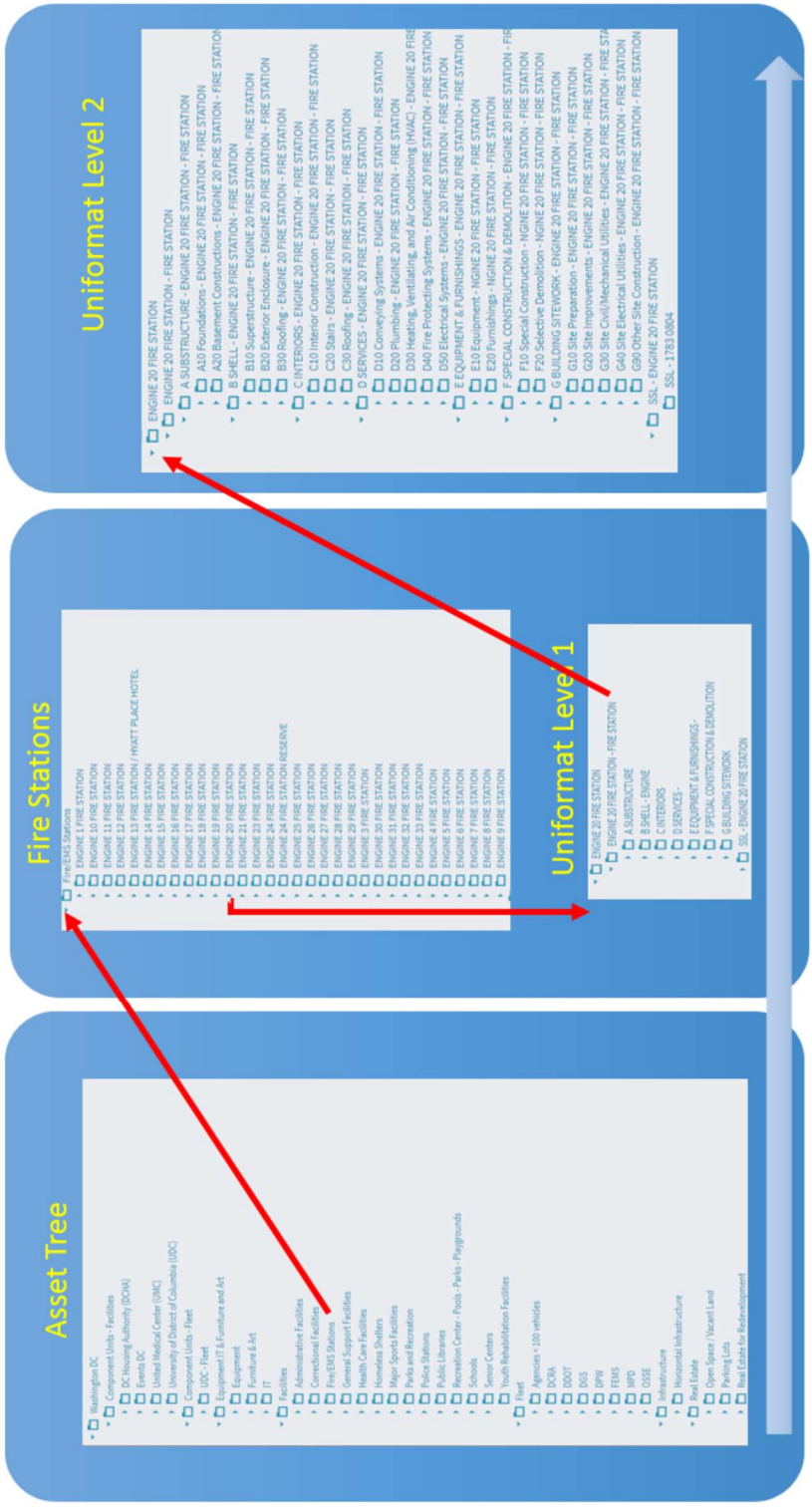
** Does not include construction in progress*

*** Does not include assets from the District's component units - UDC, Housing Finance, UMC, and Events DC*

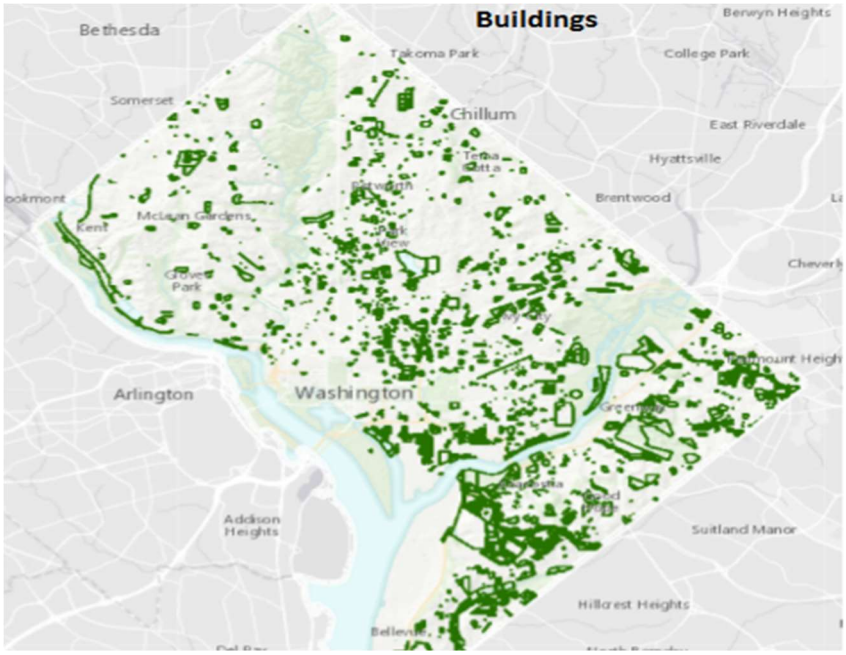
This asset-by-asset approach is the ultimate goal of the CARSS project, whereby each major capital asset in the District will be cataloged in an asset register, along with its current condition and cost for repair or replacement. The screen shot below *(Figure 2)* shows a portion of the asset tree

structure that is used in CARSS to organize the asset-level data using a fire station as an example of the level of asset detail that is currently available in the system. The data breakdown is based on industry standards, called the uniformat, and the District facilities are structured to the level 2 standards, which provides data around individual building system components.

Figure 2: Asset Tree



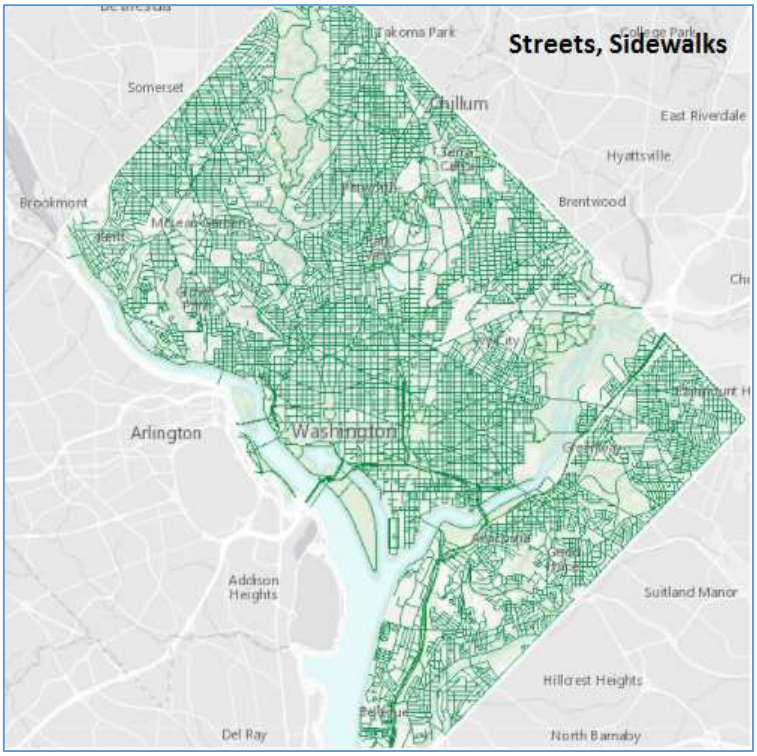
Tremendous amounts of data on individual assets currently exists and was pulled into the centralized CARSS database from existing databases spread throughout various District agencies. As seen in the image to the left, information on the more than 640 municipally-owned buildings within the District has been captured in CARSS and displayed in the related GIS system. However, while data might have existed on the type, location and assessed value of a particular building, information on the current condition of the building, and its sub-systems, might have been missing or not up to date. Subsequently, DGS and its contractor have committed to perform facility condition assessments (FCAs) on all District-owned buildings over the next twelve to eighteen months. The information from the FCAs will be uploaded into the CARSS database, allowing for more accurate calculations of costs for repair and maintenance of various facilities and their sub-components, such as roofs, HVAC, etc., thereby facilitating a more data-driven approach to building the capital budget for DGS.



Enhanced Analytics Using Insights

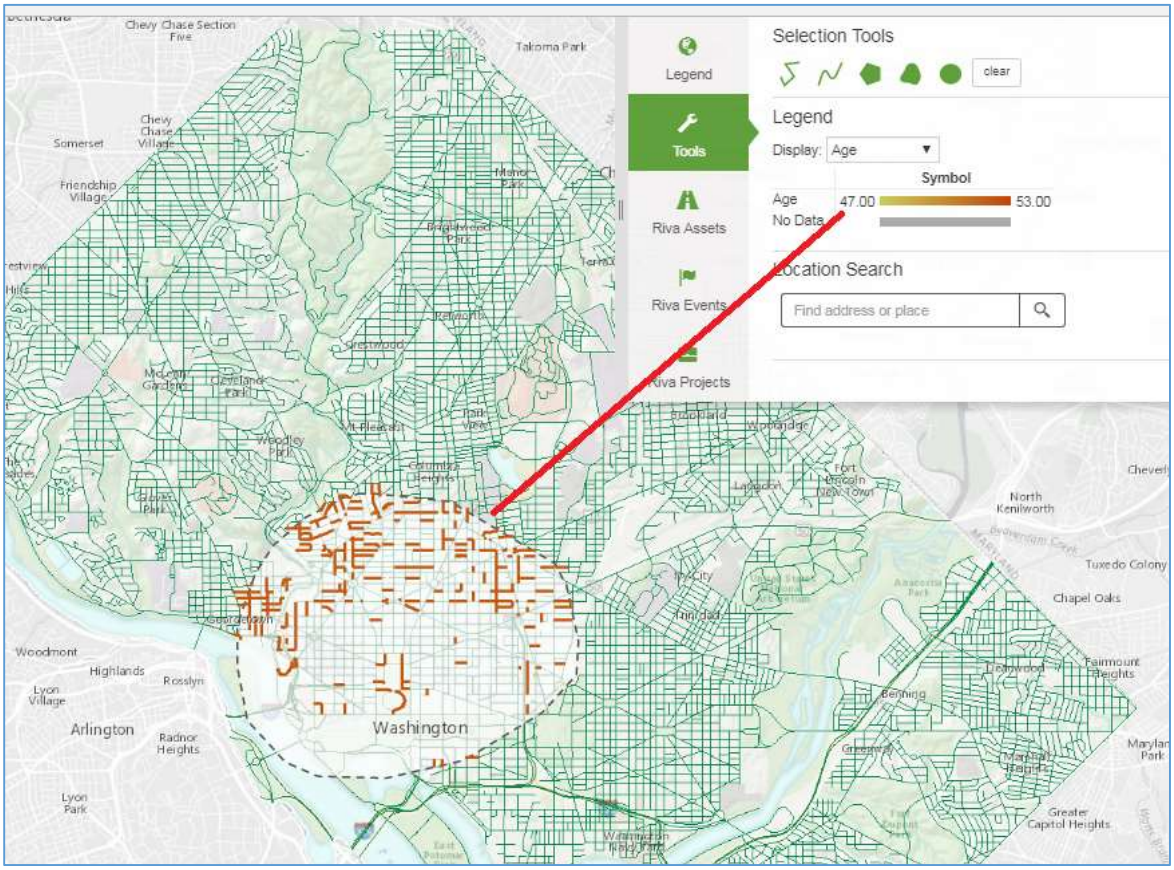
CARSS was enhanced last year with a new analytical tool called Insights. Insights allows for the creation of easily defined, and user-friendly, analysis and "drill down" capability from any asset type down to specific information on individual assets.

For asset types where high-quality data already existed, such as streets and sidewalks with DDOT, the CARSS database working with existing DDOT databases provides a powerful tool to more accurately forecast capital needs for horizontal infrastructure.



The District now has the ability to map all streets, service roads, sidewalks and alleys utilizing data in CARSS and GIS. In an example of this new ability, the image to the left illustrates all streets and sidewalks in the District.

More impressively is the ability of DDOT to now "drill down" on any portion of the map using Insights to look at particular street and sidewalk segments. More specifically, as seen in the graphic below, the ability to focus on just those segments that are in poor condition to help better prioritize those assets most in need of capital maintenance.



Fleet "Drill Down"

When viewing all fleet assets through CARSS and Insights, it becomes quickly apparent that the District's rolling stock, or fleet, is procured and owned across multiple agencies; of which the key agencies are OSSE, FEMS, MPD and DPW. The CARSS database, pulling information from the databases of the various owner agencies, shows 5,362 fleet assets currently owned by the District *(see Figure 3)*. Further drilling down into the data using Insights the ability exists to produce user-friendly graphics showing not only the number of vehicles, but also the condition of the various fleet assets in each of the agencies, and the District as a whole.

Figure 3: Total Fleet Assets/ Condition Overview

The data further reflects that over 1,284 vehicles in the District are currently in the '*Poor/Replace*' category, as determined by the assessment of a combined set of factors including age, vehicle mileage, maintenance costs, and engine hours.

Drilling down another level, the ability exists to focus on just the fleet data of a particular agency. As an example, the data shown below will just focus on Fire and Emergency Management Services (FEMS) vehicles.

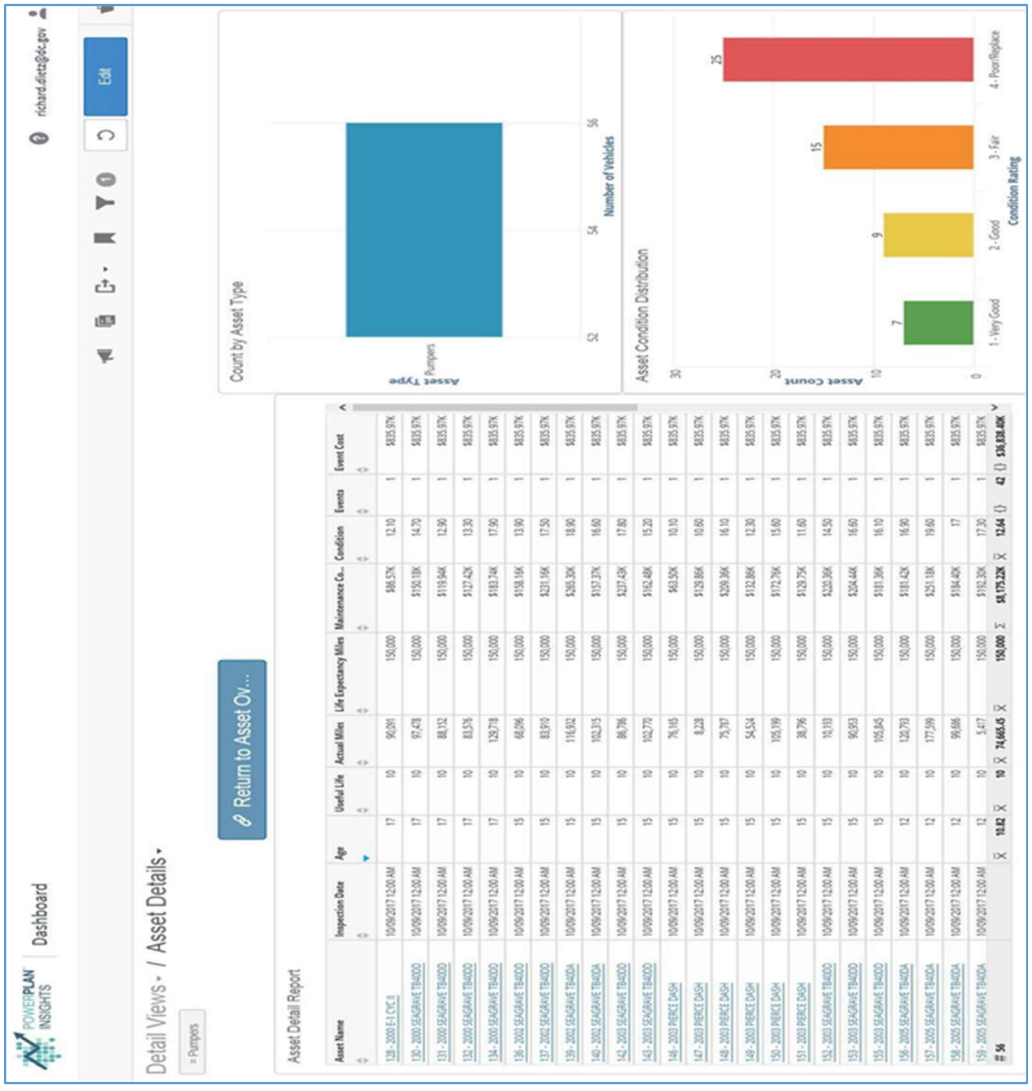
In the table below *(Figure 4)*, the user can see data within FEMS at an even more granular level, by vehicle type, such as ambulances, command vehicles, ladder trucks, pumper trucks, etc. The data reflects both the number of vehicles of each type, age, maintenance costs, conditions, etc., along with the condition of the overall FEMS fleet.

Figure 4: FEMS Fleet Data

Insights allows users to drill down even further to review data around a specific vehicle type, such as pumper trucks (pictured to the right). From the graphic above, the data shows that there are 56 pumper trucks with an average age approaching 11 years and a condition score (the higher the score, the worse the condition) of over 12.5, the poorest of all of the vehicle types. The data further shows that there are also 42 events, or needed replacements, of these vehicles within the CIP period. Thus, only 14 of the 56 vehicles would remain in service in the current fleet if replacement was done on a more rigorous, data-driven basis.

The chart below provides the additional detail obtained by looking specifically at pumper trucks. Data in the table is at an individual vehicle level and reflects additional data regarding age, actual mileage (when last serviced), the total maintenance costs to date, and the vehicle condition. For example, the data reflects that 25 of the 56 pumper trucks are in the *'Poor/Replace'* category.

Figure 5: Pumper Trucks Data



Finally, Insights allows users to drill down all the way into detailed data on a specific asset, by taking the user directly into the CARSS application, where the actual asset data is stored. The screen shot below *(Figure 6)* shows only a small sample of the data on this particular pumper truck that a user could access. The level of detailed data includes everything from the make and model of the vehicle, to the VIN number and the license plate number, as well as the remaining useful life, the estimated cost of replacement for this vehicle and when the replacement should occur.

Figure 6: Individual Asset Data

130 - 2000 SEAGRAVE TB40DD	Asset		
Name	130 - 2000 SEAGRAVE TB40DD	Rollup To	Pumpers
Asset Type	Pumpers	Active Date	00:00.0
Title	130 - 2000 SEAGRAVE TB40DD	Retirement Date	
Status	Active	Riva Asset Code	87953

Asset Details			
VIN	1FSEU28T4YCST2098	License Plate	GT4762
Make	SEAGRAVE	Model	TB40DD
Year	2,000	Organization	FIRE & EMERGENCY MEDICAL SERVICES (FEMS)
Class	7PFF	Class Description	FIRE UNIT, PUMPER

Lifecycle			
Useful Life	10	Current Age	17
Life Consumed (%)	170	Remaining Life	-7
Current Condition			

Inspection			
Inspection Date	10/16/2017	Rehabilitation Count (Initial)	0
Last Rehabilitation Date		Life Expectancy Hours	10,000
Life Expectancy Miles	150,000	Actual Reading Hours	0
Actual Reading Miles	97,478	Condition Factor	0
Inspected Condition Predictive Score	14.8		

Costing			
Replacement Cost ($)	788,648	Rehabilitation Cost ($)	
Inspection Cost ($)		Maintenance Cost	7,421
Repair Cost	144,202	Total Maintenance Costs	151,623
CapitilizedCost	309,177		

Measure Values

	2018	2019	2020	2021	2022	2023	SUMMARY
Age	0	1	2	3	4	5	
AdjustedAge	0	1	2	3	4	5	
Rehabilitation Count	0	0	0	0	0	0	
LIFECYCLE	2018	2019	2020	2021	2022	2023	SUMMARY
Condition	100	99.942	99.533	98.407	96.154	92.252	
Replacement Value	835,966.88	886,124.89	939,292.38	995,649.92	1,055,388.92	1,118,712.26	202,339,102.87
Cycle Count	1	2	3	4	5	6	
COSTING	2018	2019	2020	2021	2022	2023	SUMMARY
CAPEX	835,966.88	0	0	0	0	0	19,147,537.35
OPEX	0	0	0	0	0	0	0
Cost	835,966.88	0	0	0	0	0	19,147,537.35
Asset Value	835,966.88	835,480.188	832,059.679	822,653.836	803,816.29	771,196.931	
CONDITION SCORE PREDICTIVE	2018	2019	2020	2021	2022	2023	SUMMARY
Engine Hours Reading	0	0	0	0	0	0	
Engine Mileage Reading	0	12,378.159	24,756.317	37,134.476	49,512.635	61,890.794	
Predictive Condition Score	0	0.913	1.825	2.738	3.65	4.563	

Appendix B

(Summary of the Metro Funding Needs Analysis)

Prepared by the District of Columbia OCFO

District of Columbia

Analysis of Metro's Long-Term Capital Funding Needs

Jeffrey S. DeWitt
Chief Financial Officer

District of Columbia

Overview

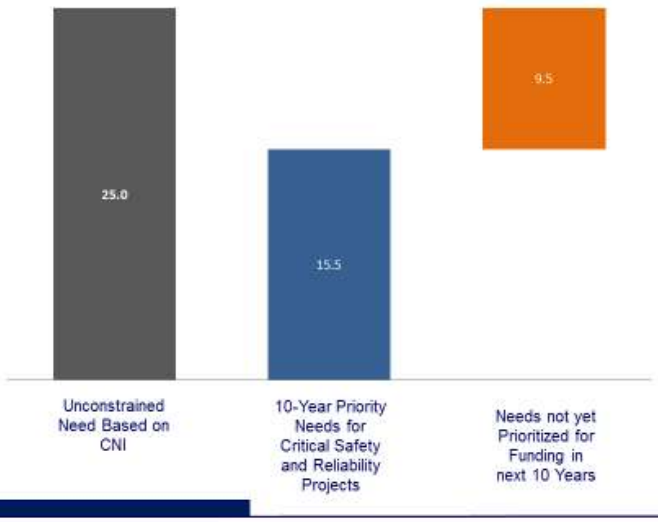
- Development of a reasonable basis to estimate the total WMATA funding gap
  - ✓ *Realistic State of Good Repairs (SGR) capital needs*
- The models initially developed for this analysis have been updated based on WMATA's Approved FY 2018 budget
- Potential impact of the Capital Needs Inventory (CNI) versus the CIP
- Need for additional contributions to fill the gap, and the impact on jurisdictions
- Determine the needed level of a dedicated funding source

District of Columbia

Determination of Capital Needs

10-Year Capital Needs, by Funding and Priority Status

(in $ billions)



Metro has $25B in capital needs over the next 10 years identified through a CNI process

- $15.5B is required for critical safety and reliability projects (State of Good Repair)
- Remaining $9.5B of capital projects has yet to be prioritized

District of Columbia

Items Required for SGR

WMATA 10-Year State of Good Repair (SGR) CIP Needs FY 2017-2026

Replacement, Rehab and Maintenance of Existing Assets Only

($ in millions)

Program and Project	10 Year SGR Need (Adjusted per the CNI)
Railcar Acquisition	1,707
Railcar Maintenance/Overhaul	850
Railcar Maintenance Facilities	744
Railcars	**$ 3,301**
Propulsion	1,842
Signals and Communications	1,194
Rail Systems	**$ 3,036**
Fixed Rail	812
Structures	1,217
Track Maintenance Equip	21
Track and Structures Rehabilitation	**$ 2,050**
Fare Collections	310
Parking Facilities	448
Platforms & Structures	485
Station Systems	351
Vertical Transportation	965
Stations and Passenger Facilities	**$ 2,559**

Program and Project	10 Year SGR Need (Adjusted per the CNI)
Bus Acquisition	800
Bus Maintenance/Overhaul	550
Bus Maintenance Facilities	1,010
Bus Passenger Facilities/Systems	63
Paratransit	148
Bus and Paratransit	**$ 2,572**
IT	1,287
MTPD	21
Support Equipment/Services	656
Business Support	**$ 1,964**
Total Need for 10 Year Period	**$ 15,482**

See handout for more detail on SGR CIP projects

District of Columbia

Critical Capital Needs Beyond SGR

- Eight-car trains during peak periods (order of magnitude - $1.7 billion)

Project	FY 2020 Cost ($M)
220 Railcars*	756
140 Railcars	521
Traction power and related systems upgrade (3rd rail)	459
Storage and maintenance facilities	744
Total (excluding 220 railcars)	**$1,724**

**Already under contract and part of the CIP.*

- Core station improvements (order of magnitude - $1.25 billion)
- New blue line connections (order of magnitude - $2 billion plus)
- Red line "sleeving" (order of magnitude – TBD)
- Pocket tracks (order of magnitude - $500 million)
- Metro Bus improvements (order of magnitude - $1.3 billion)
- Other improvements (order of magnitude - $2 billion)

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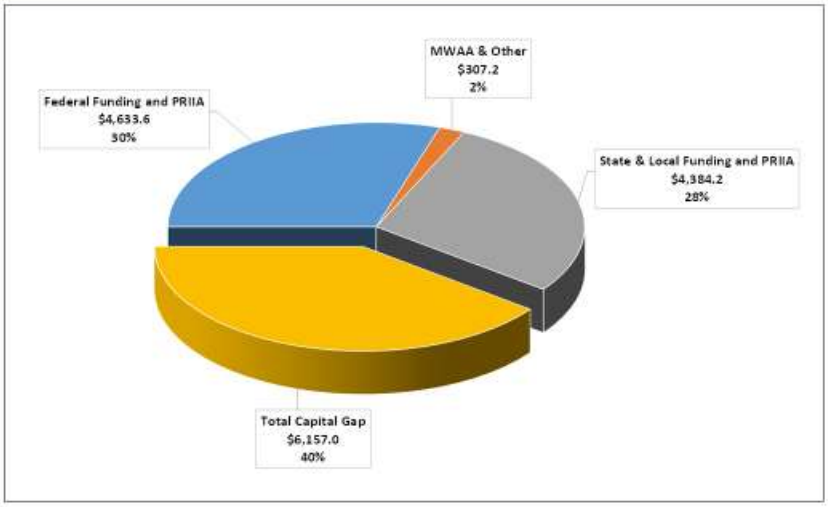
District of Columbia

Capital Budget Revenue & Funding Gap
(in $millions)



Total is approx. $15.5 Billion

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District of Columbia

Adequacy of $500M Additional Funding
(10-Year Capacity)

A regional consensus has been reached that a $500M per year dedicated funding source, that can be leveraged, is necessary to fund the $6.2B SGR capital gap plus other high priority capital needs.

(Dollars in millions)

	$500M[2]
Debt Financing Capacity[1]	$6,157
Pay-as-You GO Capacity for Other Critical Capital Needs beyond SGR	$2,743
Total Financing Capacity	**$8,900**

1. Based on estimated capital funding gap for $15.5 billion revised SGR CIP as identified by WMATA. Assumes debt funding of all annual capital gap amounts; 30-year amortization and 6% cost of borrowing.
2. Estimate of revenues from a dedicated funding source throughout the compact area escalated at 3% annually for growth. First year estimated to collect only 50% of revenues due to timing of implementation.

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District of Columbia

Debt Funding Calculations
($500M Option)

Fiscal Year	Capital Funding Gap[1]	Est. Debt Service to Cover Capital Gap[2]	Dedicated Tax Revenues[3]	Revenues Available to Fund Critical Capital Needs beyond SGR
2017	-	-	-	-
2018	-	-	-	-
2019	448,194	(32,561)	***250,000***	217,439
2020	510,985	(69,683)	***515,000***	445,317
2021	417,567	(100,019)	***530,450***	430,431
2022	166,738	(112,132)	***546,364***	434,231
2023	136,794	(122,070)	***562,754***	440,684
2024	1,467,690	(228,697)	***579,637***	350,941
2025	1,535,862	(340,275)	***597,026***	256,751
2026	1,473,169	(447,299)	***614,937***	167,638
Total	**$6,157,000**	**($1,452,737)**	**$4,196,168**	**$2,743,431**

Notes:
1. Estimate. Represents the annual capital funding gap for $15.5 billion revised SGR CIP as identified by WMATA.
2. Assumes debt funding of all annual capital gap amounts; 30-year amortization and 6% cost of borrowing.
3. Conservative estimate of revenues from a dedicated funding source throughout the compact area escalated at 3% annually for growth. First year estimated to collect only 50% of revenues due to timing of implementation.

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District of Columbia

2017 Capital Contributions vs Additional Required Contributions

Compact jurisdictions have agreed that 2017 capital funding levels can be sustained, escalated at 3% annually. The table below shows 2017 funding levels and member's shares of the additional $500M of required funding.

New Dedicated Funding Source Amounts	2017 Current Contributions[1]		Additional Required Contributions[2]	Estimated Total Contributions[3]
			$500,000,000	
District of Columbia (Regular CIP)	$70,400,000	35.7%	$178,500,000	$248,900,000
District of Columbia (PRIIA)	*$49,500,000*			$49,500,000
District of Columbia Subtotal	**$119,900,000**		**$178,500,000**	**$298,400,000**
Montgomery County	$32,300,000	16.4%	$82,000,000	$114,300,000
Prince George's County	$33,600,000	17.0%	$85,000,000	$118,600,000
State of Maryland (PRIIA)	*$49,500,000*			$49,500,000
Maryland Subtotal	**$115,400,000**	33.4%	**$167,000,000**	**$282,400,000**
County of Alexandria	$8,500,000	4.3%	$21,500,000	$30,000,000
County of Arlington	$15,800,000	7.9%	$39,500,000	$55,300,000
City of Fairfax	$500,000	0.3%	$1,500,000	$2,000,000
County of Fairfax	$27,800,000	14.0%	$70,000,000	$97,800,000
City of Falls Church	$600,000	0.3%	$1,500,000	$2,100,000
Loudoun County	$0	4.1%	$20,500,000	$20,500,000
Commonwealth of Virginia (PRIIA & Other)	*$49,700,000*			$49,500,000
Virginia Subtotal	**$102,900,000**	30.9%	**$154,500,000**	**$257,200,000**
Total	**$338,200,000**	100.0%	**$500,000,000**	**$838,000,000**

Notes

1. Amounts per FY 2017 WMATA approved budget. Amounts are before additional contributions or debt, and also do not include prior year carryovers.
2. Percentages represent WMATA compact capital contribution shares as of 2020 when Loudoun County joins the compact. Amounts do not include local PRIIA match amounts.
3. Additional contributions are required beginning in FY 2019 in order to fund SGR capital needs identified by Metro.

Note: These additional contributions would have to grow at 3% annually

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District of Columbia

Summary of Issues

- Allows WMATA to reach a State of Good Repair in 10 years
  - ✓ *SGR total capital needs are estimated by WMATA at $15.6 Billion*
- Effort will require metro to execute approx. $1.5B CIP annually over 10 years
- Represents a capital funding gap of $6.2 Billion over 10 years
  - ✓ *Far exceeds reasonable capacity of the compact jurisdictions*
- A dedicated regional funding source is essential to achieve a State of Good Repair
  - ✓ A dedicated funding source collecting $500M annually, beginning in January 2019, can cover the capital funding gap and provide additional capacity for other critical non-SGR capital projects
- To achieve a substantial additional funding level of $500 million per year is difficult for all compact jurisdictions, therefore a regional solution is required

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Appendix C

(List of Potential P3 Projects)

Per the Office of Public Private Partnerships

List of Potential Public-Private Partnership (P3) Projects

Based on available information as of FY 2019 capital budget formulation, below is a list of potential projects, as identified by the Office of Public Private Partnerships (OP3), for which that office is actively seeking to structure and finance as P3 projects. While actual dollar values for these projects are not available at this time, the OCFO conservatively estimates that these projects represent between $1 billion and $1.5 billion in capital costs alone. More information on these projects can be found at http://op3.dc.gov/pipeline.

Project	Agency(s)
In Procurement	
Digital Kiosks	DPR, DMV, MPD, OCTO
Street Light Modernization	DDOT, OCTO
Henry J. Daly Building	DGS. MPD
Under Consideration	
West Virginia Avenue Public Works Campus	DPW
Corrections Center	DOC, DGS
Library Facilities	DCPL, DGS
Police Facilities	MPD, DGS
Fire and Emergency Medical Facilities	FEMS, DGS
Parks and Recreation Facilities	DPR
Educational Facilities	DCPS
Waste Management / Recculing Center	DOEE, DPW
Solar and Microgrid Projects	DOEE, DGS

While there is no singular definition for public-private partnerships (P3s), the World Bank generally defines them as, *"A long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance."* All P3s involve a basic trade-off between a transfer of risk (risk of construction, risk of management, etc.) by the private party versus control (control of day-to-day operations of the facility, control of the revenue stream from the facility, etc.) by the government entity. There are several advantages and challenges related to P3s that government entities need to address when considering their use. These include, but are not limited to, the following:

Advantages	Challenges
Accelerated project delivery compared to pay-as-you-go approach	Restricted control over day-to-day operations of the facility
Fixed-price contract where private partner is at risk for any cost overruns	Ongoing costs of monitoring the contract over a long period of time
Access to more innovative, and cost-effective methods of design and operation of the facility	More expensive cost of borrowing for private partner versus traditional public borrowing
Account for full life cycle costs of operating and maintaining a facility	Often less transparency and accountability in the contract with private partner versus traditional public sector approach
Ability to hold private partner to specific performance standards in a contract or otherwise withhold payment	A mismatch in technical expertise on the side of the private partner can lead to overpayment by the government entity

Appendix D

Description of Long-Range Capital Financial Plan Model

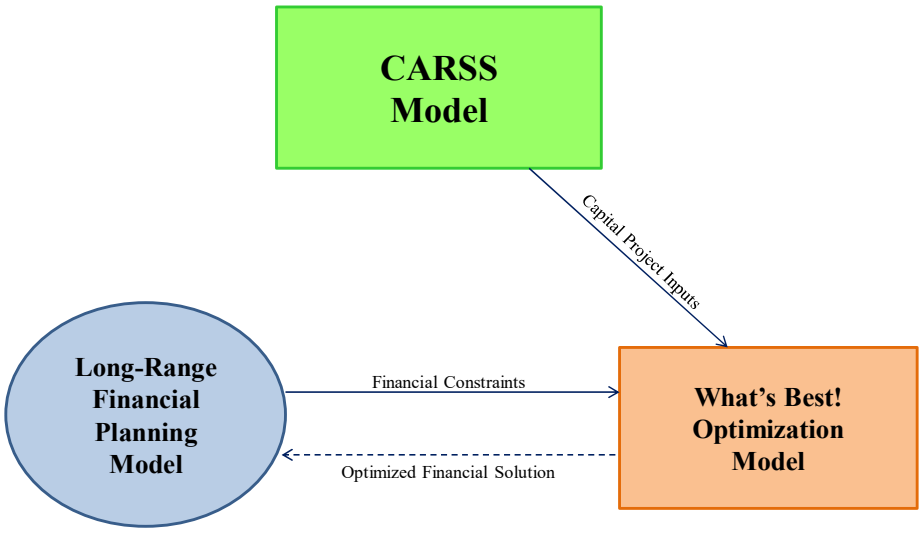
Description of Long-Range Capital Financial Plan Model

In order to address the complex challenge of financing the unfunded capital infrastructure needs identified in the capital asset replacement scheduling system (CARSS), while remaining within the various constraints imposed by the District's borrowing limits, the OCFO engaged the services of our external financial advisor, PFM Advisors LLC ("PFM") to develop a long-range financial planning model. This modeling effort will assist the District in identifying financial strategies to fund the identified capital needs gap in the earliest year possible given various constraints, such as the amount of paygo or additional federal funding available over various periods.

The Long-Range Capital Financial model is a combination of three discreet models that work in conjunction to identify the optimal financial result. The various components are:

- CARSS – an asset management planning ("AMP") software solution developed by PowerPlan;
- Long-Range Financial Planning Model ("LRFPM") – which is a Microsoft Excel based model developed by PFM; and
- Lindo What's Best! ("WB!") – a linear optimization model, which works as an add-in to Microsoft Excel.

Long-Range Capital Financial Model



The CARSS model extracts the capital project inputs from various District Agency files and prioritizes, scores and, based on specific District criteria, ranks them in comparison to all other projects across the District. Then, under capital budget constraints and with a specific priority ranking assigned to each project, it determines which projects can be funded in the Capital Improvement Plan (CIP) each year, and which projects will not receive funding (due to their lower priority ranking). The detailed list of unfunded capital projects is then imported into the WB! linear optimization model, along with certain debt and source assumptions from the Long-Range Financial Planning Model, to solve for the optimal solution to finance the unfunded capital gap as

soon as possible. The financing information from the WB! linear optimization model is then exported back into the Long-Range Financial Planning Model in order to present a complete long-term capital financing plan for the District over the forecasted 15-year period.

This modeling effort will allow the District to accomplish several capital financial planning goals. Specifically, it will allow the District to:

- Alter individual assumptions within internal and external source categories and drive source projections, with specific focus on paygo funding levels;
- House all existing debt service (by series);
- Project the District's debt service through the end of its 15-year forecast period (FY 2033) by exporting sizing results calculated in DBC Finance, a bond modeling software program;
- Utilize linear optimization software to maximize the amount, and optimize the structure, of future debt issuances to ensure that the District stays within its statutory debt limits;
- Summarize all projected debt and expenditure detail through FY 2033; and
- Calculate the projected ratio of debt to expenditures on an individual fiscal year basis throughout the entire financial planning period.

The engine of the model lies in the macros and linear WB! linear optimization software. These tools allow the model to directly interface with other internal models to ensure the District maintains the flexibility to incorporate the most current source data and CARSS assumptions into each analysis. It also allows the District to optimize and project the maximum amount of debt that can be issued in each fiscal year (under the 12% cap), while simultaneously determining the earliest possible fully-funded year of all unfunded capital projects. The District will also be able to quantify the amount of paygo needed to fund entire backlogs of unfunded capital needs over various time periods. Outputs of the Long-Range Capital Financial Model include two reports: a "*Gap Report,*" which (based on the CARSS file) details and quantifies the current capital projects funding gap in each fiscal year using that year's sources of funds; and a "*Funded Report*" which lists the unfunded capital projects from the FY 2019-2024 CIP that receive funding, and in which years outside of the current CIP period, and summarizes the allocation of sources based on fiscal year projections of debt service.

Appendix E

Methodology for Classifying and Scoring Capital Projects

Methodology for Classifying and Scoring Capital Projects

Project Classification

After all agencies of the District of Columbia formally submitted their capital projects, and the Capital Budget Team (CBT) reviewed and made adjustments to them, the total number of capital projects with requested budget needs stood at 381. This set of projects went through several progressive actions to better refine and assess the total capital needs of the District.

After defining the categories and classifications of all projects within the four asset types; Horizontal infrastructure, Vertical infrastructure, Fleet, and Information Technology and Equipment, all capital project requests were then re-examined placing them into one of two groups based on their need for capital investment. The first group of projects consists of what are called "new capital projects." This group is characterized by the fact that the project is essentially a one-time investment that either expands or establishes a new service for District constituents. For example, projects to build a new swimming pool, completely modernize a school, or to invest in an extension to the streetcar line are examples of projects in this grouping. These projects receive budget a single time, perhaps over multiple years during construction, and are then placed into service without a specific continuing capital investment need.

The second group of projects are called "capital maintenance projects," and are comprised of those projects where a continued capital investment must be made in the asset. These projects can generally be thought of as the capital maintenance of existing assets that are already owned by the District. It is important to note that these are qualified capital expenditures, not the routine operating and maintenance costs, of capital assets. Capital projects such as public safety vehicles, sidewalks, information technology upgrades, and roof or HVAC capital repairs to buildings are examples of these types of projects. These projects require periodic investments of capital in order to maintain them in a good working condition, or otherwise replace the assets at the end of their useful lives (i.e. vehicles). Without these periodic capital investments, the assets will deteriorate, costing significantly more in annual maintenance costs, and will eventually fail completely.

There are numerous examples in our region of this kind of asset failure due to lack of adequate capital maintenance over the years. High profile examples of this inadequate capital maintenance can be found at the federal level with the Arlington Memorial bridge, at the regional level with the well-chronicled troubles of the Metro system, and at the local level in the failing state of the District's Henry J. Daly building. The most notable example of failed capital asset maintenance in the area was probably the poor state of repair of schools' facilities in the District until about FY 2008, when the District began to spend billions of dollars over several years to repair and rebuild its school facilities. It can be argued that if an adequate amount of funds had been provided to maintain school facilities in the past the facilities might have lasted for several more years, and thereby decreased the amount of funding dedicated in the CIP to that purpose.

Based on project types, categories and classifications, the CBT then established the expected useful life of assets that make up the project (pending building CARSS at a more detailed asset-by-asset level in the next phase), and thus the amount of estimated budget the project will require over any number of years. For example, we know that a typical administrative vehicle must be replaced every seven years. The CBT applied adjustments needed to the agency requested project budgets to reflect any missing needed investment over the useful life of the asset, and beyond. The budget needs are also inflated by three percent (3%) annually (compounded) to reflect a degree of cost inflation.

Capital projects were then further reviewed to identify if they should be considered as either 'pooled' projects, or potential public-private partnership (P3) opportunities. Pooled projects have typically been used where there are known capital investments of a specific type (roofs, electrical systems, HVACs, etc.) that must take place across several agency assets, but where the specific locations and/or costs are not yet identified.

The Mayor's Office of Public Private Partnerships reviewed all projects for their potential as a P3 opportunity. They scored the opportunities on a scale of "0 to 4" where zero reflects no opportunity for the project to be structured as a P3, and "4" representing a very high probability of a P3 opportunity. The data identifying the pooled projects, as well as the P3 potential scoring was entered in CARSS. This data will enable us to better identify the characteristics of certain capital projects and will help us evaluate the potential need for funding and budget where partial funding can be obtained outside of direct District resources.

Project Scoring

To properly score projects as objectively as possible a mechanism was designed to assist with process. The tool provides a set of 16 different elements against which projects are individually evaluated. Those elements were then grouped into 3 sections to evaluate the benefits, assess the potential impacts, and determine the extent to which a proposed project would meet District policy priorities.

The scoring criteria for each element was then assigned a weight to ensure that any proposed project received a fair and unbiased score when compared to other projects. In other words, the element weighting "level-sets" projects on the same scale to ensure that a well-defined, proposed new school project receives a similar score to a project to replace HVAC systems in 3 libraries, or a project to upgrade IT software. Thus, a project that maximizes benefits, provides positive impacts to the District, and aligns with priorities, would receive a score of 100 points, regardless of the nature of the project or the asset being acquired.

Actual project scoring is simply a matter of assigning each element that the project impacts a score from 1-5. A score of 1 representing that the project only impacted that element minimally, while a score of 5 means the project impacts that element significantly. The weighting factors are then automatically applied to the score in the CARSS application. There is also a set of 10 additional sub-elements that are key priorities. Any project that meets one of those receives a bonus of 5 additional points. The scores in each section are then totaled to determine the overall project score. The scoring is initially performed by the Capital Budget Team members and is then reviewed several times to ensure consistency across all proposed projects and District priorities. These scores thus provide the basis for the ranking done in CARSS to determine the priority order of all projects proposed.

The detailed scoring criteria used for all capital projects can be seen on the following chart.

Ranking Criteria for Proposed Capital Projects

Project Scoring (Score Each Numbered Element - light gray highlights)
Evaluate the proposed project on a scale of 1-5 for the extent to which it meets any defined element(s)?

Special Emphasis Projects (Mark any project that meets sub-element criteria - dark gray highlights)
Define these with an "X" in the element score - and 5 bonus points will be added

	Agency / Project	Total Cost	Element Score	Weighted Factor	Total Element Score
	Meets District Policy Priorities				
1	*Education*		0	3	0
	Middle School				0
	Library				0
	Pre-K Classrooms				0
2	*Community (Homelessness, Housing, Employment)*		0	3	0
3	*Health*		0	3	0
	Recreation Center				0
	Ambulances				0
4	*Public Safety*		0	3	0
	Crime Fighting Technology				0
5	*Transportation*		0	3	0
	Local Road Rehab				0
	Pedestrian, bike or Public Transit				0
	Environmental Remediation - Trees and Green Infrastructure				0
6	*Good Government*		0	3	0
	Smart City - DC Net, GIS				0
Priority SubTotal					**0**
	Cost-Benefit Factors				
1	*Readiness (catalyst project, implements Small Area Plan, etc.)*		0	5	0
2	*Impact on Operating Budget**		0	5	0
3	*Potential to Generate Revenue for the District*		0	5	0
4	*Potential for Private Economic Impact or Job Creation*		0	5	0
Cost Benefit SubTotal					**0**
	Project-Specific Impacts				
1	*Health and Safety Improvements*		0	7	0
2	*Federally Required Mandate*		0	5	0
3	*Extends Useful Life of Existing Asset*		0	5	0
4	*Close Out Existing Project*		0	5	0
5	*Project Importance*		0	7	0
6	*Critical Building System Improvement*		0	5	0
7	*Co-location of projects/facilities*		0	5	0
8	*Leverages External Public or Private Investments*		0	5	0
9	*PIF Evaluation Score (IT projects)*		0	0.25	0
Impact SubTotal					**0**
	Total Score				**0**

* if the project adds costs to the operating budget, then score 1; if no impact, then score 3; if savings then score 5

Appendix F

Overview of How Capital Projects Were Prioritized

Overview of How Capital Projects Were Prioritized

Once sufficient details outlining the nature and structure of needed projects and their budgets existed, the next task was to determine an objective approach to prioritize the 381 proposed capital projects, since there was likely no possibility that all of the capital needs could be funded in the current CIP. The CARSS model will ultimately analyze this at an asset-by-asset level by evaluating the relative risks to the District of deciding whether to fund certain capital projects.

One ranking mechanism that was considered was to establish District priorities by asset type, classification, or category. However, this approach does not allow for an objective comparison of different asset types against each other. For example, given scarce funding resources, how should the decision be made to objectively compare the relative importance of an emergency vehicle versus a school facility versus I.T. equipment? It was determined that a better approach would assess each project on a stand-alone basis, and its relative importance for funding versus the other 381 projects, to ensure that a project to repair an HVAC system in a school was scored on a level playing field with a new accounting system, as an example.

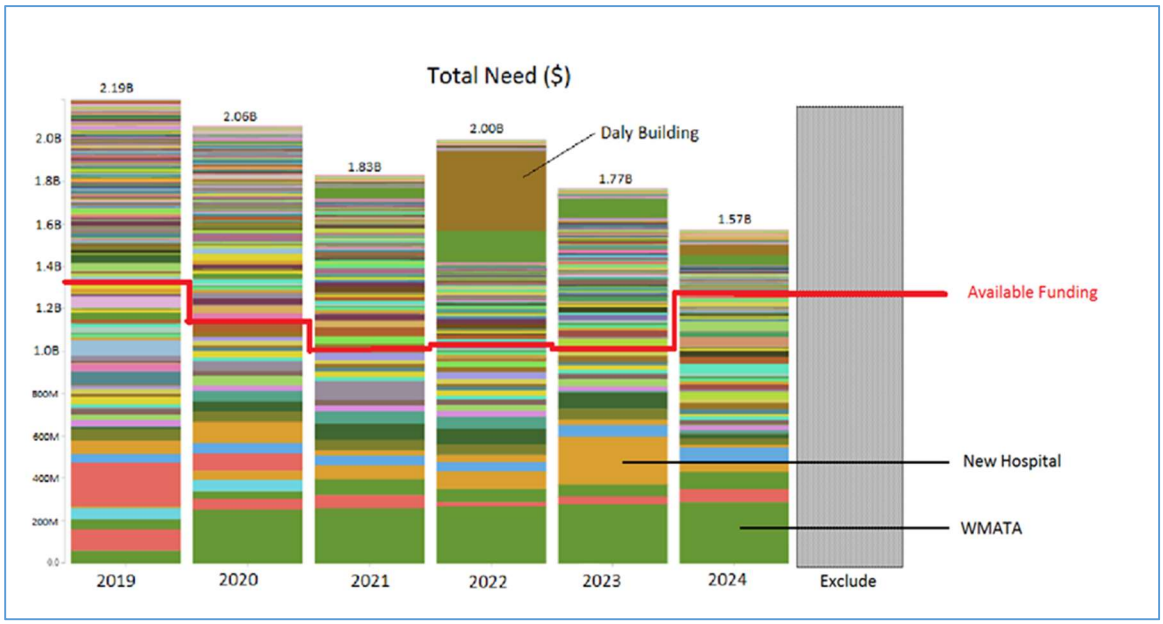
Using the standard system of scoring projects that was established, the Capital Budget Team (CBT) and other subject matter experts spent time over several weeks to individually score each of the capital projects. The scores of individual projects were reviewed several times to assess consistency and a genuine sense of logic, and to ensure they were as objective as possible. The criteria and the scores were then applied to the CARSS model, which created a project ranking from 1 to 381. As we complete the asset-by-asset driven model, an assignment of risk will also be created using a variety of different factors. In the interim, we are using the scoring as the proxy for risk at a project level. The logic is that the higher the score assigned (or 'level of importance'), the greater the risk to the District for not funding that capital project.

In addition to scoring by the CBT and other subject matter experts, agencies also ranked each of their proposed capital projects in order of the agency's priorities. This enabled the CBT to better coordinate final decisions for capital projects which were scored similarly by the CBT, serving as a tie breaker based on their relative importance to the agencies.

The data load into CARSS included the proposed funding source (debt, paygo, rights-of-way fees, federal budget, etc.) of each project, for each year of the six-year CIP period. Available budget totals based on the District's borrowing capacity and the approved financial plan are also fed into CARSS by year and by funding source. Thus, the capital projects can be segregated by funding source and type to better ensure that the proposed budgets match the revenue and funding available.

The result, at this phase of the process, provides a priority scoring of all projects that can be funded within the budget constraints of the District, in any particular year. CARSS provides a mechanism (called a "visual leveler") that allows users to see a graphic representation of all capital priorities and budget constraints and determine a measure of risk to the District.

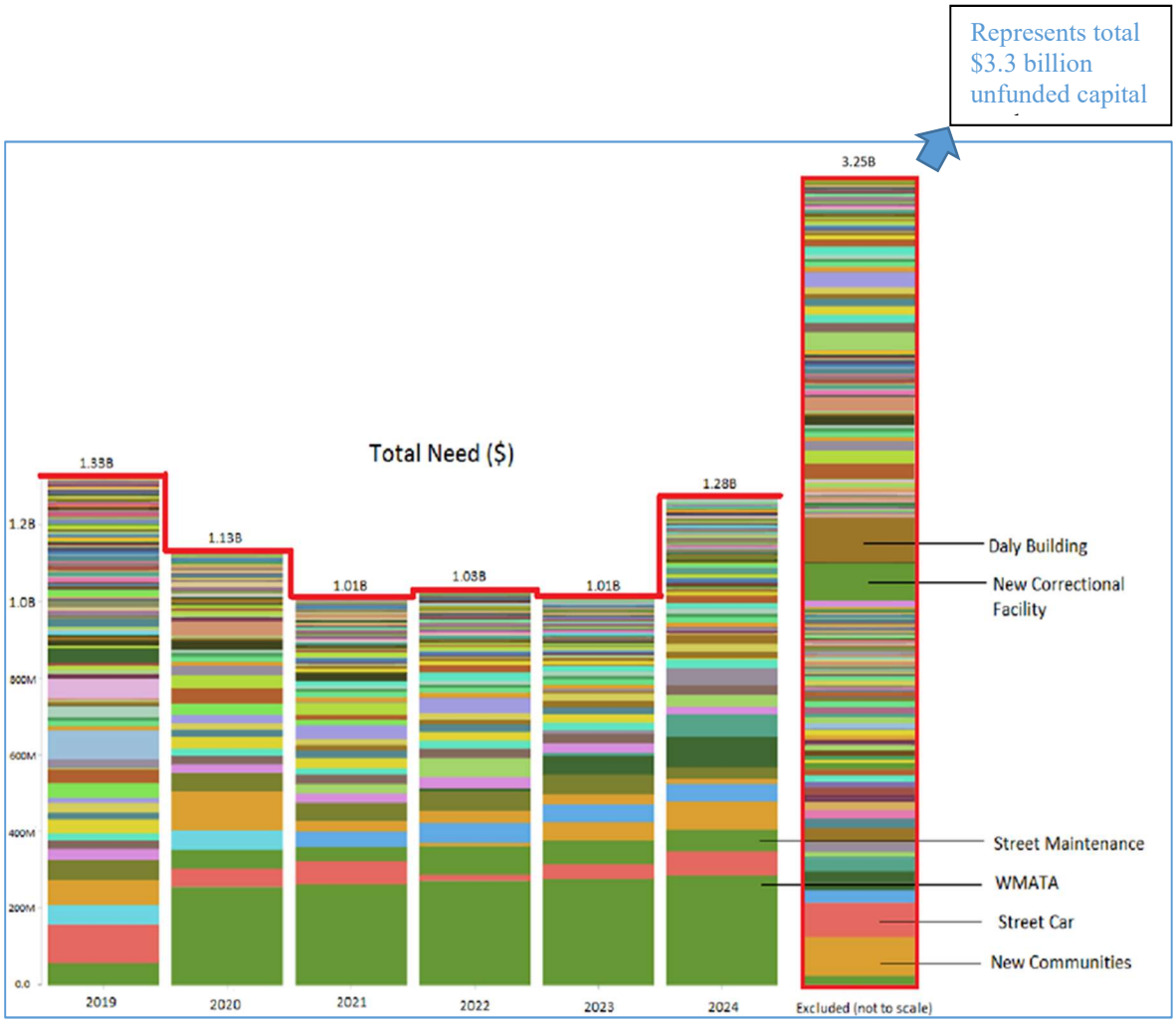
The following screen shot of the visual leveler shows all of the capital project requests from the various agencies as part of the FY 2019 – FY 2024 CIP budget formulation process, relative to the amount of funding available, represented by the red lines.



The visual leveler then enables users to maneuver individual projects by year in an attempt to determine a set of projects that can fit within the resource and budget limits for any particular year. The scenarios are captured with the results reflected in each year's set of projects, and in summary as a change to the District's risk factor. Users can propose and save different scenarios for further discussion and analysis.

In addition to allowing individual projects to be maneuvered, the visual leveler in CARSS will also automatically solve the funding problem using a combination of project scoring, risk, and budget limits to optimize the decision of which projects to fund in any particular year, and which ones will have to be excluded given budget limits. The optimization is captured both project-by-project, and year-by-year.

Below is a screen shot of the District's capital projects budget needs after running the solver (optimization) function.



After utilizing CARSS to optimize project priorities for the CIP period, capital projects that did not have a sufficiently high priority were placed in the "excluded" column on the far right of the chart (highlighted in red). This data was then extracted and used to determine the identified gaps in budget needs year-by-year. The Capital Budget Team then conducted another detailed review and scrubbing of the remaining, unfunded or underfunded capital projects, along with identifying which of these remaining projects had a high potential to be structured as a P3. This resulted in a remaining total of 208 capital projects with verified budget needs that reflected true unfunded capital projects of the District. This set of projects defines, at this point in time, our best estimate of the total unfunded capital needs of the District, and the financing challenge that needs to be addressed.

Unlike in past years, the 2018 CARSS analysis does not exclude those capital projects identified as likely to be structured as P3s from the overall calculation of total unmet needs. Given the uncertainty of when, or even if, the P3 procurements might take place for certain capital projects, it was thought to be more prudent to include those projects in the overall calculation of needs for

now. When greater certainty arises about individual projects being procured as P3s they can be removed from the analysis at that time. It is important to note that any capital needs that are eventually financed as a P3, either through the use of an availability payment by the District, or some other payment mechanism, which at least some portion of the payment stream will likely be considered as a long-term obligation of the District, or debt, will almost certainly be subject to the District's statutory borrowing limitations.