P3 PROJECT STRUCTURING GUIDELINES FOR LOCAL GOVERNMENTS

The District of Columbia P3 Program—A Case Example

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AUTHORS’ NOTE

Large infrastructure projects are some of the most complex and risky endeavors that governments undertake and, for municipal governments, using alternative procurements like Public Private Partnerships (P3s) can appear especially daunting. In addition to having to build their own necessary P3 institutional capacity, cities also have a diverse set of assets with very different characteristics. Whether they are schools, streetlights, or broadband fiber optics systems, each assets’ amenability to a market-driven P3 approach and their degree of externality as a necessary public service vary greatly. And, as always, politics get in the way—often rightfully so with necessary due process. The ultimate success of a P3 is often not determined by complex project structuring decisions, though they are important, but rather driven by consensus building and clear, proactive communication with project stakeholders on a myriad of project topics, some of which are politically sensitive, irrespective of whether they are germane to the P3’s technical viability in the end. When undertaking P3 initiatives, it is thus easy to fall prey to discouragement. Like all new and innovative tools, however, P3’s can be a valuable and powerful tool under the right political climate and with the right (and knowledgeable) decision makers at the helm. For municipal P3s, the key is for local government sponsors to have a sufficient P3 knowledge base to recognize their value if and when the time is ripe for their use. At minimum, it is hoped that the guidelines contained in this report would serve that purpose.

We would like to thank Living Cities and the Citi Foundation for their invaluable support and perspective in developing these guidelines. We would also like to thank the staff and leadership of the Washington D.C. Office of Public-Private Partnerships, and indeed the leadership of all of the city’s departments and agencies, for opening their doors and sharing their insights, challenges and experiences in creating a municipal public-private partnerships program. We are hopeful that your experience will support other cities interested in creating innovative new programs to develop and manage their infrastructure needs. Lastly, we interviewed numerous industry experts across many municipal infrastructure sectors in crafting these guidelines. Where we could, we acknowledged their input in the pages that follow. We thank you again for your time and expertise.
EXECUTIVE SUMMARY

This study was completed as part of the Living Cities and Citi Foundation City Accelerator initiative and with the support of the City of Washington, D.C. (“the District”), one of the four cities selected for the Infrastructure Finance Cohort. The District’s Office of Public-Private Partnerships (OP3) is charged with identifying private sector partnerships to finance its critical infrastructure. This study is intended to support OP3 in developing practical guidelines to help structure and use public-private partnerships (P3) for infrastructure delivery. As one of few dedicated municipal P3 offices in the United States, OP3 will serve as a model for other cities across the country. The guidelines developed in this study will likewise serve as a useful tool for OP3 and other cities as they explore using P3s to meet their municipal infrastructure needs.

Compared to their federal and state counterparts, cities face unique challenges when implementing P3 projects. Many cities today are constrained financially not only due to their limited taxing authority but also from several recent trends that have had compounding effects on municipal finances—the diminishing role of the federal government in infrastructure funding, skyrocketing legacy mandates, increasing volatility in tax revenues, and aging populations with increasing needs for social programs and entitlements. Cities are also limited in their internal capacity to manage complex procurements such as P3s for major infrastructure projects. Their infrastructure assets are diverse—schools, city halls, police stations, detention centers, health clinics, water and waste treatment plants, lamp posts, fiber optics cables—and coordinating an integrated strategy across multiple agencies is a significant burden on already constrained administrative resources.

Yet these challenges also create a unique set of opportunities. The diversity of city assets offers more ways for the private sector to participate in infrastructure delivery and, as already proven outside the U.S., more ways for cities to innovate or to bundle multiple projects to gain efficiency and economies of scale. As demonstrated by the Long Beach Civic Center (LBCC) project, there are also ways for cities to leverage their existing assets, such as unused public property, to help defray the financial burden of projects and enhance their viability as P3s.

To properly structure P3s, cities need to understand the available project structuring “forms” (i.e., various P3 procurement models) that they can choose from, and they need to establish clear “processes” to both determine the optimal structure for a given project and then implement the procurement.

For major capital improvements, the most familiar form of a P3 arrangement in the U.S. is a P3 concession, which is used primarily for infrastructure assets that are publicly owned. The salient features of a P3 concession are (1) a lifecycle-based asset delivery approach that integrates multiple elements of infrastructure delivery including design (D), build (B), finance (F), operate (O), and/or maintain (long term) (M), (2) transfer of risk to the private partner, and (3) a performance based payment mechanism.

Availability payment (AP P3) and revenue risk (RR P3) P3 are two common forms of P3 concessions. Under an AP P3, the private partner is required to secure financing for the project,
but long term funding responsibility resides with the sponsoring government, which pays the private partner some combination of lump sum milestone payments (during the construction phase) and performance-based annual service fees (during operations and maintenance phase) for delivering the infrastructure asset. Under a RR P3, the public sponsors have no financial liability and the private partner recoups its investment primarily from the direct user charges on the infrastructure asset it delivers, thus assuming demand (or revenue) risk.

For cities, the most prevalent P3 concession model for their social infrastructure assets (e.g., schools or city halls) is an AP P3 with a DBFM scope of services. The most prevalent model for economic infrastructure assets (e.g., water treatment plants or fiber optics/broadband networks) is a RR P3 with a DBFOM scope, primarily because these economic assets can be partially or wholly funded via user fees. Both of these models are designed to maximize economies of scale and transfer project risks to the private partner. For most social infrastructure, responsibility for core operations (“O”) often naturally remain in the public domain (e.g., education, government operations) while secondary operations related to asset management (e.g., custodial service, building security, or ground maintenance) may be transferred to the private partner. For economic infrastructure, core (e.g., providing clean water) and secondary services (e.g., operating water treatment plant) are one and the same.

When asset ownership can reside in the private domain, whether in part or in whole during the contract term, cities can explore other procurement forms—most notably franchise agreements or various leasing arrangements.

A franchise agreement is used primarily for economic infrastructure with the potential to directly charge users and where the private partner brings special operational expertise (e.g., solid waste-to-energy conversion) that the sponsoring government does not have. It also often involves “off-takers” that can guarantee minimum demand (or revenue) levels for the private franchisee (e.g., through a power purchase agreement (“PPA”), a local utility can guarantee a minimum level of energy purchase once the waste is converted). The most prevalent franchise forms are BOT (build-operate-transfer, where the private partner transfers asset ownership) and BOO (build-own-operate, where the private partner retains asset ownership). In all cases, the public sponsor assumes no financial liability except to purchase power or authorize the private partner to collect user charges on the asset it delivers. This model often also uses revenue sharing arrangements.

Cities can also involve a private partner in their infrastructure delivery through various long-term leasing arrangements. By leasing, cities leverage their long term operating budget to fund capital improvements without having to issue long-term debt and without assuming direct liability for the asset, thus gaining flexibility in adjusting to changes in technology or capacity needs. Leasing arrangement are used primarily for social infrastructure and their two most prevalent forms are Lease/Purchase (L/P) and Lease-Develop-Operate (LDO). L/P is used for greenfield projects where the private partner delivers the new asset then leases it to the public sponsor. Once its investment is fully recovered through the lease, the private partner transfers asset ownership to the public sponsor. LDO is used for brownfield assets where the private partner leases an existing public asset to rehabilitate it, then operates and maintains it on behalf of the public sponsor, and gets paid either monetarily or in-kind (this is a form of “enhanced use lease” (EUL) used successfully by the federal government).
Over and beyond major capital improvements, cities can engage private partners to share their financial risk in providing infrastructure services during the O&M phase of an infrastructure asset. A good example of this model is an energy service (or savings) company (or ESCo) where existing assets are retrofitted to minimize energy consumption but the cost of the retrofit is financed by the private partner and recovered primarily from energy cost savings. Together with the private partners, cities can also explore other innovative opportunities to generate additional revenues. For example, cities can defray the capital investment burden of infrastructure delivery by incorporating real estate development into the procurement, as mentioned earlier for the LBCC P3.

In addition to project structures, cities need processes to streamline their P3 project structuring decisions. Broadly, the P3 implementation process encompasses (1) a planning stage to establish a long range capital improvement plan, from which a pipeline of specific capital projects that could be explored as P3s is identified, (2) a screening stage where candidate P3 procurement options are compared with traditional approaches and screened for further consideration, (3) a structuring stage in which a preferred P3 strategy is developed with sufficient project structuring details to enable the start of the procurement process, (4) a procurement stage that extends from the preparation of bid and contract documents to the selection of preferred bidder, ultimately leading to commercial close, and (5) an implementation stage in which monitoring of the P3 contract is undertaken over the entire project lifecycle to ensure that performance requirements are met.

Throughout the planning, screening, structuring and procurement cycles, various assessments, both qualitative and quantitative, should be completed to ensure that (1) a P3 is preferable to the traditional design-bid-build (DBB) approach and (2) if a P3 is indeed preferred, the optimal procurement model is chosen for competitive bidding. Various tools are available for both qualitative and quantitative assessments.

Qualitative assessment examines various screening criteria to determine whether a particular project is eligible for procurement as a P3 using non-quantitative factors that can help determine the best procurement option. For example, the screening criteria can help to assess (1) whether a project is of sufficient size to warrant the transaction costs associated with a P3 and whether there are potential bundling opportunities to overcome this size hurdle, (2) whether the public sponsor has had experience with projects of similar size and complexity and the extent to which project risks can be transferred to the private partner, (3) whether it is possible to define performance-based specifications (for both construction and O&M phases) and the extent to which the public sponsor needs flexibility and control over the project lifecycle, and (4) whether there are potential opportunities for a private partner to innovate to reduce the project’s life cycle costs.

Quantitative assessment involves the completion of a Value for Money (VfM) study for the project. VfM is in essence risk-adjusted net present value (NPV) cash flow analysis based on a whole-life cost comparison between traditional procurement (where its whole-life cost equivalent is referred to as a “public sector comparator (PSC)” and procurement as a P3. In a workshop setting, various stakeholders and subject matter experts (SMEs), drawn both internally and from
industry, identify critical project risks (a project “risk register”) and allocate them to the party best able to assess or manage them (the private or public partner), and estimate both the likelihood and the financial consequences of a particular risk materializing over the course of the project.

The extent these assessments and tools are utilized depends on the particular needs of a public sponsor in determining the optimum procurement for their projects. The objective of these assessments is not to determine a single right answer (because there will be many) but rather to incorporate risk-based decision making into infrastructure investment planning and to ensure the procurement selected matches the context and priorities of the government.

Along with these assessments, several other processes should be established for municipal P3 programs. For example, a P3 procurement process can be streamlined and more formalized into a three-stage process that includes: (1) initial market sounding through a formal request for information (RFI) and/or an informal industry workshop, (2) a request for qualification (RFQ) stage to prequalify a short list of firms, and (3) a request for proposal (RFP) stage for competitive bidding of the short listed firms. Aside from formal procurement, it would be beneficial to establish processes to handle unsolicited proposals. More importantly, interagency coordination would need to be more streamlined by forming a P3 project board to oversee the overall P3 implementation. In addition to a P3 office like OP3, such a board could include one or more line agencies that are the primary users/tenants of the infrastructure asset under consideration as well as a representative from the CFO or treasury office. Once the formal procurement starts, evaluation committee(s) would also need to be formed to evaluate proposals.

Cities face different sets of challenges for different types of assets. For civic buildings—such as the Henry J. Daly police headquarters or many other public buildings currently in the District’s OP3 project pipeline—the challenge is to transfer as much of the project’s risk to the private partner and achieve budget certainty, both for capital and O&M costs, so that the city’s budget is not exposed to volatility and critical infrastructure risks, such as deferred maintenance, can be avoided. For these buildings, when feasible, cities should also take advantage of many auxiliary opportunities that the partnership can offer to generate additional revenue for the project, including proximate real estate development. For both public buildings and schools P3s, the predominant P3 structures have been AP P3 concession with DBFM as the scope.

Unlike colleges and universities such as U.C. Merced, P3 applications in elementary/secondary schools under local jurisdictions in the U.S. have been limited to date. However, there is ample evidence from countries with similar institutional arrangements (e.g., Canada, U.K., and Australia) that indicate that P3s have helped them to build and modernize more schools on time and on budget than under traditional procurement. In those cases, the partnerships helped educators focus on their core mandate of educating, while modernizing aging school assets with better design and better integration of latest information and communication technology (ICT). Through on-line platforms, the private partners were also able to engage the local communities directly in the design, reflecting both school-specific needs as well as the multi-use of school facilities by the local communities.
Financially, schools P3s bundled multiple projects into one procurement to maximize the economies of scale and minimize procurement costs. Schools P3s also helped the public sponsor spread out capital funding needs over a long period because, in most cases, no milestone payments were required during construction. Although significant progress has been made in the District’s school modernization program, there still remains almost $850 million in unfunded school capital projects involving 22 elementary and secondary schools. In addition to the pay-as-you-go option currently considered by the District, P3s may be able to offer a viable alternative to help finance and deliver these unfunded school projects faster and on budget without a significant additional financial burden on the District.

Short-term detention centers and correctional facilities under city and county jurisdictions, such as the consolidated correctional center envisioned by the District, are also viable for P3s as a delivery option. Due to high prison populations and severe capacity limitations, private sector participation in delivering correctional assets is not new in the U.S. The two prevalent P3 procurement models have been Lease/Purchase (L/P) where the asset ownership is in private hands and AP P3 where the asset is publicly owned. For private prisons, the private partner delivers all prison related services (i.e., DBFOM), whereas under an AP P3 with public ownership, certain security-related operations remain the responsibility of the public sector.\(^3\) One of the key challenges with this asset type is developing a resilient design and using technology to manage the higher physical damage and wear-and-tear to which the assets are often subjected. The transfer of such design risk to a private partner and the ability to bundle multiple facilities, sometimes across multiple jurisdictions, have been an advantage under these models when compared to traditional procurement.

Most of the existing 85 waste-to-energy (WTE) conversion facilities in the U.S.—of which more than half are privately owned and over two-thirds are privately operated—are under city or country jurisdictions and predate 1995. Although these projects in the U.S. have been limited, there has been a renewed interest in using P3s to deliver WTE assets outside the U.S. In the last 5 years, for example, this market grew at 8 percent per annum globally and it is projected that the growth would increase to 11 percent per annum in the next 10 years. This market trend will no doubt help facilitate a P3 procurement for the proposed waste management and materials recovery facility (MRF) currently envisioned by the District, especially in addressing the key project risks.

WTE assets come with several potential risks. Notably, they are related to the selection of appropriate technology, managing the financials and varied revenue sources (i.e., tipping fees for receiving the waste, the sale of energy output, and the sale of material outputs and residues), and other environmental risks stemming from residue disposals. Most of the existing WTE plants in the U.S. are franchise based, either BOO or BOT. In the recent WTE P3 undertakings outside the U.S., however, the new emerging model has been an AP P3 with DBFOM as the scope, where the key element to P3 success has been an appropriate risk allocation between the public and the private sector. In cases where securing private financing has been difficult due to the perceived

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\(^3\) Here we refer to this model as DBFoM, with a small “o” to signify that core operations remain the responsibility of the public sector while some secondary maintenance and facility management operations are transferred to a private partner.
project risks, the public sponsors have taken on the financing responsibility and the private partner’s scope thus has been limited to DBOM.

The District is currently in the process of selecting a short list of bidders to procure its streetlight modernization program. Through a private partner, the District is looking to retrofit the lights with more energy efficient LED bulbs, install a remote monitoring and control system, and repair and maintain the assets under a long-term performance-based contract. The District is also envisioning an expanded use of the lighting assets to serve as a critical sensor network for future smart city applications, including broadband WiFi, enhanced cell phone services, information kiosks, etc.

A majority of successful streetlight modernization programs in the U.S. have been publicly funded where the resulting energy cost savings have helped to more than offset the initial investments. These projects, however, were focused primarily on LED lights only without planning for fully integrating smart city technologies. At this juncture, the District is envisioning an AP P3 procurement model with DBFOM as the scope to deliver the LED-related assets. In the long run, however, the District’s challenge would be to determine when and how to integrate the future smart city technologies with the current LED undertaking. The selection of the particular P3 procurement model for the fully integrated system would depend on the ability to identify potential third party revenue sources for various smart technologies enabled by the networked lighting assets, a challenge faced not only by the District but the smart city proponents in general.

Finally, in the modern digital economy, cities are beginning to consider internet access a public good. The challenge is that the fiber optics cable network (the physical asset layer) that supports the broadband internet service (the digital layer) requires significant investment, either from the public or the private sector. When a public sponsor invests in fiber optics and also decides to operate the broadband services on its own, as was the case for Chattanooga, an additional requisite is to have competent municipal utilities that can run the internet service. Most municipal broadband programs have also been centered around efforts to incentivize greater investments by private companies in the fiber assets, the most notable example being Google Fiber in Kansas City. Under this approach, the private partner both owns and operates the asset and the public sponsor provides key incentives such as tax benefits, an expedited permitting process, and/or granting easy access to physical assets and information that are in the public domain.

Many cities are currently examining a public owner-private operator model, where the public sponsor delivers the fiber network asset using a P3 concession model for use by Internet Service Providers (ISPs) who operate and compete to provide internet services to end users. Under this model, allocation of demand (or revenue) risk has been a key P3 structuring issue. When the private partner assumes demand risk, as was the case for the UTOPIA network in Utah, the P3 concession is structured as RR P3 (DBFOM) and the local utility (in that case, UTOPIA) guarantees minimum revenues to the private partner for building the fiber assets and operating the broadband service. When the public sponsor assumes the demand risk, as was the case for the KentuckyWired project, the P3 concession is structured as an AP P3 (DBFM) where the private partner builds and maintains the fiber network with availability payments from the public.
sponsor but does not provide broadband services, which are left to local ISPs to provide for end users. Under this arrangement, the public sponsor often has a revenue sharing arrangement with local ISPs to recuperate the initial investment in their fiber assets.

The District is well positioned to utilize these guidelines for the successful use of P3s to deliver and improve the diverse asset base it currently maintains. Thus far, the District has been able to establish several of the key building blocks for a successful and transparent P3 program. The District’s OP3 is one of very few independent P3 offices at the city level with dedicated and qualified staff. OP3 enjoys strong support from the Mayor’s office, which has championed the District’s P3 initiative and provided the executive leadership often tied to P3 success. The District has also established P3 statutes that help to streamline project governance and processes. Also unique to the District, and critical to any rigorous public asset management program, is their formal lifecycle accounting approach to long range capital planning that helps inform the P3 selection process and minimizes deferred maintenance risks. Finally, unlike many other cities and local governments, the District has been able to maintain a strong fiscal position. Its fiscal health has also enabled the District to pursue P3s with the right set of motivations. P3s are not merely an alternative financing mechanism, as they are often perceived to be, but a potential avenue for providing the best value for money in delivering the critical infrastructure assets that cities need to grow and thrive.
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1. INTRODUCTION

1.1 Background

The City Accelerator, an initiative of Living Cities and the Citi Foundation, works within and across cities to advance and promote the spread of promising innovations that will have a significant impact in the lives of residents. Since 2014, the City Accelerator has been advancing these innovations by supporting and engaging cohorts of three to five cities, each focused on a different topic and led by an expert in the field.

Launched in early 2017, the City Accelerator’s third cohort, the Infrastructure Finance Cohort, brings together four cities—Pittsburgh, St. Paul, San Francisco, and Washington, D.C.—for an opportunity to explore a new set of financing options to help address the funding gaps for high priority capital projects. The cohort is represented by cross-departmental city teams who are seeking to be at the cutting-edge of financing capital projects but have formidable obstacles to making their initiatives a reality.

This study is conducted as part of the third cohort and in direct support of Washington, D.C. (“the District”), which has launched one of the only Offices of Public-Private Partnerships (OP3) at the city level in the United States. Responsible for identifying private sector partnerships to finance its critical infrastructure projects—including streetlights, school facilities, homeless and emergency shelters, and waste recycling centers—the District’s new office will serve as a model for other cities and local governments across the country. Focusing on project structures and project structuring processes, this study is intended to support the District’s new office in developing practical guidelines to help streamline its infrastructure delivery process involving the private sector partners. The guidelines are intended to serve as a useful tool for both the District and other local governments across the country.

1.2 Study Objectives and Definitions

The primary objective of this study is twofold:

1. To conduct an in-depth assessment of different project agreement structures pertaining to public-private partnerships (P3) available for local governments

2. To develop a set of process guidelines for local governments to help select an appropriate project structuring option when delivering infrastructure projects through P3

A “project” here pertains to capital improvements and/or operations and maintenance (O&M) of fixed physical assets—including both horizontal infrastructure and vertical facilities, collectively referred to as “infrastructure” assets in this report—that involve the private sector in varying degrees.

In this study, we define “public-private partnership (P3)” very broadly as:
**Long-term arrangement for the delivery of a capital project and related operations and maintenance (O&M) services involving the private sector that entails a greater transfer of risk to the private sector than occurs under traditional public sector procurement.**

This definition is intended to allow local governments to explore all possible ways the private sector can assume project risks and contribute positive net value in the delivery of critical infrastructure services.

This study focuses on “project agreement structures” for P3s, both in terms of their “forms” and “processes.” We identify various P3 project structuring forms and procurement models available at local governments’ discretion as they deliver diverse infrastructure asset types and services. We also describe project structuring decision processes that can guide the selection of the most appropriate project structure. We include processes pertaining both to pre-procurement planning as well as formal procurement processes.

In considering “local” jurisdictions, we focus primarily on municipal and other local and regional governments—be they the primary project sponsors or partaking in broader local initiatives sponsored by the state and/or federal governments. In this report, we use the terms “municipal” and “local” interchangeably to cover all local and regional jurisdictions that are non-federal and non-state.

**Table 1: Specific Asset Types Covered in This Report**

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Compared to their federal and state counterparts, municipal infrastructure projects are inherently diverse. As such, this study covers diverse infrastructure asset types, including those that are generally considered “social”—e.g., public schools, healthcare clinics, and correctional facilities—as well as those that are more “economic” in nature with potential for varying degrees of financial self-sustainability—e.g., waste to energy conversion, micro solar grid, and fiber-to-the-home (FTTH)/broadband network. Table 1 lists the specific asset types we will consider in this report.

Broadly, we define “social” infrastructure as those asset types where no or very limited possibility exists to collect third party user charges and where the government sponsor must provide the necessary funding for the asset’s delivery. Alternatively, we define “economic” infrastructure as those asset types where third party user charges can be collected and used, in part or in whole, to pay for the necessary investments. Social and economic infrastructure are further defined later in the report in the context of project structuring decision making.
1.3 Report Organization

This report is organized into 7 sections. Section 2 provides a brief overview of the unique challenges associated with delivering P3 projects for municipal governments, as well as the unique set of opportunities for municipal P3 programs. Section 3 summarizes the basic institutional requirements over and beyond project-specific considerations that improve the likelihood of successful P3 implementation. Section 4 outlines the processes involved in making optimal P3 project structuring decisions, including the need for qualitative and quantitative assessments and various tools available to perform these assessments. Section 5 identifies the project structuring forms and P3 procurement models available at the discretion of local government sponsors for their P3 undertakings, including those pertaining to capital improvements, O&M services, and other auxiliary opportunities that could be leveraged to help enhance a project’s viability as a P3. Section 6 highlights P3 project structuring options pertinent to each asset type, including specific case examples, and identifies potential implementation issues in each asset category. Finally, in Section 7, we consider the planned P3 project pipeline for Washington, D.C. and, based on the guidelines presented in this report, recommend appropriate P3 structuring options for each of the City’s proposed projects.
2. P3 IMPLEMENTATION AT THE LOCAL GOVERNMENT LEVEL

Historically, P3 procurements in the U.S. have been largely limited to large-scale capital projects in the transportation sector led primarily by federal and state government agencies. More recently, more P3 projects are emerging in water and social infrastructure sectors that are relatively smaller in scale and led largely by local and regional governments or other non-federal public entities. Unlike large-scale state or federally driven projects, P3 undertakings at the local government level present their own set of issues and challenges, while also offering a unique set of opportunities.

2.1 Issues and Challenges

P3 Legislative Framework. In addition to federal P3 initiatives, the legislative framework for municipal P3s is generally governed by P3 enabling legislation at the state level. To date, 35 states, the District of Columbia, and one U.S. territory (Puerto Rico) have enacted statutes that enable the use of various P3 project structures, in most cases for transportation infrastructure [1]. Most of these state P3 statutes address the authority of lower level local agencies to engage in P3s, including their veto power.

These state P3 statutes generally cover the following topics (or some subset thereof):

- Broad applications of P3s beyond highways and roads
- Acceptance of unsolicited proposals
- Use of availability payments (or shadow tolls) as an alternative or supplement to toll revenues
- Approval protocols by the state legislature before P3s can be undertaken
- Whether a non-compete clause prohibiting the public sector from building competing facilities can be included in P3 agreements
- Allowance to use outside consultants in P3 evaluation and implementation.

While these statutes are often fairly flexible, they also include constraints and requirements that impact the ability of a municipal government to undertake a P3.

Moreover, P3 statutes are not uniform across all infrastructure asset classes. Local governments must be cognizant of multiple state statutes pertinent to each asset type. In California, for example, there are six separate P3-relevant state statutes that pertain to highways (A.B. 680), local roads and transit (S.B. 2X 4), court houses (S.B. 82), high speed rail (S.B. 1420), and local government financing authorities (A.B. 2660, S.B. 628).

Financial Capacity Constraints. Local governments are also significantly constrained in terms of their ability to raise financing for infrastructure projects. Relative to the federal and state governments, most local governments have limited taxing authority and thus their ability to generate revenues to fund critical infrastructure is limited. This lack of revenues also translates

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4 For those local governments with limited P3 experience, a P3 Primer describing basic P3 concepts, including key project risks, is provided in Appendix A.

5 Numbers in brackets correspond to the numbering in the References section at the end of this report.
directly into limitations on their borrowing capacity. With the federal government gradually decreasing its role in infrastructure spending in recent decades, local governments have also been burdened with an increasing share of the total responsibility for infrastructure funding, and especially for operations and maintenance. To make matters worse, since the 2008 financial crisis, state and local governments have been experiencing almost a four-fold increase in their revenue volatility (when compared to the average in the preceding four decades), severely undermining their ability to rely on traditional revenue sources [2,3].

These trends amount to a perfect storm for U.S. local governments. In addition to diminishing federal funding and increasing revenue volatility, they are also faced with skyrocketing legacy mandates—namely, unfunded pension liabilities and other post-employment benefits (OPEB). In addition, ever-present statutory and political sensitivities about budget deficits are exacerbated by unfavorable demographic trends (i.e., an older and less productive population) and growing needs for social programs. All of these factors are contributing to conflicting priorities and create incentives for local governments to adopt a short-term fiscal outlook, and to kick the can down the road whenever possible.

Under budget pressures and operating shortfalls, maintenance and capital budgets for infrastructure can be an attractive source of spending cuts. The resulting delay in maintenance, repairs, and replacements exacerbates asset decay even further, ever widening the infrastructure gap. Surprisingly, many local governments currently do not have a formal mechanism to monitor the conditions of their infrastructure assets and collect data to estimate and report their aggregate deferred maintenance liability. Accordingly, no renewal accounting standards currently exist for local governments to accurately reflect the impact of deferred maintenance in their long term capital planning and budgeting process in a standardized way.

Lack of Internal Capacity. Compared to their federal and state counterparts, local governments generally have fewer resources available to dedicate to the planning and delivery of a large capital project. By their nature, P3 projects are complex and require significant up front planning. The procurement process for a P3 is also different from the traditional procurement many public officials are familiar with. These processes generally require a breadth of knowledge, skills, and experience across multiple disciplines, including having the appropriate level of technical, financial, and legal expertise. For these reason, when assessing the potential to use P3 procurements for their infrastructure, local governments often turn to outside resources, such as dedicated P3 agencies at the state level, federal resources (e.g., the new Build America Bureau), or other non-profit professional organizations (e.g., National Council on Public Private Partnerships (NCPPP), Performance Based Building Coalition (PBBC), etc.). For many municipal governments, however, this lack of internal capacity presents a significant impediment to establishing an effective P3 program.

Interagency Coordination. Local P3 programs differ from similar initiatives in the transportation and water sector in the degree of interagency coordination required to successfully manage procurements. This additional challenge is partially a cause for the relatively lower level of adoption for P3s for municipal infrastructure when compared to, for example, the transportation sector, in which a single state department is often the primary sponsor of a project. Most municipal infrastructure projects require the coordination of several independent agencies
for financing, operations, maintenance and construction, and in many cases these separate agencies have no organizational interface except through the mayor’s office or city council.

Interagency coordination can impede major projects and other complex public initiatives, primarily due to organizational conflicts, the communication burden required to obtain joint approvals, and a lack of project ownership by any one agency. Impediments due to organizational conflicts arise when the two agencies responsible for a public works procurement do not have a readily available process for resolving disputes. In many cases these disputes need to be resolved at the local executive or council level, increasing delays and project uncertainty. A higher communication burden is also naturally a function of projects that require the involvement of multiple local agencies, but this can be resolved by designated contact points and regular project board meetings. A lack of ownership occurs when there is no one central agency designated as responsible for successfully procuring a project. For projects that require significant interagency coordination, this can create an incentive for the various agencies involved to not resolve problems proactively.

**Scale Issues.** The procurement costs of P3 projects are often significantly higher than those for traditional delivery in part because all of the project’s lifecycle risks and costs are accounted for in procurement. For this reason, P3 approaches tend to be more appropriate for large projects where, relatively speaking, the impact of the additional transaction costs on the total project costs is less significant. In general, municipal P3 projects tend to be smaller in scale than those undertaken at the state level. While there is no definitive minimum project size below which P3 should *not* be considered, there is a general recognition that larger projects have a greater potential to generate efficiency gains from a P3. Larger projects are also naturally riskier, which makes them more appropriate for the risk transfer provided by a P3. Additional planning and procurement costs associated with a P3 can be material and, while not always transparent and accounted for, can have direct impact on the ability to generate real value for money and the overall justification for choosing the P3 option in the first place.

**Sensitivity to Local Community Objectives.** Unlike the federal and state governments where the P3 policies apply across multiple jurisdictions, local governments must consider the local community’s objectives when establishing their own set of P3 policies. By their nature, local governments and their elected officials are more accessible to citizens and thus more responsive to public concerns. P3 procurement and service delivery policies must ensure that the public interest is served through good governance, accountability, transparency, and value for money. Experience has shown that the P3 procurement process at the local level is also less amenable to a standardized approach when compared to those at the federal and state levels [4]. A more tailored approach that reflects the unique realities of the local community, its legislative and institutional context, and political culture is often needed for municipal P3 projects.

### 2.2 Opportunities

**Manageable Project Scale and Bundling Opportunities.** Although large-scale P3 projects have a higher potential for efficiency gains, as mentioned above, they are massive undertakings which require a great deal of expert knowledge and bring significant management challenges, be they project-specific or related to external processes and pressures. Municipal P3
projects are relatively smaller in scale and more manageable, especially when resources are limited. The smaller project scale opens up opportunities for innovative ways to bundle multiple projects, even across multiple jurisdictions, to achieve economies of scale.

**Diverse Assets with Diverse Auxiliary Opportunities.** Municipal P3 projects also involve diverse assets with an array of opportunities to involve the private sector and structure innovative P3 deals. Among others, municipal assets amenable to P3 delivery can include:

- Public buildings (e.g., city halls, courthouses, libraries, and cultural community centers)
- Public healthcare facilities
- Public schools and other related educational facilities
- Prison, correctional, and other related justice system facilities
- Water/wastewater utilities and other related facilities
- Environmental facilities (e.g., stormwater, solid waste treatment, waste-to-energy conversion)
- Energy utilities and other related facilities (e.g., solar and other renewable energy)
- Telecommunication and other technology related facilities (e.g., fiber to the home (FTTH), LED street lighting, and various smart city applications)
- Entertainment and event facilities (e.g., convention centers, sports arena)

P3 capital improvement projects can also be combined with various other opportunities to enhance a project’s funding. These auxiliary opportunities range from adding a major real estate development component to the project, or using technology solutions or marketing arrangements to generate additional revenues to help defray initial capital costs. Of particular importance to municipal P3s is the role of real estate development. These auxiliary opportunities are discussed further in Section 5 of this report.

**Experience with Enterprise-Type Operations.** Most municipal governments are already familiar with enterprise-type agencies with independent revenue sources. These agencies are managed like private businesses with significant operational and financial autonomy. Many municipal water and energy utilities that are still in the public domain are good examples in this regard. In addition, beyond transfers from the federal and state governments, many municipal governments rely on local property taxes, which represent about 30 percent of their total revenues (or 80 percent of tax-related, i.e., self-reliant, revenues). They are adept at making strategic development decisions and leveraging their own real estate assets to trigger both broader economic growth and to monetize (or “value capture”) the resulting increase in local property values. The same market-driven skills can serve as an effective tool in P3 project implementation.
“Smart” P3 Opportunities in the O&M Space. A majority of P3 projects are large-scale, capital improvement solutions. As capital resources become scarcer and the cost of building new infrastructure becomes prohibitive, O&M solutions that maximize the use of existing facilities become much more attractive and rational. O&M costs are often about half of the total infrastructure funding needs and they constitute about 60 percent of the total project lifecycle costs. Furthermore, O&M services also create 75 percent of all infrastructure-related jobs, in comparison to 15 percent for new construction.

O&M investment opportunities can be further enhanced by integrating with emerging “smart” technologies and concepts. Some of these technology-driven solutions—such as ride-sharing (e.g., Uber and Lyft), car ownership sharing (e.g., ZipCar), and other emerging “smart city” concepts (e.g., smart sensors to monitor parking, traffic, energy, water, air quality, waste, etc.)—reside primarily in the private sector and are designed particularly for densely populated urban areas. These highly networked and integrated solutions can potentially be a game changer with a far reaching effect on traffic congestion, mobility, urban land use, and, ultimately, a municipality’s overall infrastructure needs.

For local governments, significant opportunities exist in developing a new breed of P3 models that capitalize on “smart city” and other emerging technology solutions in the O&M space.

“Brand” Equity and Better P3 Resource Pool. Many major hub cities or metropolitan centers, such as New York, Washington, D.C., Chicago, or San Francisco, have a unique “brand” that attracts talented resources, providing a better P3 market capacity and quality in general. Unlike federal or state agencies that are remotely located, these cities can also capitalize on this readily available pool of concentrated resources to develop their own P3 competency. In addition, such “brand equity” often carries with it strong social, cultural, political, and institutional infrastructure that can add value to successful P3 implementation beyond those factors that are more project-specific.

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8 For example, it is estimated that when these and other technologies, such as autonomous vehicles, are optimally integrated into multi-modal, networked, and mobility friendly solutions, they can reduce current urban traffic levels by as much as 90 percent, potentially eliminating the need for new roads [5].
3. FACTORS THAT AFFECT SUCCESSFUL P3 IMPLEMENTATION

Beyond project-specific considerations, there are several more general factors that can influence the overall success of a P3 program implementation and directly or indirectly impact P3 project structuring decisions.

3.1. P3 Policies and Goals

For P3 projects to be successful, it is critical that a clear set of P3 policies and goals are established early on before any P3 related planning and procurement activities can take place. Further, these policies and goals need to be directly linked to the government sponsors’ overall long term capital planning and implementation strategies. Surprisingly, many state and local governments prematurely jump into P3 procurements on a project-by-project basis without having the proper policy context. P3 policies and best practices should serve as the basis for developing P3 enabling legislation to define the rules of the game for any P3 undertaking.

In developing P3 policies and goals, it is important to have a clear understanding of a P3—both what it is and is not—and to develop a consistent set of value propositions that can serve as the basis for all P3 decision making. The following factors are generally considered as the primary benefits of P3s:

- Means to achieve overall lifecycle efficiency
- Means to establish a transparent and disciplined approach to maintenance and avoid costly deferred maintenance situations
- Ability to transfer risk and achieve an optimum risk allocation formula between public and private partners
- Ability to accelerate the delivery schedule
- Opportunity to bundle multiple projects
- Opportunity for innovations
- Means to ensure budget and schedule certainty

These benefits are counterbalanced by the fact that P3 projects are complex undertakings and require internal capacity building on the part of the local government sponsors with higher transaction costs. Beyond this, the two most critical and substantive downsides of P3s—which can sometimes override benefits achieved from any or all of the above upside factors—are:

- Higher financing costs associated with involving the private sector
- Political risks and the potential for contentious opposition to a P3 from the local stakeholders

If a P3 is chosen as the delivery option, there are several effective ways to deal with these downsides, as will be discussed later in this report.

In considering the P3 value proposition, it is important to recognize that, while it provides an alternative means of financing, a P3 is not a funding source and does not offer a means to relieve a funding shortage. Even under the revenue-risk P3 model described later in this report, a public
sponsor can just as well impose new user charges directly without going through the private sector and leverage these new revenues to secure its own financing more cheaply on its balance sheet.

3.2. P3 Regulatory Considerations

In addition to regulatory requirements delineated by P3 enabling legislation as discussed briefly earlier, the most critical regulatory consideration for P3s are those related to debt capacity and limit. Each local government has its own statutory debt limit and debt policy that can govern how P3 debt obligations ought to be treated and the extent of such obligations. For Washington, D.C., for example, the District’s overall debt exposure is limited to 12 percent of general fund expenditures and is governed by its statutory debt policy as established in the District’s Anti-Deficiency Act of 2002 (D.C. Code § 47-355.01 et seq.) and the District Code for Borrowing and Debt Capacity Provisions (D.C. Code § 47-334 et seq.).

In addition to debt policy, there are several other critical regulatory and legal considerations pertinent to municipal P3 programs. Among others, they include those related to procurement (e.g., competitive bidding, local business participation, local labor union rules, etc.), environmental approvals and clearances, zoning and land use, and intellectual property (IP) rights.

3.3. P3 Leadership and Organizational Issues

As mentioned previously, creating the internal capability and expertise to assess and procure P3s is a critical element to establishing an effective P3 program. Depending on resource availability, a dedicated P3 office may be established or P3 staff competency can be seconded from existing departments. Over and beyond staff competency, however, past experience has shown that having one or more P3 champions fully committed to P3 undertakings, especially at the executive leadership level, is one of the most critical P3 success factors. Often, the P3 office is directly linked to the executive branch and plays a “staff” (rather than a “line”) function with significant interoffice coordination responsibilities.

More often than not, the organizational structure of local governments can be quite complex with many disparate institutional “fiefdoms” with long and complicated histories. These fiefdoms are cultivated over a long time frame and reflect unique local political climates and interests. Even more so than federal and state governments, building consensus through effective communication and interagency coordination can be crucial for a successful P3 at the local level. Depending on the nature and complexity of the organizational structure and coordination needs, it may be beneficial to formalize P3 processes with interagency agreements between the P3 office and other public organizations. As will be discussed later, major gateways and approval points should be an integral part of the P3 lifecycle, especially in its early phases. They help ensure the proper sequencing of P3 activities and help avoid reversals of procurement decisions at later stages of the procurement process that can be extremely costly.
3.4. P3 Fiscal Impacts and Financing Issues

At a project-specific level, P3 financing costs are largely determined by the risk allocation between the private and public partners. A project risk assessment, described in some detail later in this report, helps to identify key project risks, allocate these risks to the party best able to bear them, and translate them ultimately into risk premiums and financing costs. In a P3, financing is never a problem as long as sufficient funding sources can be identified to repay the financing—i.e., investors will always provide financing as long as they can be repaid and receive returns commensurate with the risks they take.

Therefore, from a fiscal perspective, the clarity in P3 funding sources and the reliability of these sources (as governed by their volatility) are key to P3 success. As mentioned, a P3 does not provide free infrastructure funding. It is important to reach an understanding early on that P3 debt obligations (such as payments on Availability Payment (AP) P3 models to be discussed later) need to be treated just like any other long-term obligation on the public sponsor’s balance sheet. To the extent possible, the P3 long-term payment obligations should not infringe on the public sponsor’s overall credit rating. Further, the financial analysis of a P3, often performed as part of a Value for Money (VfM) assessment described later, is generally limited to project-specific cash flows without adequately addressing the project’s overall impact on the local government sponsor’s fiscal health. Like any other major capital projects, it is the responsibility of the local public sponsor to assess a P3 project’s affordability and its long-term fiscal sustainability.

3.5. Deferred Maintenance Considerations

As mentioned earlier, concerns around the deferred maintenance of public assets are fast emerging as a major issue in the United States. Deferred maintenance can lead to significantly shorter useful lives and can substantially increase future rehabilitation costs for a many types of existing public assets. As is the case for many federal and state agencies, many U.S. local governments do not have the discipline of a lifecycle cost accounting or asset management system, and it is very difficult to obtain an accurate estimate of overall maintenance needs necessary to keep their existing infrastructure in good working condition (or more formally, State of Good Repair (SGR)) until a system breaks or is in chronic disrepair. Thus, in many cases when regular maintenance is deferred, the additional cost of such deferrals in the long run remains hidden until it is too late.

One of the key value propositions for a P3 is the lifecycle based approach to project development inherent to the procurement model. This ensures that a regular and proper maintenance program and its transparency is accounted for in project development. Without lifecycle accounting on the part of a public sponsor generally, this particular P3 value proposition is less visible and apparent. There are current proposals for organizations like credit rating agencies to further examine the impact of deferred maintenance on the overall credit rating of public agencies, though this is a relatively recent trend in the United States. Notwithstanding the transparency in highlighting the P3 value proposition, such a move would ultimately impact the public sector’s overall borrowing costs with a far reaching effect over and beyond P3 undertakings.
3.6. P3 Political Risks

Political risks associated with P3s are quite complex and often highlighted as one of the key challenges to successful P3 procurement. Political risks can be internal, stemming largely from institutional fragmentation within the public sponsor’s organization that can result in costly reversals in P3 procurement decisions (in the worst cases, cancel projects mid-procurement). They can be also external, stemming from the local political climate or vocal opposition from local stakeholders who are directly and adversely impacted by P3 projects, be they taxpayers, users, local unions, or legacy infrastructure businesses. The underlying issues for P3 political opposition can be broadly categorized into (a) those concerns that have legitimate and rational basis and thus need to be addressed in P3 project feasibility assessments, (b) those that are misconceptions resulting from a lack of understanding or miscommunication, and (c) those that are primarily ideologically driven and thus difficult to resolve. Where possible, effective outreach programs that promote open communication and transparency combined with appropriate education and training programs can help to deal with some of these political concerns.

3.7 P3 Market Capacity Concerns

Overall market capacity and interest is another important factor, which can be specific to P3 projects under consideration and/or to government sponsors themselves. To gain insight into market demand for an individual project, a “market sounding” exercise is often included as one of the initial steps in the overall P3 process, as will be discussed later in this report. Market interest and appetite for P3 projects can also be directly linked to government sponsors, which in essence reflects their reputation in the P3 industry and the extent to which their past P3 procurement decisions have been overturned for political and/or other reasons. Often these political “flip-flops” (sometimes referred to as “regulator capriciousness” in the investment community) are made without proper prior understanding or due process. Unfortunately, they have become much more common in the U.S. (and, for that matter, increasingly in other advanced economies such as the U.K., France, and Australia) and have the ultimate effect of reducing competition and further increasing the P3 financing costs.
4. P3 PROJECT STRUCTURING DECISION PROCESS

This chapter presents the “processes” required in P3 project structuring decision making. We first provide an overview of the overall P3 implementation process over the entire project lifecycle and then focus specifically on the project structuring decision processes, including various qualitative and quantitative assessments that can support the decision making.

4.1. Overview of Overall P3 Implementation Process

Figure 1 shows a general overview of the overall P3 project implementation process. The diagram can serve as a general guide in establishing major building blocks and instituting formal P3 processes. The specific details of P3 implementation process, however, can vary for different local jurisdictions depending on their unique governance structure and needs. For example, it is at the local governments’ discretion to decide how different stages are defined, what activities are included, which roles and responsibilities are assigned to different agencies, what gateways/approvals are required and their respective timing, which processes are formalized into practical guidelines, and which supporting qualitative and quantitative assessments are undertaken.

*Figure 1: Overview of P3 Implementation Process*

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<th>Stage 3</th>
<th>Stage 4</th>
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9 Derived in part from the draft P3 framework for the City and County of Denver (currently being developed by Arup).
**Stages/Activities.** We define the P3 process as encompassing five main stages: (1) Planning, (2) Screening, (3) Structuring, (4) Procurement, and (5) Implementation.

Under the *Planning* stage, the basic activities include establishing and formalizing a comprehensive long range capital improvement plan and developing a pipeline of specific capital projects to be implemented in the future, including identifying those projects that are potentially a strong fit for delivery as P3s.

Under the *Screening* stage, for each candidate P3 project, high level project definitions are established, including defining major project components, developing preliminary cost estimates, identifying a potential set of P3 procurement options to be explored, and screening these options to a manageable set for further consideration.

The *Structuring* stage entails further screening of the P3 procurement options to select the preferred P3 strategy with sufficient project structuring details to enable the formal procurement process to start. As desired and appropriate, details pertinent to refining project structuring decisions can be derived from various qualitative and quantitative assessments—e.g., technical feasibility, a project risk register, financial modeling, and/or business case development—all of these will be discussed further in the next section.

Under the *Procurement* stage, the basic activities involve preparing necessary bid and contract documents, soliciting competitive bids, selecting a preferred bidder, and entering into negotiation with the preferred bidder to ultimately lead to commercial close and the signing of a project agreement.

During the *Implementation* stage, the public sponsor will administer the long term contract and closely monitor the private partners performance according to the P3’s performance-based specifications. This includes contract monitoring during the development and operations phases of the asset, and turnkey inspections during transitions between phases, such as at construction completion, over the project lifecycle to ensure that performance requirements and other contract terms are met.

**Responsible Agencies.** Three key agencies within the local government will primarily be involved directly in P3 implementation: (1) the sponsoring “line” agency that is the primary user of the infrastructure assets under consideration (e.g., public schools or local police/firefighting department), (2) a P3 agency or, in the case where independent P3 agency does not exist, P3 staff assigned to the task, and (3) a representative from the Office the Chief Financial Officer (OCFO) (or a treasury-equivalent thereof) responsible for capital planning and debt management.

In general, the sponsoring agency can take the lead role in the Planning stage while being supported by P3 office staff. Once the project enters into Screening and Structuring stages, the P3 office can assume a lead role in providing guidance in defining, screening, selecting, and structuring the project and, as appropriate, play an oversight role in the P3 procurement process. Once the project has reached commercial close and is under way, the sponsoring agencies can reassume the lead role in administering the contract with the P3 staff providing support as appropriate and needed. Throughout the P3 procurement process, the OCFO staff should provide necessary fiscal oversight and financial coordination and input.
Sometime during the Screening/Structuring stage, it may be beneficial to establish a formal “project board” to facilitate communication and decision making between all of the agencies involved in a project. At minimum, the project board should consist of representatives of the P3 office, the OCFO (or treasury equivalent), and each of the sponsoring line agencies with an interest or involvement in a given project. Optionally, the project board could also include a representative of the Mayor’s or equivalent elected executive for key projects. The project board should meet regularly to receive reports from the P3 office and line agencies, monitor procurement progress, make joint decisions regarding project structure, and resolve any interagency disagreements.

**Approvals/Gateways.** During the procurement process, and especially in the early stages, important milestones need to be established before proceeding to the next stage. These milestones can require gateway decisions where formal approvals are required by the project board or individual members. As indicated in Figure 1, these gateways can include: (1) Gateway 1—P3 Eligibility and Screening (at the conclusion of Screening stage), (2) Gateway 2—P3 Business Case Evaluation (at the conclusion of Structuring stage), (3) Gateway 3—Commercial Close (at the conclusion of Procurement stage). At minimum, City Council approvals may be necessary when major capital budget commitments are formally made, e.g., before the procurement activities can begin and at commercial close.

**Process Guidelines.** A clear set of guidelines for each stage of a P3 undertaking is often critical to ensure efficient work flow and a clear division of responsibilities between the agencies involved. These guidelines can be process-oriented and can include those pertaining to P3 Eligibility and Screening (Stage 2), Business Case Development (Stage 3), Procurement (Stage 4), and Implementation (Stage 5) to monitor various activities in key stages. In addition, it may be helpful to set up other processes and procedures—for example, to manage the consideration of unsolicited proposals or to conduct the market sounding activities to solicit input from industry on a potential project.

### 4.2 P3 Project Structuring Decision Process and Assessments

#### 4.2.1 Process Overview

The project structuring decision process, which is the focus of this study, extends from Screening to Procurement stages. For a given P3 procurement, project structuring undergoes continuous refinements and is finalized at commercial close in the Procurement Stage based on the selected bidder and the negotiated project agreement. The overall decision process can encompass the following:

- Conducting an initial screening exercise to determine whether the P3 will be considered as an alternative delivery option for the project
- Developing a list of potential P3 procurement model structures for further consideration and assessment
- Performing a qualitative assessment to compare with the traditional approach and to further screen/reduce the P3 candidates to one or, at most, two viable P3 procurement option(s)
• Conducting a market sounding exercise to determine market capacity and interest on P3 candidates with a particular focus on the selected P3 option(s)
• With the support from outside consultants as needed, performing more rigorous quantitative analysis (e.g., Value for Money or “VfM”) to compare the selected P3 procurement option(s) with the whole-life equivalent of the traditional option (referred as “public sector comparator” or “PSC”)
• If the decision is made to proceed with the formal P3 procurement, developing an integrated P3 procurement strategy based on the findings from market sounding and qualitative/quantitative analyses

The overall P3 delivery lifecycle presented in Figure 1 can be further supplemented with more detailed assessments to facilitate the project structuring decision making process. Figure 2 provides an overview of a P3 project structuring decision process broken down broadly into three assessment phases: Screening, Qualitative, and Quantitative. It is important to note that, for local government sponsors, these assessments are not so much about “getting it right” the first time but, by virtue of going through these processes, to gain much better understanding of the different elements of risk for a particular P3 project that inform structuring decisions.

*Figure 2: Overview of the P3 Project Structuring Decision Process*
4.2.2 Screening Phase

As shown in Figure 2, before beginning the assessment phase, several early Planning Stage tasks must be completed in order to develop the necessary inputs to the project structuring decision process. This includes an early stage cost estimate and broad scope of work for the project in question. Both of these elements are generally included as part of the local government’s long term capital improvement programming and budgeting for projects. Some form of a benefit-cost assessment (BCA) and/or investment analysis is often performed as part of the long term capital planning process to determine each project’s overall feasibility and priority. High-level estimates of both the project cost and schedule can be developed from these early assessments to quantify the economic and other benefits of a project. In addition, as part of the long term capital plan, individual projects can be prioritized within a broad database of all other infrastructure investment opportunities under consideration. This will enable the local government sponsors to consider the P3 structuring decisions holistically within the context of their multi-faceted development objectives.

The primary objective of Screening Phase assessment is twofold: (1) to conduct an initial screening to determine whether a project is suitable to be considered as a P3 and (2) once determined to be suitable for P3 procurement, to develop a set of candidate P3 procurement models for further consideration in qualitative and qualitative assessments.

Initial Screening. The initial screening process is designed to identify at a fairly early stage which projects may be best-suited for a P3 or for other alternative structure. Appendix B provides a sample initial screening matrix that consists of a list of potential screening criteria, questions related to each criteria, and a scoring approach to help determine P3 project feasibility [6]. Among others, initial screening criteria can include:

- Investment size
- Private sector capacity and expertise
- Market experience and precedents
- Type of infrastructure site and risk transfer opportunity
- Potential for private sector innovations
- Complexity in security requirements and potential impediments
- Potential for contract integration over project lifecycle
- Asset useful life
- Number of asset classes/asset complexity
- Availability of performance-based output specifications (construction)
- Stability/predictability of operational and maintenance requirements
- Availability of performance-based specifications and indicators (operations)
- Ability to develop full lifecycle costs
- Revenue generation opportunity

As appropriate, local government sponsors can choose all or a subset of these criteria to assess P3 project feasibility relevant to their own pool of capital projects.
Broadly, initial screening assessment can be grouped into four major “gates” on various aspects of the project which will help determine whether an alternative procurement is appropriate when compared to the traditional approach. The four gates are (1) scale, (2) risk, (3) flexibility and (4) innovation. Each is described in some detail below along with the key questions involved.

**Gate 1—Scale:**

a. *Is the project’s capital budget estimated to be greater than $50M?*

b. *If the answer to 1a is no, could multiple similar projects be “bundled” into one procurement to have a total capital budget estimated to be greater than $50M?*

This gate provides a preliminary screening based on project scale. Project scale provides a good initial indicator of whether a P3 or other alternative structure is appropriate for several reasons. As P3 procurements are primarily appropriate based on the ability of the municipality to transfer project risks to a concessionaire, project scale is a strong initial indicator of the number and severity of risks associated with a project, as large scale projects are often significantly more risky than small projects. As mentioned earlier, larger scale projects are also more appropriate for P3 structures because the transaction costs associated with assessing and managing the P3 procurement are a smaller component of the overall project costs.

For this gate, bundling consists of similar projects combined into one procurement, such as the renovation of a group of elementary schools across the municipality, or the construction/repair of several small bridges. If the project scale is close to or greater than $50M, the project is further considered with a P3 structure based on the other gates.

**Gate 2—Risk:**

a. *Has the municipality completed similar projects in the past?*

b. *If yes, was development risk exposure high?*

c. *Does the municipality have experience maintaining similar assets?*

d. *If yes, was O&M risk exposure high?*

e. *Can core project risks be fully or partially transferred via procurement?*

This gate focuses on the amount of risk associated with a project and the ability to transfer those risks to a private concessionaire via a P3 project structure. Question 2a and 2c focus on whether the municipality has experience building and operating a project of similar scale and qualities as the one in question. This could pertain to the scale of a project if it is very large or to the unique nature or technologies involved in the project. Significant additional project risk is implied when the municipality lacks experience in completing similar projects to the one in question. If the municipality has built or operated similar projects in the past, questions 2b and 2d provide an opportunity to assess the past results of those projects and roughly determine whether project risks came to fruition—i.e. did the project go over budget or was the asset under-maintained.

---

10 This minimum project size threshold can vary depending on the asset type, complexity of the project, risk involved, market appetite, and other factors. For schools P3 projects in Australia, for example, about $100 million was determined to be the minimum level of bundling to gain reasonable economy of scale [7].
Finally, question 2e assesses the ability of the P3 structure to transfer risks to the private sector. Some project risks cannot be efficiently transferred via procurement and must be retained by the government. This reduces the applicability of a P3 or other alternative structure for the project.

**Gate 3—Flexibility:**

- **a.** Does the municipality require significant flexibility over the asset life or have difficulty defining performance-based requirements for the project?
- **b.** Does technological change occur for the project over a relatively short time period (less than 5-7 years)?
- **c.** Are their other social factors that require sponsor operational or maintenance control for some or all of the asset’s functions?

This gate is an initial assessment of the flexibility required by the sponsor for the project. If significant uncertainty or flexibility is required by the government over a project’s life cycle, a non-P3 structure may be more appropriate, or an alternative structure that does not entail a single contract for the project’s life-cycle. A government may require life-cycle flexibility for several reasons. Question 3a addresses circumstances in which a municipality cannot define its performance-based requirements at the outset of a project. Question 3b addresses sectors that undergo fairly rapid technological change (such as telecommunications infrastructure) and therefore are less appropriate for a long-term concession. Question 3c addresses other factors or considerations in which a municipality wishes to participate in operations of the project for social reasons.

**Gate 4—Innovation:**

- **a.** Is there an opportunity for life-cycle innovation and procurement bundling across phases?
- **b.** Is there an opportunity to improve value capture for the project by incorporating additional public assets into the procurement?

This gate is meant to provide an initial assessment of the potential for innovation via a P3 project structure. Question 4a addresses the opportunities created by bundling across a project’s life-cycle. This could be achieved, for instance, by aligning incentives for a contractor to optimize life-cycle costs because they are responsible for both construction and long-term maintenance. For projects which generate user-fee or other revenue, this could also include aligning incentives to maximize revenue because the contractor is responsible for both early design work and long-term operations. Question 4b assesses the opportunity for improved value capture for a project. This would assess circumstances in which a project is also associated with a public asset, such as unused public land near a building that requires rehabilitation. In those cases there may be opportunities for innovation by incorporating those assets into a procurement to offset project costs and create an integrated development.

**Development of P3 Candidate Procurement Options.** If the outcome of the initial screening exercise above is to proceed with further exploring P3 as a delivery option, a set of candidate P3 procurement models would be identified based on known information about the
project under consideration. Basic project parameters that could influence the selection of procurement options would include, for example, whether the project involves a new greenfield asset or renovation/expansion of existing brownfield asset, whether the asset ownership would reside in the public or private hands during P3 lifecycle, who would be responsible for P3 financial liability in the long run, what would be the primary funding mechanisms for repayment, and what project tasks would be incorporated into the project scope.

Typically, only two options are carried forward for comparison in qualitative and quantitative assessment phases—traditional design-bid-build (“D-B-B”) option vs. a P3 model—where the selected P3 model is often based primarily on prior experience with similar assets. Given the diverse asset base and other auxiliary opportunities available to municipal governments, we recommend a more rigorous review of available P3 models, be they long term concessions or some form of lease or franchise agreements. A more detailed discussion of a robust set of available P3 models and their appropriateness with respect to different asset types, including the potential for value capture and other auxiliary opportunities, is provided later in Section 5 of this report.

4.2.3 Qualitative Assessment Phase

The Qualitative Phase examines various non-quantifiable aspects that will influence the selection of the best procurement option. This Phase starts with an initial set of P3 candidate options from Screening Phase and ends in the selection of the P3 procurement option to be used as the basis for a formal P3 procurement and bidding process. Broadly, the non-quantifiable aspects would address public policy considerations, economic factors, stakeholder expectations, operational flexibility, and the ability to determine expected outputs/outcomes. Appendix C provides a representative list of specific qualitative factors that could be considered in the qualitative assessments [8,9]. Some of these qualitative factors were already considered as part of the initial screening assessment discussed above. Without engaging additional tools, a more rigorous screening can be developed based on additional details provided in appendices B and C. The level of detail and effort that goes into qualitative assessments varies between public sponsors based on their desired level of rigor needed to decide on a final procurement option.

One method for developing additional qualitative assessments beyond the initial screening is by using a “qualitative factors scoring” approach. This approach involves: (1) selecting a set of specific qualitative factors that are most relevant to a given local sponsor (e.g., from those provided in Appendix C), (2) assigning weighting factors to determine the relative importance of these qualitative factors with respect to meeting the sponsor’s overall strategic investment objectives, and (3) comparing and assessing P3 candidate option(s) and PSC based on numerical scoring of each criteria and applying relative weighting factors.

Table 2 provides an example of a scoring approach to qualitative factors. In this case, the local sponsor has chosen five specific factors as shown as the most relevant to their needs. These factors are assigned weighting factors based on their relative importance to the local sponsor’s overall objectives—in this case, alignment with investment objectives was considered most important (30 percent) followed by schedule/budget certainty and public acceptance (each with 20 percent). Relatively less important were private sector market interest/capacity and operational flexibility/potential for future scope change (at 15 percent each). For simplicity, only
two options were considered in this example, P3 and PSC. For each criteria, the two options were given numerical scores between 1 to 5 based on the sponsor’s qualitative knowledge of the two options and additional insights gained from the market sounding and other relevant activities and data sources. By applying weighing factors on the scores, the total weighted averages shown at the bottom indicate the relative merits of the two procurement options with respect to the qualitative factors selected. In Table 2, P3 with weighted average score of 3.65 is shown to be slightly preferred to PSC with the score of 3.5.

Table 2: Quantitative Factors Scoring Matrix Example

<table>
<thead>
<tr>
<th>Qualitative Factor</th>
<th>Weighting Factor (percent)</th>
<th>P3 Option</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Score</td>
<td>Weighted</td>
<td>Score</td>
</tr>
<tr>
<td>Alignment with investment objectives</td>
<td>30%</td>
<td>4</td>
<td>1.20</td>
<td>4</td>
</tr>
<tr>
<td>Private sector market interest/capacity</td>
<td>15%</td>
<td>5</td>
<td>0.75</td>
<td>2</td>
</tr>
<tr>
<td>Schedule/budget certainty</td>
<td>20%</td>
<td>5</td>
<td>1.00</td>
<td>2</td>
</tr>
<tr>
<td>Operational flexibility (future scope changes)</td>
<td>15%</td>
<td>2</td>
<td>0.30</td>
<td>4</td>
</tr>
<tr>
<td>Public acceptance</td>
<td>20%</td>
<td>2</td>
<td>0.40</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100%</td>
<td></td>
<td>3.65</td>
<td></td>
</tr>
</tbody>
</table>

Sensitivity analysis involving adjusting the weighting factors and numerical scoring would help test the robustness of the outcome and better understand this methodology. Where the numerical scores are low, e.g., public acceptance in the case of P3 option or schedule/budget certainty in the case of PSC (both with low numerical scores of 2 in Table 2), various mitigation strategies—such as a public outreach program for P3 or a guaranteed not-to-exceed contract with liquidated damage clause for PSC, respectively—could also be considered to further adjust and refine the numerical scores.\textsuperscript{11}

While a qualitative factors scoring assessment (or more rigorous screening exercise) is taking place, the local sponsors can also begin developing the business case for the project. The business case generally would include a high level review of the project specifications and proposed structure, as well as initial procurement terms and, most importantly, a specific justification for the selected procurement structure for the project. As shown in Figure 2, an important part of the business case development is the qualitative risk assessment, which is intended to establish broad risk categories that the project will be exposed to depending on the procurement option chosen. Ultimately, the overall project risk assessment directly feeds into Value for Money (VfM) analysis in the subsequent quantitative phase.

\textsuperscript{11} More detailed discussion of qualitative factors scoring methodology can be found in PPP Canada’s publication on \textit{Procurement Options Analysis Methodology} [8].
As shown in Figure 2, several other parallel activities can also be completed during the qualitative assessment phase. In preparation for a potential P3 procurement, informal market sounding efforts can begin in conjunction with more formal Request for Information (RFI) exercise to gain P3 market insight from key stakeholders, such as builders, operators, and financiers. Among others, the basic goal of such an exercise is to:

- Gain an understanding of various P3 procurement options’ demand from the private sector within the context of potential market constraints and uncertainties
- Inform the potential for risk allocation and innovation
- Gain an understanding of the project factors that can improve competition
- Any other information that can help enhance the quality of initial project feasibility assessments

As mentioned before, at this juncture, interagency coordination can also become more streamlined and formalized by establishing a P3 project board. Should a P3 procurement model be selected at the end of this phase, the project board can approve a P3 structure for the project to begin the procurement process. As necessary and desired, a formal business case document approved by the project board can also be published as a stated rationale for the particular project structure selected. This document can report the project’s early business case and scope as well as the outcome of qualitative factors and risk assessment for public consumption.

4.2.4 Quantitative Assessment Phase

The basic goal of quantitative assessment phase is to identify and summarize all relevant quantifiable benefits and costs associated with the selected procurement options over the life of the project, including potential value of the different risks retained by the public sponsor under each option. A substantive part of this phase is a Value for Money (VfM) analysis and, as such, P3 quantitative assessment is often synonymously referred to as “VfM analysis.” In many cases, VfM analysis is performed post-procurement when the proposed costs of the winning P3 bid are available and can be compared with the risk-adjusted estimate of PSC. In addition to a post-bid VfM, VfM analysis can also be performed during pre-procurement phase in preparation for formal P3 bidding process. For this pre-bid VfM, whole-life cost for P3 option must be estimated (referred to as a “shadow bid”) and compared with early PSC estimates based on the degree of risk and cost assessments completed at the time.

VfM analysis is, in essence, a risk allocation and valuation exercise that quantifies the probability and financial consequences of different risk events that are identifiable and material. The ultimate outcome of VfM analysis is risk-adjusted cash flows for each procurement option expressed in terms of corresponding net present values (NPVs). These NPVs enable apple-to-apple comparisons to determine which procurement option will generate the greatest value for taxpayers.\textsuperscript{12}

First and foremost, VfM is based on whole-life-cost estimates for both the traditional approach (PSC) and P3 model. Appendix D identifies all individual cost components that go into the

\textsuperscript{12} For more detailed discussion on VfM, refer to Infrastructure Ontario’s guide on VfM assessment [10].
whole-life cost estimation of PSC in a VfM analysis [8]. Early in the quantitative assessment phase, beyond the capital cost estimates, local sponsors can begin to review their historical O&M cost data and start developing PSC cost estimates to reflect whole life cost-equivalent of the traditional approach.

Along with the whole-life-cost estimation, a critical part of VfM analysis is risk assessment and quantification. Some elements of the risk assessment can begin during the qualitative phase and continue throughout the quantitative phase as more accurate data become available, thus allowing more analytical rigor. “Risk workshops” are often a helpful tool to identify, describe, allocate, and quantify all relevant potential risks of a capital investment. Workshop participants are generally key project stakeholders and other subject matter experts (SMEs) most knowledgeable about the nature of the particular project investment under consideration. During the workshops, the participants are typically asked to perform the following tasks:

1. Identify a list of most critical project risks (referred to as “risk register”)

2. Allocate these risks to the party best able to manage them—specifically, by deciding which risks may be: (a) retained by the local government sponsor, (b) shared between the local sponsor and the private sector, or (c) transferred completely to the private sector

3. Develop the necessary inputs required for the quantification of risks (i.e., a probability range of occurrence of each risk)

4. Assign monetary value to each risk based on the likelihood and expected impact of the risk if it were to occur (typically, in terms of low, most likely, and high range of potential monetary impacts if the risk were to occurs)

The risk allocation exercise is a critical part of the risk workshop. As a point of reference, Table 3 identifies key risk categories and shows an example of typical risk allocation between traditional and P3 procurement options. In a P3, the actual risk allocation is written into the Project Agreement and becomes an integral part of the final project delivery structure. Once the probability and impact ranges have been estimated for each risk at the risk workshop, a project-level risk assessment is performed using a Monte Carlo simulation. Ultimately, the outcome of such risk assessment is integrated into both the PSC and P3 cash flow financial model in VfM analysis in order to compare the procurement models on a risk-adjusted basis.

VfM analysis is a complex undertaking and often requires retaining an outside consultant to develop and support PSC cost estimation, risk assessment, financial modeling, cash flow and NPV analyses. If used appropriately, VfM can be an effective tool and serve as a critical component to procurement options analysis. However, a VfM analysis is only a reflection of the project assumptions used to develop it. Thus, changes to project assumptions will change the

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13 More detailed discussion of P3 risks can be found in Appendix A as part of the P3 Primer.
14 A Monte Carlo simulation effectively calculates a project’s outcome thousands of times, given all of the project’s risks, their probabilities of occurrence, and their impacts on the project, to determine a range of overall project outcomes. It is a commonly used tool in VfM and other risk assessments to aggregate discrete individual risks.
results of the analysis. In particular, assumptions on the discount rate used for future project cash flows can have a sizable impact on a VfM’s outcome. While a VfM’s results are often communicated as a single dollar value (i.e. the mean expected savings from using a particular procurement model), it would be more accurately conveyed as a range of potential project outcomes under the different procurement options. Whether and when a VfM analysis is performed is at the discretion of the local government sponsor. A better understanding of the VfM process and its results will help local government sponsors to make the best use of this tool and, for that matter, all other assessment tools presented in this section.

*Table 3: Risk Allocation Example for Traditional vs. P3 Options*

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>Allocation of Risk</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Traditional (PSC)</td>
<td>P3 (Shadow Bid)</td>
</tr>
<tr>
<td>Land acquisition cost risk</td>
<td>Public</td>
<td>Public</td>
</tr>
<tr>
<td>Permitting and approval risk</td>
<td>Public</td>
<td>Public or Private</td>
</tr>
<tr>
<td>Environmental risks</td>
<td>Public</td>
<td>Public or Private</td>
</tr>
<tr>
<td>Existing soil contamination risk</td>
<td>Public</td>
<td>Public</td>
</tr>
<tr>
<td>Procurement risk</td>
<td>Public</td>
<td>Public</td>
</tr>
<tr>
<td>Design risk</td>
<td>Public</td>
<td>Private</td>
</tr>
<tr>
<td>Construction risk</td>
<td>Shared</td>
<td>Private</td>
</tr>
<tr>
<td>Operations, maintenance, and life-cycle risk</td>
<td>Public</td>
<td>Private</td>
</tr>
<tr>
<td>Financing risk</td>
<td>Public</td>
<td>Private</td>
</tr>
<tr>
<td>Revenue risk (if applicable)</td>
<td>Public</td>
<td>Private, Shared, or Public</td>
</tr>
</tbody>
</table>
5. P3 TAXONOMY AND ALTERNATIVE P3 PROJECT STRUCTURING MODELS

This chapter focuses on “forms” and identifies various P3 project structuring models that may be available to government sponsors for their P3 undertakings. Table 4 provides an overview of the overall P3 taxonomy, which is organized broadly by different project types—i.e., whether the project investment under consideration involves (1) major capital improvements or (2) operations and maintenance (O&M) services only without substantive capital expenditure. Also included in the project type is (3) other auxiliary means to engage the private sector to improve infrastructure delivery, whether in conjunction with capital improvements or O&M services (herein referred to as “other auxiliary opportunities”). In addition to project type, the P3 taxonomy is further organized in Table 4 in terms of agreement structure, procurement model, project scope, and potential applicability with respect to specific asset categories. A more detailed discussion of this taxonomy follows. Appendix E provides a glossary of the main procurement models identified in Table 4 with brief descriptions.

5.1 Capital Improvements

In considering a municipal P3 associated with major capital improvements, there is a general tendency to focus primarily on social infrastructure and the availability payment (AP) P3 model. As mentioned earlier, municipal infrastructure assets are diverse and can include both social (e.g., city halls, public schools) and economic (e.g., solid waste conversion, FTTH) infrastructure assets, where more options than an AP P3 can be considered.

There are several alternative forms of long-term arrangements to engage the private sector in delivering capital improvements. The specific agreement structure for these long-term arrangements can broadly be categorized into: (1) “P3 concessions” (also referred as P3 “leases”), (2) various “franchise-based” agreements, and (3) other “lease-based” arrangements that are not structured as P3 concessions/leases as described in (1). There can be significant overlap in how these agreement structures are labelled and, often, the terms concession, lease, and franchise are used interchangeably for very different structures. The exact legal form of an agreement can also be determined by what is possible by state law. Although all of these terms are used loosely to refer to alternative forms of public-private partnerships, in this report we will use the terms as typically used in the asset classes where they have occurred in the U.S. and elsewhere. When relevant for the project structuring discussions at hand, we will also highlight the differences.

15 These lease-based arrangements represent long-term leases that are longer than 5 years and treated as debt. Historically, these leases have had additional accounting implications under GASB in the treatment of the project debts as will be explained later.
<table>
<thead>
<tr>
<th>Project Type</th>
<th>Agreement Structure</th>
<th>Procurement Model</th>
<th>Potential Scope/Function</th>
<th>Applicable Municipal Asset Category</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capital Improvements (CI)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 Concession/Lease</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Always public ownership of assets</td>
</tr>
<tr>
<td>Private Sector Finance:</td>
<td></td>
<td></td>
<td>DBM, DBO, or DBOM</td>
<td>Social and Economic</td>
<td></td>
</tr>
<tr>
<td>Availability Payment (AP) P3</td>
<td></td>
<td></td>
<td>DBFM, DBFO, or DBFOM</td>
<td>Social and Economic</td>
<td></td>
</tr>
<tr>
<td>Revenue Risk (RR) P3</td>
<td></td>
<td></td>
<td>DBFO or DBFOM</td>
<td>Economic</td>
<td></td>
</tr>
<tr>
<td>Brownfield P3 (RR P3)</td>
<td></td>
<td></td>
<td>DBFOM (RME)</td>
<td>Economic</td>
<td></td>
</tr>
<tr>
<td>Franchise-Based Agreement</td>
<td>BOT/BOOT</td>
<td>DBFOM</td>
<td>Economic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BTO</td>
<td></td>
<td>DBFOM</td>
<td>Economic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLT/BLOT</td>
<td></td>
<td>DBFOM</td>
<td>Economic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOO</td>
<td></td>
<td>DBFOM</td>
<td>Economic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOBO</td>
<td></td>
<td>DBFOM (RME)</td>
<td>Economic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Lease-Based Arrangement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lease/Purchase</td>
<td></td>
<td>DBFM/DBFOM</td>
<td>Social+Economic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LDO/BDO</td>
<td></td>
<td>DBFOM (RME)</td>
<td>Social+Economic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sale/Leaseback</td>
<td></td>
<td>DBFOM (RME)</td>
<td>Social</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lease/Leaseback</td>
<td></td>
<td>DBFOM (RME)</td>
<td>Social</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O&amp;M Services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Various Performance Based/Risk Sharing Contract</td>
<td></td>
<td>OMM (O&amp;M “Concession”)</td>
<td>FO or FOM</td>
<td>Economic</td>
<td>O&amp;M focus and risk sharing but limited CI; can also represent O&amp;M scope for CI projects</td>
</tr>
<tr>
<td>Others:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESCo</td>
<td></td>
<td>FOM</td>
<td>Social and Economic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovative Technology Partnership (ITP)</td>
<td></td>
<td></td>
<td>FOM</td>
<td>Economic and Social</td>
<td></td>
</tr>
<tr>
<td>Other Auxiliary Opportunities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Various</td>
<td></td>
<td>Real Estate Development</td>
<td>Revenue Generation/ Value Capture</td>
<td>Social and Economic</td>
<td>Used jointly with CI and O&amp;M projects; used to generate additional revenues</td>
</tr>
<tr>
<td>Marketing Agreement</td>
<td></td>
<td>Revenue Generation</td>
<td>Social and Economic</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.1.1 P3 Concessions/Leases

The most familiar form of a P3 in the U.S. is a P3 long-term concession, also referred to as a P3 long-term lease (hereinafter referred to as a “P3 concession”). In general, P3 concessions are used for those infrastructure assets where the asset ownership resides in the public sector. A P3 concession is a long term contractual relationship between a public sponsor and a private partner with the following general characteristics [6,12,13]:

- Public ownership of the asset throughout its lifecycle
- Provision of capital assets and associated services based on defined performance-based output specifications
- Lifecycle-based asset delivery approach with the integration of multiple elements (i.e., various levels of integration that include design (D), build (B), finance (F), operate (O), and/or maintain (M) elements)
- Transfer of risk to the private partner
- Private sector capital at risk throughout the duration of the contract
- Performance-based payment mechanism

There is a broad spectrum of models included in the definition of a P3 concession used by different organizations. In this report, using the general characteristics identified above as a point of reference, we further identify alternative P3 concession models in terms of (1) whether the public or private sector is responsible for securing the initial capital financing (“F” or not “F”) and (2) the specific delivery scope of the concession agreement (i.e., different combinations of “D,” “B,” “O,” and/or “M”).

Publicly Financed P3 Concession. When the public sector secures financing for the project, the private sector assumes no or limited financial risk (i.e., no “F”) and the potential scope of a P3 delivery can be DBM, DBO, or DBOM. This type of procurement model is in essence an enhanced performance-based contract where most of the project risks assumed by the private sector are performance related and non-financial. The goal here is to achieve some level of lifecycle integration and efficiency not offered by the traditional D-B-B option without transferring the financial risk. The public sector is wholly responsible for compensating the private contractors for the work they perform. The most expansive version of this procurement category is a “DBOM” contract, which has historically been used for airport people mover systems or, as will be discussed later, waste-to-energy conversion projects. With the public sector being responsible for the overall project financials, publicly financed P3 concessions can be used to deliver both social and economic infrastructure projects. As this model does not arrange for financing at the project level, it lacks the investment scrutiny of outside lenders prior to financial close for a project.

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16 For more detailed discussions on P3 concessions, see References [11,12,13].
17 With the exception of publicly financed P3 concessions.
18 These publicly-financed P3 models sometimes involve the private sector arranging short-term financing for design/ construction activities to cover for the payment lag, but they take on no long-term financial risks, such as tying up their at-risk equity capital over the lifecycle.
When the private sector secures the financing and assumes the financial risk (i.e., commits at-risk equity capital to finance the project), there are two prevalent P3 concession models: (1) availability payment P3 (“AP P3”) and (2) revenue (or demand) risk P3 (RR or DR P3, herein after referred to as “RR P3”).

**Availability Payment P3 (“AP P3”)**. Under the AP P3 model, although the private sector is responsible for securing financing for the project, the long term funding responsibility resides in the public sponsor. The repayment funding sources thus come from the public sponsor’s general fund revenues in most cases. In general, the public sponsor pays the private partner a combination of (1) a lump sum milestone and/or substantial completion payment(s) during the construction phase to cover a portion of their design/construction costs and (2) regular disbursements (typically on an annual basis but sometimes more frequent) for the duration of O&M phase to cover for their annual O&M expenses as well as the remaining balance of the design/construction costs. In some cases all capital costs are amortized over the payments during operations, and the public sponsor makes no payments until construction is completed. The regular disbursements are performance based and payments are conditional upon the availability of infrastructure assets in working condition.

An alternative form of the AP P3, where the private sponsor also assumes the long term financial liability, is a “shadow toll” P3. A better known form of the shadow toll P3 is the Private Finance Initiative (or “PFI”) model used prevalently in the U.K. and other parts of the world outside of the U.S.\(^{19}\) Under the shadow toll P3, the performance-based regular disbursements are conditional upon the demand level achieved rather than the asset availability.

In terms of its potential scope of services, an AP P3 can be DBFM, DBFO, or DBFOM. With no or limited potential to generate revenue, the AP P3 is a natural fit in delivering social infrastructure.\(^{20}\) For the municipal assets under consideration, public buildings, education, healthcare, and correctional facilities would fall into this category. As mentioned previously, the most prevalent P3 procurement model for social infrastructure is an AP P3 with a scope of DBFM.

**Revenue Risk P3 (“RR P3”)**. When an underlying infrastructure asset is inherently “economic” in nature, meaning a user-paying funding mechanism is already established or can be established relatively easily, the RR P3 is a preferred P3 procurement strategy. For the municipal assets under consideration, all utility-like infrastructure with the potential to charge users (e.g., solar micro-grid, solid waste-energy conversion, or FTTH/broadband network) would fall into this category. Under RR P3, the primary financing responsibility resides with the private partner where the recovery of their investments are derived in part or in whole from the direct charges they impose on the users of the infrastructure assets. Unlike the AP P3, the public sector assumes no funding responsibility under this procurement model other than granting the private partner the authority to collect user charges (usually subject to a fixed or capped pricing

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\(^{19}\) The term “PFI” was used initially to refer primarily to shadow toll P3s but its use is now expanded to include availability payment-based P3s as well.

\(^{20}\) In Australia, where the terms “social” and “economic” infrastructure were first coined in the context of P3 projects, social infrastructure was defined synonymously with AP P3 (or PFI) and economic infrastructure with RR P3.
schedule). The private partner is wholly responsible for achieving the demand (and revenue) levels necessary to make them financially whole. Because the operational phase (“O”) is an essential part of the private sector earning the user revenue, the potential scope for RR P3 is either DBFO or DMFOM, with more common scope being DBFOM.

Under both an AP P3 and a RR P3, at-risk equity capital is the private sector’s skin in the game, i.e., the private sector loses it completely if they default on the contract at any time over the project’s lifecycle (whether due to financial hardship or lack of performance). In general, the private sector’s at-risk equity capital is much higher for the RR P3 model (which is typically around 20 percent or more of the total project cost) than for the AP P3 model (which is typically around 10 percent) because, particularly from the perspective of the private debt financier, a RR P3 is considered to be a much riskier undertaking with a higher probability of default. For this reason, there is a tendency on the part of the public sector, whether at federal, state and/or local level, to provide more financial support in RR P3 deals than for those of AP P3.21

**Hybrid AP P3.** An AP P3 can also be used for economic infrastructure (referred to as “hybrid” AP P3), especially when it is difficult to engage the private sector to assume the underlying revenue or demand risk. This type of situation can be especially acute when the industry observes an unusually high level of RR P3 defaults, as was the case for several toll road RR P3 transactions in recent U.S. P3 history. In this case, the public sector takes on the revenue risk and collects/administers user charges, while limiting the private sector’s exposure to financial liability by providing availability payments. These payments are still conditional upon meeting the performance specifications. In terms of the scope, under the hybrid model, the public sponsor can choose to operate the asset themselves (i.e., DBFM) or, more commonly, let the private sector operate it (i.e., DBFO or DBFOM).

**Brownfield P3 Concession.** The P3 concession models described above pertain primarily to greenfield projects for delivering new infrastructure assets. In general, most brownfield P3 projects are associated with existing facilities that are already collecting user charges or have core asset elements that generate revenue. For this reason, the risk of brownfield P3 projects are essentially that of a RR P3 concession where the private sector takes the revenue risk, albeit the risk being much less when compared to greenfield projects, since there is already a track record for revenues. In addition to transferring the operating right to the private partner, the public sponsor also grants them the authority to collect user charges, be they charges at current level, any increases from the current level, or new charges altogether. In exchange, the private partner provides the needed capital investments to rehabilitate, modernize and/or expand (“RME”) the brownfield assets, and also operates and maintains them for the term of the concession. In addition, the private partner also provides “brownfield proceeds” at the project outset—often a hefty lump sum—effectively to compensate in part for the public sponsor’s already sunken investments on the assets. Australia’s Asset Recycling Initiative is based on this type of brownfield P3 transaction where the brownfield proceeds from the existing assets are used

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21 For major transportation projects, for example, these government supports can take the form of credit enhancements (e.g., low-interest subordinated loan from TIFIA, up to one-third of the project cost), direct subsidies from the state and/or local governments (typically around 10-15 percent), and/or tax-exempt private activities bonds (typically 10 percent or more).
(“recycled”) to fund much needed greenfield projects, which are generally perceived to be riskier by the investment community.

5.1.2 Franchise-Based Agreements [14]

A group of terms, such as build-operate-transfer (BOT) or build-own-operate (BOO), are sometimes used to refer to private sector involvement in infrastructure delivery. In this report, in terms of the type of agreement structure, we referred to these terms collectively as “franchise-based” agreements as shown in Table 4. Before the term “public-private partnership” and its arrangements became more formalized as a “P3 concession” as described above, franchise agreements and related terms were the predominant way to represent the private sector’s engagement in infrastructure delivery. Such lexicon was used primarily for infrastructure sectors that were deregulated and/or partially privatized where there was some transfer of asset ownership from the public to the private hands. Currently, such franchise agreements are used more commonly outside of the U.S. and is especially common (even in the U.S.) for power, energy, telecommunication, and rail sectors where there has been significant deregulation and, in many countries, partial privatization.22

Unlike P3 concessions, franchise agreements almost always involve some degree of private sector ownership of the underlying asset over the asset’s lifecycle. The private asset ownership can be temporary and ultimately turned over to the public sponsor or it can be permanent. Under a franchise agreement, for new greenfield projects, construction is usually on a “turnkey” basis where the private sector assumes complete financial risk and owns the new asset during the construction phase. As shown in Table 4, franchise agreements are thus broadly grouped into two categories: those where the underlying assets are ultimately turned over to the public sector and those that remain in private hands.

When the public sector ultimately owns the asset, the private franchisee can either (a) build the asset and retain the operating right for the term of the franchise but turn over the asset ownership to the public sponsor free of charge either (a) at the end of the term (referred synonymously as “build-operate-transfer” (“BOT”)) or “build-own-operate-transfer” (“BOOT”)) or (b) upon construction completion (referred to as “build-transfer-operate” or “BTO”). The private franchisee can also build the asset, sell it to the public sponsor, and lease it back to operate it until the end of the lease term (referred synonymously as either “build-lease-transfer” (“BLT”) or “build-lease-operate-transfer” (“BLOT”).24

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22 The term “public-private partnership” became more formalized starting in late 80’s and early 90’s with the global-scale infrastructure privatization movement that in part was triggered by the rise of “Thatcherism” in the U.K.

23 “Partial” privatization often involves decoupling of a vertically integrated industry where (i) more monopoly-like parts (e.g., upstream power generation or on-ground fixed railway tracks) remain in the public hands, whereas (ii) more competition-amenable parts (e.g., downstream power distribution/retailing or above-ground rail car operations) are privatized and transferred to the private hands. Decoupling also helps to defray the conflict of interest situation often facing vertically integrated sectors, where the government plays both the asset owner and the regulator roles.

24 Unlike in a P3 concession, the private sector owns the underlying assets during construction phase for BTO, BLT and BLOT.
If the asset ownership ultimately resides in private hands, the private franchisee obtains the operating rights, builds the underlying asset, and operates it for the term of the franchise but retains asset ownership in perpetuity (referred to as “build-own-operate” or “BOO”). If the underlying asset is brownfield, the private franchisee buys the existing public asset, provides major improvements, and operates it per the terms delineated in the franchise agreement but owns the asset in perpetuity (referred to as “buy-build-operate” or “BBO”). For both BOO and BBO, it is up to the private sector to decide what to do with the assets when the franchise term ends.

In general, franchise agreements are primarily designed for economic infrastructure and can be considered a form of RR P3. There is not much difference between a RR P3 and a franchise agreement with respect to the general contract terms, except for the asset ownership issue discussed above. In this report, for clarity in discussion, we distinguish a franchise agreement from a RR P3 when private asset ownership is involved. For the local assets under consideration, a franchise agreement could be a potential procurement option for solar micro-grid, solid waste-energy conversion, FTTH/fiber optics, or, possibly, some of the smart city concepts (e.g., smart waste bins with sensors) where it may be more beneficial for the private sector to own, in part or in whole, the underlying assets and where there is no significant political concern about the ownership transfer. A more detailed discussion on potential procurement options for these asset types are provided later in this report.

Most of these franchises are DBFOM and have stable repayment funding sources through direct user charges. In addition to third-party users, more often than not, the government sponsor can also be the user of the franchisee’s services to meet their own “base load” needs. For this reason, although franchise agreements have similar characteristics as RR P3s, franchisees generally take less revenue risk. In a toll road RR P3, for example, the users are a third-party general public and there is always uncertainty regarding the achievable demand level. On the other hand, for waste-to-energy conversion, for example, private franchisee can own the waste treatment plants, and sell the energy output to local utility companies (for general public consumption with established demand level) and/or for consumption by the public sponsor. These project “off-takers” typically guarantee minimum demand for the project through long-term power purchase agreements (PPAs).

With the prominence of P3 concession models, the RR P3 concession has now expanded and has been structured so that its use is interchangeable with what used to be considered a form of franchise agreement. For local government sponsors, the practical choice of whether to use a RR P3 or a franchise agreement would depend on, among other factors, whether there are special legal and/or tax implications in using these specific terms in their jurisdiction, whether one party is more familiar with or prefers one lexicon to the other (whether in the P3 concessionaire team and/or in the investor-finanier side), or whether some transfer of asset ownership is involved in the transaction.

25 We define “third-party” as those users who are not direct signatory to project agreements, be they P3 concessions, franchises or lease-based arrangements.

26 Under this case, the public sponsor also often provides waste inputs to the private franchisee, helping to further reduce the overall project risk.
5.1.3 Other Lease-Based Arrangements [15]

P3 concessions are often referred as long-term “leases.” In addition to leases that are specific to P3 concessions as described above, there are other lease-based arrangements that can be used to finance capital improvements. The (non-P3 concession) lease arrangements that are specifically designed for capital improvements are identified in Table 4. Unlike P3 concessions, these lease arrangements are generally used by public sponsors to finance capital projects without technically issuing long-term debt. As such, they have less impact on the public sponsor’s debt limit and capacity concerns when compared to P3 concessions, especially in reference to an AP P3. In addition, by leasing the infrastructure assets, the sponsors avoid any risks associated with direct liability of owning the assets.

Often, these lease arrangements involve the private sector’s ownership of the underlying assets and thus can be likened to a form of franchise agreement. In general, however, although there is no clear cut division, franchise agreements are associated more with utility-like economic infrastructure, whereas lease arrangements as identified in Table 4 are used more commonly for social infrastructure with more real estate development characteristics. These lease arrangements can also be used for economic infrastructure, especially in situations where their key features such as no long-term debt issuance, decreased asset liability, etc. are of critical importance.

The majority of these lease arrangements tend to be associated with brownfield assets and are used to rehabilitate, modernize, and/or expand (“RME”) the assets that the public sponsors currently own but where it is difficult for them to inject any additional investments. As such, the lease arrangements identified in Table 4 can be broadly categorized into those that pertain to new greenfield assets and those that are for existing brownfield assets.

For greenfield projects, “lease/purchase” is the preferred procurement option. In this model, the private sector finances and builds a new asset and leases its use to the public sector for the duration of the lease, who then has the option to buy the asset at the end of the lease term at no or little cost (using their accumulated lease payments as equity). Under this model, either the lessee (public sector) or lessor (private sector) can operate the asset. The potential delivery scope for the private sector in this case is thus DBFM or DBFOM. Lease/purchase arrangements have commonly been used for prison and correctional facilities by many state governments in the past, as will be described later.

For brownfield projects, “lease-develop-operate” (“LDO”) and “buy-develop-operate” (“BDO”) are two lease arrangements where the private sector leases or buys, respectively, the existing public assets to finance and develop it as well as operate and maintain it. When used for economic infrastructure, these arrangements can be very similar to a franchise agreement. For example, a municipal government can engage the private sector through a LDO (or BDO) model to develop shelters at existing bus stops to increase passenger safety, where the private sector can also provide advertising space to generate revenue to pay for building, operating and maintaining...
the shelters.\textsuperscript{27} When used for social infrastructure, they are in essence very similar to the Enhanced Use Lease ("EUL") program used effectively by the federal government in the past\textsuperscript{28}

There are other brownfield leasing models used more for public buildings and social infrastructure where capital improvements normally are not the primary motivation. Where specific capital clauses can be included, however, "sale/leaseback" is a brownfield procurement option where the public sector sells the existing asset they own to the private sector with the understanding that the private sector would make necessary capital improvements. The public sector then leases back the asset to continue to operate it and makes lease payments to the private sector for the use and upkeep of the asset. In cases where the public sector cannot relinquish the asset ownership, however, an alternative form of "sale/leaseback" is "lease/leaseback" where, instead of buying the asset, the private sector leases it to make the necessary capital improvements and leases it back to the public sector for its use.

As mentioned earlier, when capital improvements are the underlying goal, these lease arrangements are in essence the public sector’s attempt at leveraging their future operating budget to fund their capital needs while avoiding any long-term capital debt implications. As such, unlike major one-time capital expenditures, these lease arrangements are subject to limited approval protocols and often do not require any legislative or voter approvals.

Most of existing leasing arrangements are of two basic types—capital vs. operating leases—with very different long term debt implications for the public sponsor \[16\].\textsuperscript{29} Lease payments under a capital lease are considered a long-term debt obligation, whereas those for operating lease are not. To be classified as a capital lease, the key criteria is the transfer of ownership from the private (lessor) to the public sector (lessee) at the end of the lease term with no or little additional cost, as is the case for Lease/Purchase arrangement (referred to as “bargain purchase option”).\textsuperscript{30} Any lease that is not classified as a capital lease is an operating lease.\textsuperscript{31} Many of the lease arrangements identified in Table 4 have often been misused to look like an operating lease based on accounting and other gimmicks to avoid taxes (for the private sector) or transparency in addressing debt capacity concerns (for the public sector). When exploring these leasing

\textsuperscript{27} A similar leasing approach was used by the District of Columbia to provide bus shelters and to kick-start a bike sharing program but the project was structured as a franchise agreement.

\textsuperscript{28} EUL has been used, for example, by the Department of Defense (DoD) to finance its military housing needs and by the Veterans Administration (VA) for its various asset management programs. Under EUL, private developers are allowed to develop underused federal assets or properties for their own for-profit commercial purposes and, in exchange, provide in-kind capital improvements to federal assets at no cost to the government. As EUL has been largely effective, in addition to DoD and VA, temporary EUL authority has also been granted to GSA and NASA.

\textsuperscript{29} The Governmental Accounting Standards Board (GASB) has established new accounting rules that apply the same standards to all leases, without special distinctions for capital vs. operating leases. These go into effect in 2019. \[17\].

\textsuperscript{30} There are additional criteria for a capital lease, such as the lease term has be to greater than 75 percent of the asset’s useful life. For the private sector, a capital lease also has additional federal tax implications that an operating lease does not due to depreciation and capital gains accounting issues.

\textsuperscript{31} The terms "capital lease" or "operating lease" can also be used for P3 concessions and franchise-based agreements from accounting perspective only to reflect whether “on-balance sheet” or “off-balance sheet” accounting is exercised in treating the underlying project financing.
arrangements as potential procurement option, local sponsors should be cognizant of these issues to ensure that their selections are based on the right set of motivations.\textsuperscript{32}

5.1.4 Other Hybrid and Innovative P3 Approaches

Although not identified in Table 4, there are other hybrid and innovative P3 models that should be considered in exploring alternative procurement options. As mentioned, one of the major downfalls of the P3 procurement approach is the high financing costs of involving the private sector, in part due to the at-risk equity capital that can be quite expensive. There are alternative P3 models that are designed specifically to address this issue. We highlight a few notable examples in this report:

- The “63-20” Model involves using a non-profit intermediary to enable tax-exempt financing, which has had several successful applications in the U.S., especially for social infrastructure assets (an example of this model’s application is provided in Section 6)

- Other credit enhancing P3 models—such as “Credit Guarantee Finance” from the U.K. or “Forfaiting” Model from Germany, both representing P3 best practices from each country, respectively—involving innovative leveraging of the public sector’s credit worthiness to lower the P3 financing cost\textsuperscript{33}

Along with more “standard” P3 approaches presented in Table 4, local government sponsors should also review these models as a point of reference and potential means to minimize the high private sector financing costs.

5.2 O&M Services Only

As mentioned earlier, O&M costs constitute a large part of infrastructure funding needs in the U.S. and one way to reduce the funding needs is to reduce the O&M costs through efficiency gains. Ultimately, a P3 is also about efficiency gains through lifecycle integration. Various measure can be taken to gain O&M efficiency—whether from congestion pricing, green

\textsuperscript{32} Whether it is P3 concession/lease or other lease arrangements, the general tendency in P3 undertakings has been to move from off-balance sheet to on-balance sheet accounting. In the first decade of PFI undertakings in the U.K., however, almost a half of the P3 transactions in terms of their value were off balance sheet.

\textsuperscript{33} “Credit Guarantee Finance (CGF)” from the U.K. involves the public sponsor supporting the short-term debt financing of a project during construction with repayment guarantee insurance. When the private partner refines the debt upon construction completion with low-cost long-term debt, the proceeds are used to repay the public sponsor, thereby lowering the overall project financing cost [18]. “Forfaiting” (with an “a” not “e”) from Germany involves the private partner arranging interim financing during the construction phase and, upon construction completion, selling the P3 account receivables (i.e., availability payments) to a second bank through forfaiting contract to pay off the construction debt [19]. Both of these approaches were designed to facilitate the securing of construction phase financing, considered to be high risk by the investment community, which can be refinanced more easily after construction completion with long term project financing with more favorable terms. Milestone payments during construction have since replaced these approaches but the financing risk exposures to the public sponsor from CGF and Forfaiting are much less and indirect than direct remuneration through milestone payments.
sustainability initiatives, and/or various “smart city” concepts that are still evolving. They all help to make the maximum use of existing infrastructure without needing to build new assets. For local governments, significant opportunities thus exist in developing a new breed of P3 models in the O&M space.

Table 4 identifies various P3 procurement models that currently exist to deliver O&M services. The most prevalent O&M P3 model is “operate-manage-maintain” or “OMM” (or more generally referred to as an “O&M Concession”), where a public sponsor contracts with a private partner to operate, maintain, and manage an infrastructure asset providing a service. Under this model, the public sponsor retains the ownership of the asset and provides all necessary capital improvements but, in return, shares operating revenue with the private sector based on pre-agreed terms, which can vary significantly from concession to concession. The private party may also choose to invest its own capital in the asset, where its return on such investment is derived primarily from the operational efficiencies they can achieve on the asset. In general, the longer the contract term, the greater opportunity for increased private investment and for operational efficiency gains.

In general, the O&M concession model can be used for most of the economic utility-type assets, especially in situations where the public sponsor can deliver the capital assets but does not necessarily have the competency to operate (functionally) and manage (financially) the core services provided. An O&M concession is often used by local governments to provide wastewater treatment services. It can also be used for broadband internet services in situations where the public sponsor builds, owns, and maintains the physical fiber optics asset but a private party (e.g., internet service provider or ISP) operates the fiber to provide broadband services to retail customers.

An energy service (or savings) company (or “ESCo”) can be considered a special form of O&M concession. Under this model, the private sector (third-party service provider) assumes the upfront costs of its services in exchange for a performance-based contract. For example, ESCOs get paid a fee (or assume the utility bill, for example, for the legacy power/electricity provider) from the building owners (in this case, public sponsor) for investing in and implementing a broad range of energy savings solutions. In all cases, energy savings are guaranteed to exceed the fee (or the legacy system utility bills) so that the building owners in essence take no financial risk. ESCOs also lease various equipment they own that is designed to reduce energy costs and get the equipment lease payments from building owners to finance the upfront costs of energy saving retrofitting.

Innovative technology partnerships (herein referred to as “ITP”) are O&M P3 models that can continue to evolve in parallel with evolving technologies, including various “smart city” concepts. Although the definition of “smart city” is still evolving and actual benefits of some new urban technologies are yet to be proven, the primary goals are to improve the quality and performance of infrastructure services, reduce resource consumption in the process, and engage

34 In this report, we consider “O&M outsourcing”—i.e., where various municipal services (e.g., garbage collection, custodial services for public buildings) are contracted out to the private vendors—as a traditional O&M procurement model and not a P3 because very little financial risks are assumed by the private sector (similar to contract-based D-B-B traditional approach in capital improvement side).
more effectively and actively with the local citizens. There are many smart city concepts with varying degrees of cost and financing implications. Some (e.g., networked and dynamic scheduling for BRT system) bring significant benefits to citizens with little cost implications, whereas others (e.g., smart LED street lighting) require a moderate capital investment with clear and proven savings that can help pay for itself. Some (e.g. emergency and disaster response control centers) provide services that are primarily in the public domain where the costs must be borne by the public sector, while others are citywide “enterprise-level” applications (e.g., fiber optics backbone, “Big Data”) that are costly but with significant potential benefits both for the public and private domain.

A good example of ITP type models that currently exist is transportation network companies or TNC (e.g., Uber and Lyft). This model represents a relatively new and emerging concept where the companies do not provide direct O&M services themselves but link other service providers to maximize operational efficiency and capitalize on the benefits of integrated network effects. ITP examples vary widely and can also include those related to energy savings (e.g., solar panels), real-time information (e.g., mobile applications, street-level kiosks/displays), Wi-Fi/wireless services, and automated payment/collection system. Often, these ITP driven procurement models are franchise-based (similar to those described earlier) and have revenue sharing arrangements that have minimum cost implications for the public sponsors, while providing the needed infrastructure services they are responsible for. As a point of reference, Appendix F provide a few recent examples of ITP models used successfully in the U.S.

5.3 Other Auxiliary Opportunities

The P3 procurement models described above are all directly linked to infrastructure assets, whether in making capital improvements on them or providing O&M services integral to the assets. These direct infrastructure-related procurements can be implemented independently or in conjunction with other auxiliary opportunities that can help enhance the viability of the infrastructure project delivery under consideration. In essence, these opportunities help to generate additional revenues in the short run through direct payment arrangements into the project or in the long run by capturing and monetizing the eventual value enhancement of the underlying assets (or “value capture”).

As shown in Table 4, two important examples of particular relevance to municipal P3 implementation are (1) real estate development incorporated into a procurement and (2) various marketing arrangements.

The real estate development component captures some of the additional value created as property values increase due to improved infrastructure services, whether from direct capital or O&M improvements. A real estate development component can be a part of larger P3 deal, where the primary driving force behind the P3 deal structure is infrastructure related, be they capital improvement and/or O&M services. Alternatively, the primary economic driver of a project can be the real estate, while the related infrastructure development (capital and/or O&M) is there to support the real estate development needs.
Public sponsors can take several different approaches to incorporate a real estate development component into the P3 delivery including, for example:

- Entering into various joint development partnerships or joint venture arrangements with a real estate developer
- Providing air rights to allow the private partner to build above new or existing infrastructure assets in exchange for capital improvements or in-kind contributions
- Providing easements to enable the private partner direct access to critical infrastructure assets, e.g., existing transit stations, in exchange for capital improvements or other in-kind contributions
- Entering into various retail concession contracts with the private vendors to be located with the new or existing infrastructure assets

Depending on how the deal is structured, the private partner in these examples can be a third party or a part of the P3 infrastructure delivery team. Appendix F provides a few real case examples where the real estate was the economic driver to help carry out needed infrastructure improvements. In Chapter 6, we also highlight a municipal infrastructure P3 example—namely, Long Beach Civic Center—where the real estate development component played a key, albeit supportive, role in delivering important public infrastructure assets.

Marketing agreements are various smaller scale deals and are primarily about generating additional revenues from new or existing infrastructure assets. They include, among others, sponsorship, naming rights, and advertising. These agreements generally involve the private installation and operation of marketing assets such as display monitors, advertising boards, or other advertising venues linked to infrastructure, be they buildings, stations, bus shelters, vehicles, or others. The private sector is often responsible for operating and/or maintaining their own assets, while also providing the public sponsor with various revenue sharing arrangements. In this regard, as was the case for ITP, the procurement models are often franchise-based similar to those identified earlier. Appendix F also provides real case examples of marketing arrangement.

5.4 Other Considerations that Affect Procurement Scope and Options

5.4.1 Defining Operations (“O”): Core vs. Ancillary Services

In defining the potential scope of a P3 undertaking, especially for the operational (“O”) component, it is important to distinguish between operations that pertain to “core” services vs. those for non-core “ancillary” services (sometimes referred to as “accommodation” services). This distinction is also germane to how we distinguish economic vs. social infrastructure and define “O” for these two asset categories.

We define “core” services as the intended public services—e.g., public education (social) and transportation (economic)—that use the infrastructure assets under consideration—e.g., school
buildings (social) and toll roads (economic). We define “ancillary” services as all services necessary to operate and regularly maintain the underlying infrastructure assets in good working condition so that core services can continue to be provided.

For social infrastructure, competency in operating infrastructure assets (e.g., building management and maintenance) is not directly linked to competency in providing the intended “core” services using the assets (e.g., providing education or healthcare). For economic infrastructure, on the other hand, competency in operating infrastructure assets (e.g., operating and maintaining roads or water treatment plant) is germane to competency in providing core services (e.g., providing transportation or clean drinking water). As such, when “O” is included in the economic P3 scope, it generally represents all necessary operational tasks that pertain to both core and ancillary services.

For social infrastructure, however, we need to decouple core and ancillary services when defining “O” because public sponsors are often required (by law) to provide the core services themselves. Depending on different jurisdictions and different asset types, the extent to which the core service responsibility can be transferred to the private infrastructure provider also can vary. This becomes relevant when some efficiency gains can be achieved by this transfer. For example, for some correctional institutions, counseling – part of their core services – can be transferred to the private party whereas security tasks must remain in the public hands. For these and other reasons, defining “O” for social infrastructure can be a little more challenging when compared to economic infrastructure. In general, except under special circumstances, core services are not included as part of social infrastructure P3 undertakings. This is the reason why the prevalent scope for social infrastructure is DBFM without the “O.”

One of the challenges in structuring social P3 deals is also about figuring out what is all included in “ancillary” services. In general, there are two types of ancillary services: hard facility management (HFM) and soft facility management (SFM). HFM pertains to those that are related to hard assets (building, HVAC, etc.) that typically require engineering and technical expertise to provide routine maintenance, whereas SFM pertains to other services that are associated with grounds surrounding the building, FF&E, and other accommodation services. SFM, for example, can include ground maintenance, custodial, security, food services, etc. IT services can also be included as a part of SFM or considered separately. Table 5 provides an example of core vs. ancillary services for public school assets, where ancillary services are categorized in terms of HFM, SFM, and IT.

More often than not, ancillary services associated with SFM are provided by the public sponsor’s own personnel. The extent to which different SFM services can be included in P3 undertaking would depend on the public sponsor’s own personnel requirement and pertinent local labor laws and regulations. We provide some pertinent examples related to core vs. ancillary and HFM vs. SFM when discussing each asset types in Section 6.

Generally, efficiency gains in social infrastructure P3s are not as significant when compared to economic infrastructure due to the narrowing of the scope discussed above, not only from

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35 FF&E represents furniture, fixtures and equipment that are movable and have no permanent connection to the structure of a building or facilities.
excluding core services but also SFM services, whether in part or in whole. In addition to losing economies of scale for the private partner, this natural division of responsibilities for P3s in social infrastructure complicates procurement for the public sponsor. This may be a contributing reason why adoption of P3s has been slower in the social infrastructure sector when compared to the transportation sector. Although difficult to come by, non-core ancillary cost estimates can be a useful measuring stick to determine broadly the level of efficiency that can be gained from the allowable P3 scope. In Canada, for example, hospital costs for non-clinical (i.e., non-core) services have been estimated at 46 percent of the total whole-life cost [24]. For the elementary and secondary education sector, however, the non-instructional and school administration (i.e., non-core) costs have been much lower, ranging between 15 to 25 percent [7], making it proportionally less of a factor in developing opportunities for efficiency gains. Figure 3 illustrates conceptually where each asset type under consideration might fall in the broad spectrum of potential efficiency gains through economies of scale in scope with respect to core and ancillary services.

**Table 5: Core vs. Ancillary Services for Public Educational Facilities [7]**

<table>
<thead>
<tr>
<th>Core Services</th>
<th>HFM (for Building/HVAC)</th>
<th>SFM (for FF&amp;E and Grounds)</th>
<th>IT[b]</th>
</tr>
</thead>
<tbody>
<tr>
<td>School Administration</td>
<td>• Building Maintenance (roofing structures, windows, floors, other fixed physical components, etc.)</td>
<td>• Grounds Maintenance</td>
<td>• Hardware and System Platform</td>
</tr>
<tr>
<td>Teaching</td>
<td>• Heating and Cooling Systems (HVAC)</td>
<td>• Equipment Maintenance</td>
<td>• IT Support</td>
</tr>
<tr>
<td>Teaching Assistance</td>
<td>• Mechanical Services (e.g., elevators)</td>
<td>• Security</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Lifecycle Maintenance (replacements)</td>
<td>• Cleaning and Other Caretaking</td>
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<td></td>
<td></td>
<td>• Cafeteria</td>
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<td></td>
<td></td>
<td>• Community Access[a]</td>
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<tr>
<td></td>
<td></td>
<td>• Ancillary Property Development</td>
<td></td>
</tr>
</tbody>
</table>

[a] Can sometimes establish revenue sharing arrangement between the public and private sector for this component.
[b] Treated either separately or sometimes included as part of SFM.
5.4.2 Project Structuring Decision Roadmap

There are several basic project parameters that can constrain the available procurement options. They include:

- **New vs. Existing**—whether the P3 undertaking is to (a) build new greenfield assets or (b) improve (i.e., rehabilitate, modernize and/or expand, RME) existing brownfield assets

- **Asset Ownership**—whether the assets are (or can be) owned by the public sponsor or the private partner, in whole or in part, over the project lifecycle

- **Repayment Funding Sources**—where the ultimate financial liability for the P3 project resides and whether the financial obligations are ultimately repaid by (a) the public sponsor’s funds (collected via taxes and/or other non-tax revenues, such as third party user charges, lease payments, and any other fees collected directly by the public sponsor), (b) third-party user charges paid directly to the project company, or (c) especially for franchise and lease arrangements, usage fees\(^{36}\) and/or lease payments made by the public sponsor to the private sector

Figure 4 presents a project structuring decision “roadmap” as determined by these project parameters that limit specific procurement options and scope available for P3 capital improvements.

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\(^{36}\) Usage fees here are direct charges from off-takers under PPA arrangements, as distinguished from charges from “third-party” users who are not signatory to project agreements.
### Figure 4: P3 Structuring Decision Roadmap

<table>
<thead>
<tr>
<th>New/Existing</th>
<th>Asset Ownership</th>
<th>Agreement Structure</th>
<th>Primary Repayment</th>
<th>Funding Source</th>
<th>Procurement Model</th>
<th>Scope (Capital Improvement)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green-field</td>
<td>Public Sector</td>
<td>P3 Concession</td>
<td>Gov’t Funds*</td>
<td>Enhanced Perf Contract</td>
<td>DBM, DBO, or DBOM</td>
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<td></td>
<td>Private Sector</td>
<td>Franchise</td>
<td>Usage Fees</td>
<td>RR P3/ Hybrid AP P3</td>
<td>DBFM, DBFO, or DBFOM</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Usage Fees</td>
<td>BOO/BOOT</td>
<td>DBFOM</td>
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<td></td>
<td></td>
<td>Usage</td>
<td>Lease/Purchase</td>
<td>DBFM, DBFOM</td>
<td></td>
</tr>
<tr>
<td>Brown-field</td>
<td>Public Sector</td>
<td>Concession</td>
<td>3rd Ptv Charge</td>
<td>Brownfield P3</td>
<td>DBFOM (RME)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Private Sector</td>
<td>Franchise</td>
<td>Usage Fees</td>
<td>BBO</td>
<td>DBFOM (RME)</td>
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<td></td>
<td>Lease Paymts</td>
<td>Sale/Leaseback</td>
<td>DBFOM (RME)</td>
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<td></td>
<td>Various</td>
<td>BDO</td>
<td>DBFOM (RME)</td>
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<td>Lease Paymts</td>
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<td>Various</td>
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</tbody>
</table>
6. P3 STRUCTURING CONSIDERATIONS BY SPECIFIC ASSET TYPES

In this section, we provide project structuring discussions for each asset type and highlight different aspects of P3 structuring decisions pertinent to each. As mentioned earlier, the asset types we cover in this study are civic buildings, public schools, public healthcare facilities, justice/correctional facilities, solid waste-to-energy (WTE) facilities, fiber-to-the-home (FTTH)/broadband networks, and street light modernization projects.

On the social infrastructure end of the asset spectrum, for civic buildings, we discuss the Long Beach Civic Center, one of the most successful recent social infrastructure P3 projects in the U.S., highlighting, among others, the role the real estate development component played in enhancing the project’s viability. For public education, we use the recent U.C. Merced P3 as a case example. For both elementary/secondary public schools and public healthcare facilities where P3 applications have been very limited in the U.S., we look to Canada for their recent (and some very successful) P3 experiences. Using a healthcare facility as an example, we also discuss how a 63-20 hybrid model can be an effective procurement model for social infrastructure, especially when the development is of mixed use. For both public schools and public healthcare assets, we further highlight the issues related to core vs. ancillary scope, in particular, specific issues related to determining the SFM scope.

On the economic infrastructure end of the asset spectrum, for justice and correctional facilities, we focus on prisons and detention centers, where the U.S. has had a long history of involving the private sector, and highlight different uses of the P3 concession, leasing arrangement, and O&M only contract forms. For WTE projects, most of the asset delivery in the U.S. predates 1995 and, as such for this asset, we examine both the franchise agreement models used in the U.S. in the past as well as the more recent P3 concession models used in Canada, U.K., and others outside of the U.S. For FTTH/broadband network assets, the P3 market is still evolving and we highlight a few emerging models that are being considered by local governments in the U.S. For street light modernization, we emphasize the cost saving that pays for itself but also its foundational role for future smart city technologies.

6.1. Civic Buildings

The Long Beach Civic Center (LBCC) is often cited as one of the more successful social infrastructure P3 projects in the U.S. to date. As a representative case example for civic buildings, we provide a detailed narrative of the LBCC P3 project below as a helpful reference in gaining insight into P3 implementation issues at the local government level. It details not only the procurement processes and P3 model structure chosen but also highlights the role of the real estate component in enhancing project viability and meeting the City’s O&M budget goals. Discussions related to ancillary service scope, output performance specifications, and performance-based availability payments during O&M phase are also provided.
6.1.1 Long Beach Civic Center (LBCC)

The LBCC procurement was completed in early 2016 as a P3 to redevelop the City Hall, the Long Beach Port Authority (LBPA) headquarters building, the main City Library, and a public park. The project also incorporates some residential, retail and hotel development on adjacent public property to the project site, and parking facilities. Total financing secured by the private partner on the project was $531 million.

The development process started when the City completed seismic assessments of the existing City Hall tower in 2005 and 2007. The existing 15-story tower, originally built in 1974, was determined to not meet seismic code requirements and required replacement or significant structural rehabilitation. The City was also considering a major renovation of the adjacent City Main Library at the time. An environmental study was completed and, in 2013, the City issued a Request for Qualifications (RFQ) to gauge the market for a single performance-based P3 procurement to develop both sites (i.e., City Hall and Main Library) and a park at the site. The RFQ listed the City’s current carrying costs at $12.6 million for both the existing building and some other leased office space that would be consolidated under the new project. The RFQ specified that any potential bidders would be required to build and maintain the new facilities for an annual service fee of no more than that amount, except for its being indexed for inflation. In addition, the RFQ specified that a new headquarters building for the LB Port Authority was also being considered as part of the procurement and, to offset the costs of building and operating the public facilities, there was the potential to incorporate private property development on the adjacent unused public land.

The City received seven complete responses to the RFQ and conducted interviews with each team. In October 2013, the City shortlisted three consortia to compete for the project. In February 2014, the City issued a Request for Proposals (RFP) to the shortlisted bidders and, in May 2014, two of the bidders—the Long Beach CivCore Alliance (LBCCA) consortia led by Macquarie infrastructure and the Plenary Edgemoor Civic Partners (PECP) consortia led by the Plenary Group and Edgemoor Infrastructure—successfully submitted complete technical proposals. In December 2014, the City selected PECP as the preferred bidder for the project and began direct negotiations to finalize the Project Agreement. The final Project Agreement, facility design, and Environmental Impact Report were approved by the City in late 2015 and executed in April 2016.

The project was structured as an AP P3 and includes a 40-year operations and maintenance requirement for the private concessionaire. At the end of the concession, the public facilities will be handed back to the City with a requirement that they have a Facility Conditions Index (FCI) of 0.20, indicating that the facility will remain at “like-new” conditions of 80 percent level over the entire concession. The agreement requires a joint inspection by the City and the concessionaire beginning five years from the project handback to identify a “punch list” of maintenance items that must be resolved prior to the end of the concession. Based on that inspection, the City is also authorized to establish a handback reserve account for the City, in which portions of the availability payments to the concessionaire are placed in a reserve account.

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37 This section is based in part on conversations with P3 project consultants and a review of the P3 Project Agreement.
and released once the concessionaire has resolved the maintenance deficiencies identified in the inspections.

The agreement also specifies core maintenance functions and response times for system replacements or other maintenance requests. The annual service fee that the concessionaire is paid by the City is adjusted by deducting funding for various maintenance infractions or any parts of the City not being available for use by the City. For example, the agreement specifies deductions if elevators are unavailable due to maintenance for longer than a specified repair period, ranging from $1,000/day (one elevator) to $7,500 per day (four elevators). There is also an adjustment in the early years of the concession if the facilities over or under perform their energy efficiency targets.

Funding for the main two public buildings varied based on the outcomes and requirements of both the City of Long Beach and the LB Port Authority. The City’s service fee is amortized over the life of the concession for both the operations and maintenance costs and the capital investment by the concessionaire. This reflects the City’s prerogative in not adding general obligation debt to finance the redevelopment and to pay no more than it currently paid to service the existing facilities. The port authority, on the other hand, chose to finance its facility on its balance sheet. The concessionaire received completion payments by the authority as construction progressed on its facility to reimburse capital costs, and its component of the long-term availability payment thus represented only the actual operations and maintenance service provided by the concessionaire.

Capital costs were further offset by the value of the unused land which would be developed into residential and retail properties by the concessionaire once all other facilities are completed. The project agreement specified a valuation of the property given the commercial developments approved by the City for each parcel. The concessionaire then effectively purchased the property from the City at the start of the project by contributing that valuation to offset project capital costs.

For the most part, there were limited SFM ancillary services associated with the public building and, except for a handful of positions that were transferred to the concessionaire, were excluded altogether from the P3 scope. The HFM scope for the two public buildings, however, varied based on the City’s and port’s requirements. For the City, the scope was DBFM inclusive of most of HFM. For the port, for all practical purposes, the scope was DBF because most of the O&M services were already performed by the port staff and excluded from the P3 scope.

In August 2015, prior to finalizing the Project Agreement, Governor Jerry Brown signed SB 562 into law, which was special legislation to authorize the Long Beach Civic Center project. The City pursued special legislation for the project to consolidate existing state P3 procurement authorization and, in part, to reduce the potential for legal challenges to the project. The legislation also authorized the concession for the project up to a 50-year duration, as opposed to the general P3 concession authorization of no more than 30 years according to the California P3 statute. Without the legislation, the City still would have pursued and likely would still have the authorization to award the project under the planned DBFM structure, but special legislation ensured project certainty.
Tax-exempt debt was considered to finance the public building components of the project, but the concessionaire eventually chose to issue $239 million in private placement notes instead. Several reasons were cited by the concessionaire for the change. The private notes could incorporate a delayed draw on construction funds, which reduced the need to capitalize interest payments while the facilities were under construction. In addition, California law required tax-exempt debt to be used only for financing public facilities, which would have placed constraints on the concessionaire for a project that included both public building development and some private property development. Finally, the private placement effectively transferred the interest rate risk and control of the financing process to the concessionaire. Tax exempt debt would have required the City’s internal finance team to run the financing and would have caused the City to retain the risk that interest rates would fluctuate prior to the project reaching financial close.

The project is currently under construction, with the new City Hall, Port Headquarters, and Library in development through 2019. This will be followed by the demolition of the old City Hall and Library buildings, the construction of Lincoln Park, and finally the development of the residential, retail, and hotel properties between 2020 and 2022.

6.2. Public Education Facilities

6.2.1. General Overview

Almost 90 percent of school age children in the U.S. attend public schools. Public school systems are supported by a combination of local (about 43 percent), state (49 percent), and federal funding (8 percent) [20]. Because a large portion of school revenues come from local property taxes, public schools can vary widely in the resources they have available per student, including the quality of school facilities. There are more than 14,000 school districts in the country and more than $500 billion is spent each year on public primary and secondary educations. With continued deterioration in school facilities, a large portion of the funding is spent on their upkeep and related capital improvements. For the Los Angeles Unified School District (LAUSD), the second largest schools district in the country, for example, almost 20 percent of the total budget ($2.5 billion) is designated annually for capital spending [21].

In the U.S., the use of P3 models has been very limited for primary and secondary schools to date but is becoming more common for colleges and universities. The next section provides a more focused discussion of the case of University of California, Merced (UC Merced), the most recent successful example of the use of a P3 in delivering major capital expansions for post-secondary college campuses. Although there have been limited applications in the U.S., experience in the U.K., Australia, and Canada has demonstrated that P3 models can be an effective infrastructure delivery tool for primary and secondary schools as well. Using P3 models, these countries have built and modernized more schools on time and on budget within

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[38] For more detailed discussion on schools P3 experience and lessons learned from the U.K., Australia, and Canada, see Reference.
the PSC value-for-money proposition. With similar public school governance and funding system, as discussed in the following, most of the project structuring decisions and lessons learned from these countries are very relevant to the U.S. situation and can serve as useful guidelines when local schools districts in the U.S. are ready to explore P3 as a viable delivery option for their capital improvements.

Broadly, in addition to risk transfer and lifecycle efficiency benefits commonly associated with P3 undertakings, the public sponsors of schools P3s in those three countries have expressed P3 benefits as critical to their ability to (a) focus on the core mandate of education and instruction (without having to worry about, e.g., leaky faucets or checking sewage levels) and (b) spread their capital funding needs over a long period. In addition, under the P3 model, educators, parents and politicians alike also focused on (c) the community and multi-use aspect of schools, (d) improvements in information and communication technology (ICT), and (e) performance monitoring of P3 contracts.

For the U.K. and Australia, the predominant procurement model and scope for schools P3s has been, respectively, AP P3 (or PFI) and DBFM (with both HFM and SFM included as ancillary services). For Canada, there were more variations in P3 structures considered. AP P3 and DBFM were still the predominant structure but, in many cases, the SFM scope was either reduced or eliminated altogether. Also, in some cases, the schools decided to do the design themselves with the resulting scope being BFM—again, some with both HFM and SFM and others without or reduced scope for SFM. In Canada, in some cases, subcontracts providing O&M services were required to be tendered every three years to ensure competitive market rates. For all three countries, when the DBFM model was used, capital payment for the building and cost of operations did not occur until occupancy, i.e., there were no lump sum milestone and/or substantial completion payments during construction phase.

In the U.K., a formal and more streamlined P3 governance structure was one of the key elements to the success in their school P3s. In 2003, for example, the U.K. government established Building Schools for the Future (BSF), a long term investment program to transform their secondary education, to review and rebuild virtually all of their 2,500 secondary schools. One of the goals was to maximize the use of ICT through building design, managed ICT services, and by incentivizing the use of ICT in teaching and learning. In parallel with BSF, an independent public body, Partnerships for Schools (PfS), was established and tasked with delivering BSF using P3 (in this case, PFI). To facilitate the P3 implementation, local governments were also encouraged to set up Local Education Partnership (LEP) to bring together three organizations—local authority, PfS, and a private sector partner (PSP). LEP was essentially a joint venture entity established on the basis of a specific ownership formula, i.e., PSP with 80 percent ownership stake and local authority and PfS each with 10 percent.

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39 In NSW, Australia, for example, the Treasury’s post-implementation review of its first major P3 school project indicates that schools were delivered some two years earlier than would have been possible had traditional public sector funding been used [7].

40 Although a bit outdated, a comprehensive guide for applying P3 for publicly funded elementary and secondary schools, including case examples from U.K., Australia, Canada, Ireland, and Scotland can be found in Reference [7].

41 As will be discussed for the D.C. case example in Section 7, when full fledged P3 model is not an option, O&M P3 options, such as an ESCo, can also bring significant value to public school facilities.

42 LEP was itself a public-private partnership entity established on the basis of a specific ownership formula, i.e., PSP with 80 percent ownership stake and local authority and PfS each with 10 percent.
company with its own internal capacity to deliver P3 projects over the long term to streamline the local P3 process and reduce the number of competitive procurements. LEP facilitated bundling of multiple schools together into a large, high value package and, eventually, was used to procure wider services beyond schools, including healthcare and other infrastructure services.

In Australia, New South Wales (NSW) started its first schools P3 project in the 2000-2001 timeframe. The project was the first social infrastructure P3 project in Australia and involved the bundling of nine schools. Led by NSW, similar schools P3 programs followed subsequently in Victoria and other states. From the outset, as was the case for the U.K. and also followed through in Canada, schools P3 projects in Australia have predominantly been bundled to create more opportunities for economies of scale. A value of around $100 million was determined to be the minimum level of packaging to gain reasonable economy of scale. In Australia, there was also a recognition early on that the design element in schools P3 can be challenging. The challenge was not only for rapidly changing needs in curriculum and instruction related programs but also for increased community involvement in education and other school related areas, such as the community’s interest in the multiple use of school facilities and its increased awareness about energy usage and environmental impacts. To overcome these challenges, in NSW, an on-line collaboration tool for capital and non-capital projects was used effectively as part of the P3 delivery process. Such an on-line tool provided access to local residents and educators to become actively involved in the project, enabling them to provide feedback on the design through an internet-based forum.

In Canada, consideration for school P3s originated in part due to the shift in populations from rural to urban settings that resulted in an imbalance in the school facility needs, with significant increases in some areas and significant decline in others. Unlike Australia, the value proposition for schools P3s in Canada was more difficult to ascertain because significant design innovations that resulted made it more difficult to conduct apples-to-apples comparisons with the traditional design approach. For many schools in Canada, these innovations from P3 procurements nevertheless made it possible to achieve exceptional facilities within the budgeted benchmark costs.

Compared to the U.K. and Australia, Canada also encountered more challenges in early schools P3s. These challenges were due in part to a procurement mistakes from a lack of experience but also to complex issues regarding local businesses and school personnel. For example, concerns were expressed by local contractors that the bundling approach across multiple jurisdictions might reduce their ability to compete locally for projects. This concern turned out to be shortsighted because local contractors in individual jurisdictions were most likely to get involved whether the project was bundled or not. It was also found that bundled projects that were phased over time allowed local trades to participate in more projects even with limited capacity. The phased approach also enabled learning and improvements to take place more organically.

Most importantly, especially for Canada but also true in the U.K. and Australia, one of the most contentious topics of debate with the schools P3 was the delegation of responsibility for SFM

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43 From the first two major schools P3 undertakings, for example, the NSW’s Auditor General reported that the savings from the bundled contracts ranged from 7 percent to 23 percent when compared to the PSC estimate for the traditional approach.
mentioned earlier (see Table 5). For the most part, the area of educational instruction was one of the core services protected for the public sector and excluded from the private sector P3 delivery. While this has been clear, the responsibility of the delivery of the SFM ancillary services has been less clear. Many educators believed that staff engaged in these activities provide active support and are part of the instructional team and should be considered as part of the core services delivered by the public service.

Experience has shown that the transfer of operating risk for SFM to the private sector can add value and greater benefit to taxpayer in the long run. The transfer of risk for SFM is a potential area for increased P3 value-for-money. When SFM and HFM are handled separately between the public and private partners, the division also increases the private partner’s risk within HFM cost escalation because they cannot control SFM activities, resulting in increased HFM costs for the project. In the U.K. and Australia, as mentioned, HFM and SFM were both included within the P3 structure for the most part and they were able to reap the efficiency gains that resulted from the integration. In Canada, such integration was more challenging. Although all early schools P3s in Canada included both SFM and HFM as ancillary services, some contracts had to revert back the SFM services to local schools.

Interestingly, issues related to HFM and SFM integration was one of the reason why there has been a preference for greenfield projects by the private sector in schools P3, unlike economic infrastructure where brownfield is preferred. In most greenfield projects, the questions of responsibility for SFM and the responsibility for employment of staff is clearer. Also, the private sector can better control the risks because it does not assume the defects or limitations on an existing building. For brownfields involving refurbishment, however, the question of transfer of staff when assigning the SFM responsibility to the private sector is more challenging because there have often been staff already in place to carry out the SFM functions. In cases where the staff have remained as public employees but managed by the private sector, the experience has not been successful. Ultimately, the staff have been transferred to the private sector employer [7]. In the U.K., staff performing SFM services in the public sector were transferred to the operator under TUPE provisions whereby their terms and conditions of employment were protected.45

The delegation of SFM to the private sector has worked well when there has been a high degree of communication between parties (including union representatives, where present) and responsiveness to concerns and requests. Because of their sensitivity, issues related to SFM staff, especially for brownfield projects, should be addressed early on in the transaction.

44 A typical example here is whether a floor needs to be replaced more often (i.e., HFM) due to the floors not being cleaned properly (i.e., SFM).
45 The U.K.’s Transfer of Undertakings (Protection of Employment) (TUPE) 2006 Act specified the process which public employees were transferred to the private sector, which applied to all staff in an organization whose ownership changed.
6.2.2. U.C. Merced

The groundbreaking for the initial 103-acre U.C. Merced campus occurred in 2002, some 14 years after the Regents of the University of California approved the establishment of its tenth campus in Merced in 1988. Since that groundbreaking, another 14 years passed for the campus to grow to its current size at 1.4 million sq. ft. in capital facilities. With the growing student population and over-utilized classrooms for high-demand and prerequisite courses, the campus has been facing serious space deficiencies in recent years.

The Merced 2020 Project is a capital improvement program initiated by U.C. Merced to address the critical existing space needs as well as the space needed to accommodate the future growth. The project involves almost doubling of its campus facilities by 1.2 million sq. ft. in additional space. The project will be built on a greenfield site and, in addition to the buildings, it will also include all necessary support infrastructure, including outdoor recreational facilities, open space, landscaping, roadways, and parking. To develop an optimal facility program that meets the changing needs of multiple stakeholders, U.C. Merced engaged early on a stakeholder focus group comprising representatives from the academic, administrative, and student community. This stakeholder process ultimately resulted in the mixed-use academic and student-focused concept currently being implemented.

Due to the limitation in available state funding, the traditional source that enabled U.C. Merced’s other U.C. campus to grow in the past, and no guarantee of funds for long term maintenance, the U.C. Merced decided to explore alternative delivery options, including P3s, for their planned capital improvements. Prior to the formal procurement process that started in the fall 2014, the U.C. Merced chose three procurement options initially for further screening and assessment: traditional design-bid-build (D-B-B), design/build (D/B), and AP P3 Concession. Based on annualized cash flow requirements and annual project outlays’ affordability, the three options were then compared and it was determined that an AP P3 was the preferred option.

The formal procurement for AP P3 was a three-phase process that consisted of:

1. A Request for Qualification (RFQ) phase, which resulted in six teams responding and subsequently short-listing three prequalified teams (from September 2014 to January 2015)

2. A Request for Proposal (RFP) phase focused on three shortlisted firms, which resulted in all three teams bidding above the pre-established budgetary limit—requiring subsequent

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46 This section is in part based on an interview with Daniel Feitelberg, the former Vice Chancellor of UC Merced who oversaw the Merced 2020 P3 planning and procurement process. For additional details on the project, see References [22,23].

47 As of Fall 2015, the UC Merced campus accommodates 6,800 students, 1,000 staff, and 212 ladder rank (tenured and tenure-track) faculty. Of the total student body, over 55 percent are majoring in science, technology, engineering, and math (STEM) disciplines.

48 The cash flow analysis was based on the U.C. Merced’s own Budget Cost Model and not a VfM analysis in the sense that the annualized cash flows were not risk adjusted nor relied on discount rate assumptions (for more detailed discussion see [22]). External consultants were hired, however, to develop the whole-life PSC estimates in a consistent matter.
program adjustments and scope reduction through consolidation of some space elements (from January 2016 to Spring 2016)

3. Reissuing the RFP for Best and Final Offer (BAFO) based on the revised scope of work, which resulted in the selection of the final bid (that came below the affordability range) and the financial close shortly thereafter (June 2016 to August 2016)

U.C. Merced also streamlined procurement evaluation into three-stage process, where (1) Expert Panels—consisting of internal subject matter experts (SMEs) and external advisors in administrative/legal, financial, and technical subject areas—who provided inputs to (2) three Evaluation Committees in the three subject areas—consisting of campus executive management (i.e., Provost, Vice Chancellors, Deans, and Vice Presidents from the Office of the President)—who scored bids and provided final outcome to (3) the Project Selection Committee—consisting of Chancellor and CFO—who ultimately made the final decision.

The final project structure was an AP P3 Concession with the scope DBFM and 35-year concession term. All SFM services were retained by U.C. Merced due to the existing personnel and other outsourcing arrangements already in place to provide those services. To reduce construction risks, U.C. Merced required the retention of progress (milestone) payments during construction be larger than the typical level for other AP P3 projects. The total capital cost for the project was $1.34 billion, of which $690 million (52%) was eligible for state funding, whereas $650 million (48%) was not. In terms of repayment sources:

- $600 million came from the state’s and the U.C. Merced’s general funds—to repay the financing secured through a combination of (a) tax-exempt ($400 million) and (b) taxable ($200 million) general revenue bonds (GRB) and limited project revenue bonds (LPRB)

- $590 million was the P3 concessionaire’s responsibility, of which (a) $127 million was eligible to be supported by state General Fund (with appropriations under SB 81) and the rest consisted of (b) concessionaire’s at-risk equity capital contribution (in this case, 10 percent of the total cost) and (c) the debt secured by the concessionaire for the project

- The remaining $145 million came from U.C. Merced campus enterprise funds, i.e., revenues generated from tuition, fees, research grants, and others such as facilities housing, dining, parking, etc.

In terms of risk allocation, the P3 concessionaire assumed all design, construction, O&M, and financing (their portion) related risks. U.C. Merced assumed all repayment funding related risks, as well as technical obsolescence, force majeure, and any U.C. caused delays/scope changes.

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49 For example, dining and parking services represented the largest employee base for UC Merced and those employees objected strenuously to any possibility of their transferring to the P3 concessionaire.

50 State fund eligible facilities include research labs, faculty/administrative offices, class rooms and other instructional space, whereas non-state fund eligible facilities are housing, student recreation, parking, etc.
In the end, by using an AP P3 as the delivery option, U.C. Merced was able to achieve the following benefits, which may not have been possible had traditional D-B-B or D/B delivery option been used:

- **Accelerated schedule**: The same amount of space that took 14 years to build using pay-as-you-go traditional D-B-B approach was achieved within four years

- **Triple net-zero sustainability goals**: Triple net zero energy, net zero emission, and net zero waste goals were achieved by using a centralized and lifecycle approach to design that capitalized on economies of scale, minimized resource usage, and maximized sustainability

- **Tax-exempt low cost financing**: Although tax-exempt private activity bonds (PAB) were not available for the project, U.C. Merced arranged tax-exempt public financing for almost 30 percent of the total project costs to lower financing costs while retaining the lifecycle procurement benefits of a P3 procurement.\(^{51,52}\)

- **No deferred maintenance concerns**: Long-term O&M risk transfer and warranty-like protection of asset performance guaranteed long term maintenance with no additional funds and eliminated any added risks associated with deferred maintenance issues

### 6.3 Public Healthcare Facilities

#### 6.3.1 General Overview\(^{53}\)

The governmental public health system in the U.S. is made up of public health agencies from the federal, state, and local governments. Because of the broad flexibility states have in defining their public health role, the public health governance structure throughout the U.S. is extremely varied. Local health departments are structured in a variety of ways, but they all derive their authority from the state. They may be entities of local and/or state government and often report to a mayor, city council, country board of health, or county commission. There are approximately 2,800 local health departments in the U.S. In terms of physical facilities, they are responsible for managing and operating medical centers (hospitals), outpatient care centers, comprehensive health centers (CHCs), and healthcare centers (HCs). Most of local health departments are funded by both the revenues generated from their health services and by government support at various levels.

As an example, the Los Angeles County Department of Health Services (LADHS) is the second largest municipal health system in the U.S. and operates the public hospitals and clinics in Los Angeles County. LADHS reports directly to the Los Angeles County Board of Supervisors. For

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\(^{51}\) Public buildings are excluded from the PAB eligibility.

\(^{52}\) The added repayment risks associated with tax-exempt public financing would likely be lower than risks associated with comparable availability payment obligations.

\(^{53}\) For more detailed discussions on hospitals P3 experience from the U.K., Australia, and Canada, see Reference [24].
the 2015-2016 fiscal year, LADHS’s annual budget exceeded $4 billion, of which about 80 percent ($3.2 billion) came from the revenues generated from their own healthcare services and 20 percent ($0.8+ billion) came from the county funds. Under LADHS’s management and operational oversight are three academic teaching hospitals (affiliated with UCLA and USC), one rehabilitation hospital, two outpatient care centers, six CHCs, and 10 HCs. LADHS’s Capital Projects department is responsible for planning and managing capital projects associated with these facilities, whereas its Facility Management department is responsible for building operations at its administrative headquarters and for managing the leases on their medical facilities.

As was the case for public schools, to date, the use of P3 models to deliver capital improvements on public healthcare facilities has been very limited in the U.S. However, a P3 hybrid, “63-20” model we presented earlier, has sometimes been used to deliver medical and other related facilities. The following section provides a real case example of how “63-20” model was used on a medical facility in King County, Washington. Hospital P3s have been especially successful in Canada. Although the Canadian healthcare system is very different from that of the U.S. in terms of its institutional makeup, its success in using P3 models provides strong evidence for the U.S. local healthcare agencies that P3 can be a viable capital improvement delivery option. In the following, we discuss Canada’s hospital P3 experience, in particular, details pertaining to P3 project structuring decisions, that can serve as useful reference when local healthcare agencies in the U.S. are ready to explore P3s as a viable delivery option for their capital improvements.

P3s were introduced to Canada’s healthcare industry in early 2000 and, within the first decade, they were able to achieve significant success. During the 7-year period from 2004 to 2011, hospital P3 transactions that achieved financial close were valued at over $18 billion, representing 55 deals spread over four provinces (i.e., Ontario, Quebec, British Columbia, and New Brunswick). During the same period, the size of P3 transaction also increased significantly, from an initial average value of about $190 million to about $860 million per transaction by 2011. Among the key benefits cited frequently by the public sponsors were (a) VfM risk-adjusted cost savings against non-P3 delivery options (5 to 15 percent savings derived variously from lifecycle approach, risk transfer, better management for on-time/on-budget delivery, etc.), (b) innovations, particularly in relation to design and facility management ingenuity that provided more efficient use of space and better environments for patients, visitors, and staff, and (c) long-term cost certainty and built-in guarantee (for 25-30 years compared to the typical 1-year guarantee under the traditional approach) to maintain their assets based on consistent and high quality standards.

Amid these successes, hospital P3s in Canada have also been able to highlight several issues that were unique to the healthcare industry. Of particular importance in this regard has been the need for flexibility in P3 design to accommodate the necessary interface between physical facilities and medical equipment. P3 transactions generally exclude provisions for medical equipment because the underlying technology changes rapidly, the supplier market is thin, and lenders are reluctant to finance cutting-edge technology. Medical equipment, however, especially “big
ticket” item such as MRI scanners, have significant interface with physical facilities. Some technological advances, such as automated guided vehicle (AGV), have provided not only spatial cost savings and operational efficiency but also have improved infection control. Hospitals are frequently challenged by having to balance the need to make equipment selection decision early enough to avoid impacting the design or construction and also to keep pace with technological advances.

Irrespective of the model used to procure hospitals, change is inevitable in the healthcare sector. Often on P3 projects, changes requested by the public sector during and after the construction phase have proven very costly. In this regard, the need to demonstrate flexibility in P3 design solutions is becoming increasing important for hospital P3s. In many hospital P3 deals in Canada, international experts in hospital planning and design were engaged by both the public sponsor and the private bidders to help the design process. To deal with the equipment-facility interface needs, several potential solutions were identified, including long-term partnering arrangements with medical equipment service (MES) providers outside P3 transactions or a separate interface agreement as part of a P3 structure (a contract between an MES supplier and P3 private sector partner delivering the hospital facility).

As was the case for schools P3s, the most prevalent procurement model for hospital P3s in Canada has been the AP P3. Regarding the specific scope, out of 55 hospital AP P3s implemented between 2004-2011, 29 were DBFM, 23 were BF, 2 were BFM and the remaining were DBF.

Especially when the project involved large scale new construction either on greenfield or brownfield sites, DBFM was the prevalent scope. In all cases, the core clinical care and hospital management services always remained in public domain but there were significant variations in ancillary services. For the most part, HFM was included as part of P3 structure, whereas the SFM services varied from project to project. Figure 5 provides several DBFM case examples with a range of SFM service configurations. In general, if SFM services were historically outsourced to private sector, it was easier to include them in the P3 deal structure. More generally, as more SFM services fell in the public hands, healthcare authorities started to provide SFM on a regional rather than a site-specific basis.

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55 The use of automated guided vehicles (AGV) system is becoming more common in large hospitals. These robotic tools transport medical supplies, linen, and waste and often use dedicated (non-patient) horizontal circulation routes or dedicated elevators for vertical movements [23].
Dubbed “dBFM”, there were also several DBFM cases (e.g., Sault Area Hospital in Ontario) where the design was developed primarily by the hospital staff and the private sector assumed limited design risk (primarily completion and coordination risk). Where dBFM was used, the risk transfer was not always “clean” and there was a lack of clarity as to which party took responsibility for inherent defects in design.

After DBFM, BF was the most common approach, especially for brownfield assets where there was significant renovation and/or physical interface with existing assets. Under the BF, long-term maintenance was retained by the public sector and lifecycle benefits were not fully realized when compared to DBFM.\textsuperscript{56} Regardless, the public sponsors found that the construction risk transfer offered by the BF model was still significant and beneficial when compared to the traditional approach. For these brownfield projects, keeping the existing hospital fully operational during construction phase was particularly important.

Canadian hospital P3s were also the basis for establishing what has now become the norm for the AP P3 payment formula that consists of the public sector paying milestone progress payments during construction phase and performance-based payments during O&M phase. With the basic aim of reducing the overall financing risk and costs for the private sector, this formula provided a combination of government payments during and at the end of construction combined with private sector financing of both short and long range tenures. For the most part, O&M phase

\textsuperscript{56} Especially DBFM, there was a strong emphasis on managing and optimizing energy efficiency and P3 O&M contractor was often prepared to make its own capital investments in order to improve energy efficiency.
payments were divided into (a) non-indexed payment for remaining capital costs and (b) indexed payment for O&M services based on performance.

Unlike schools P3s, hospital P3s also offered more auxiliary opportunities. For many large hospitals that were located in close proximity to local communities and/or to densely populated areas, a high quality commercial retail space was also created. Such space was integrated with the existing local community service fabric offering upbeat and dynamic environment. In most cases, the capital and O&M costs associated with these auxiliary opportunities paid for themselves from their own revenue sources.

6.3.2 “63-20” Model for Healthcare Facilities\(^57\)

Although the more “standard” P3 approach to delivering healthcare facilities has been very limited in the U.S., the “63-20” hybrid model has been used successfully for several medical buildings in the State of Washington.\(^58\) As an example, we briefly describe in this section the use of this hybrid model for North and Jefferson Building (NJB) in King County, Washington.

NJB was a new medical building designed to provide expansion space and an upgrade of the outmoded facilities at Harborview Medical Center (Harborview), which was operated by the University of Washington (UW). NJB was to include medical office space for Harborview’s outpatient clinics plus medical building clinical space and retail offices for various UW’s departments and King County agencies. The project was initially a part of a larger $191 million voter approved bond program. With the oversight of King County Facilities Management Division (FMD), UW was to manage the project.

When approved in 2003, the initial publicly-funded project had a budget of $120 million with 190,000 sq. ft. in floor space and a 630-stall parking garage. The building was also designed to accommodate the future addition of an 11-story office tower for Harborview’s future growth. The NJB project was initially carried out using the traditional D-B-B approach based on general contractor/construction manager (GC/CM) model. In early 2006, after the building design and site excavation were complete and over $32 million of the budget was spent, the project was put on hold. It was discovered that the project would incur a cost overrun of $15 million from significant escalations in construction labor, material, and equipment costs due to the unforeseen market conditions.

In order to complete the project without using additional bond program funds, King County and Harborview agreed to restructure the project using a 63-20 P3 hybrid model. Under the new approach, NJB was to be developed as a lease-leaseback project financed by privately issued tax-exempt bonds.\(^59\) Specifically, under this approach, the county leases the land for the building to a non-profit corporation for a nominal fee. The non-profit then finances the project issuing non-

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\(^{57}\) This section is in part based on an interview with representatives from National Development Council, who was the signatory to NJB Properties, the non-profit “63-20” entity on the King County project. For additional details on the King County project discussed in this section, see [26].

\(^{58}\) For more general discussion about relative merits and case examples on “63-20” approach, refer to References [27,28,29,30,31]

\(^{59}\) Tax-exempt bonds issued under IRS ruling 63-20.
taxable bonds, contracts for development, and owns and manages the building until the bonds mature. The county leases back the completed building from the non-profit with the rent being used to pay back the development costs in full by the lease expiration date. Building ownership then transfers back to the county [26].

Figure 6 shows NJB’s project structure under the restructured program. Under this approach, the non-profit 63-20 corporation, a reputable organization with a prior working relationship with the county using a similar model, established a special purpose vehicle (SPV) to carry out the project. From early on, the non-profit SPV was able to engage a developer to work with the county and Harborview/UW and also identify the retail space tenants to coordinate NJB’s overall program and handle all necessary tenant improvements. The O&M ancillary services were provided by a separate O&M property management contract, which was rebid every 3-5 years on performance-based renewals. The basic scope was DBFM with 100% tax-exempt debt financing without the expensive at-risk equity capital associated with “standard” P3 concession models. In addition to the initial program, the restructured project was also able to address Harborview’s future expansion needs and ultimately delivered a 14-story, 440,000 sq. ft. building with 650-space underground parking garage on schedule and without any cost overruns. The county was also able to reduce the unit building costs from $800 per sq. foot to $450.

Figure 6: King County NJB Medical Building 63-20 Structure
6.4 Justice/Correctional Facilities

Justice and correctional facilities can broadly be categorized into three groups: (1) police stations and other related facilities used for law enforcement, (2) court buildings and other related facilities used for justice administration (or “adjudication”), and (3) prisons and other related facilities used for detention, corrections, and rehabilitation. From a P3 standpoint, police stations and court buildings are social infrastructure assets with issues that are very similar to those of public buildings, schools, and hospitals as discussed in the previous sections. Infrastructure delivery issues pertaining to correctional facilities, however, have generally been very different as discussed in this section. Correctional facilities here refer to both (a) prisons, i.e., long-term correctional facilities (for people serving a sentence of typically one year or more) that are mostly the responsibility of state and federal government and (b) jails, i.e., short-term detention facilities operated by city and county governments. We use the term “prison” to refer to both in the following.

Private sector participation in prisons has had a relatively long history in the U.S. In their current forms, however, the wave of P3 delivery of prison facilities began in the 1980s triggered largely by (a) “tough on crime” and “War on Drugs” programs with harsher sentencing policies and (b) the urgent need of the immigration services to house a surplus of detained immigrants. Since then, privately managed prisons of one sort or another have emerged in more than 30 U.S. jurisdictions. Unlike other social infrastructure, as a result, the U.S. is considered the leader in the prison P3 market driven in large part by the high prison population and the need to address the overcrowding issue.

Private management of prisons can generally take two forms. One is contracting for operations where a private management firm is hired to run a government prison. The other is contracting for bed space to house prisoners either at in-state or out-of-state private correctional facilities. Different P3 delivery models have been used to fulfill one form or the other. In all cases, however, government funds were the primary funding sources to pay for prison improvements, whether they are capital project or O&M service related.

As depicted in Figure 7, prisons P3s have varied widely in the U.S. but they can be categorized into three basic models. The first one involves the private sector financing and building new correctional facilities, where the asset ownership belongs in the public hands and where the agreement structure is one of P3 concession. In this case, the procurement model is generally AP P3 with DBFoM in scope (shown in the middle of Figure 7), where guarding of the prisoners and any security-related core services remain in the public hands. That said, as determined by the correctional statutes specific to the jurisdiction, the private sector can provide (a) some non-security related core services (thus the small “o”)—e.g., provision of recreational activities, provision of medical care, etc.—and (b) all non-security related core services. Examples of this approach include the Corrections Corporation of America, the Corrections Corporation of America, and the Corrections Corporation of America.

For more general discussion on correctional facilities P3 experience both in the U.S. and overseas, refer to References [32, 33, 34, 35]. The discussion on overseas experience pertaining to AP P3 procurement model is based in part on an interview with Philippe Rapin, Director of Transaction Advisory Americas for Mott MacDonald.

There is a long tradition of private sector involvement in prisons in the U.S. starting as early as mid-1800’s with convict leasing, i.e., providing prisoner labor to private parties, in the southern states. For example, Alaska, Hawaii and California have no privately operated prisons within their borders but contract with out-of-state private prisons to house overflow inmates [32].
vocational training, prisoner healthcare services, etc.—and (b) varying combination of HFM
and/or SFM ancillary services (e.g., facility maintenance, food services, transportation, etc.).

The second involves the private sector contracting for prison beds to relieve inmate overcrowding, where the asset ownership belongs in the private hands and where the procurement model is one of Lease/Purchase arrangement as shown in Figure 7. Under the Lease/Purchase model, the private sector builds and runs prisons in their entirety and the scope is generally DBFOM. The lease is for a long term, typically between 25 to 30 years, after which the asset transfers to the public sector ownership. Under this model, all of the staff, including the custodial and security staff, are employed by the private sector (thus the big “O”) and the private sector performs all of core and ancillary functions.

Finally, the last option involves the private sector delivering an array of services for government owned prisons to drive down the O&M costs where the procurement model is one of O&M concession, as shown in Figure 7. An O&M concession is usually for a much shorter term (e.g., 5 years) and does not generally involve capital improvements. The O&M scope in this case entails a varying combination of core (security and/or non-security related) and ancillary services (HFM and/or SFM). The use of O&M concessions (or outsourcing) has been widespread throughout the world.

For capital improvements, it is interesting to note that the most common and predominant prison P3 model in the U.S. has been the lease/purchase option. The use of this model has also been followed in the U.K., Australia, and South Africa. P3 concession, on the other hand, has been much more common in France and Belgium and its use has been also followed in parts of Latin America and Japan. Under both models, one of the key challenges has been developing resilient design and use of appropriate technology to handle additional physical damages and wear-and-tear often encountered in prison environment. The transfer of such design risk to the private sector was thus seen to be one of the clear advantages of using the P3 approach. In addition, the ability to bundle and consolidate multiple prisons, sometimes across multiple jurisdictions, was also considered a major advantage under both models when compared to the traditional D-B-B approach.

Figure 7: Prison P3 Models Across the Asset Ownership Spectrum

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63 When the O&M scope is very limited, this can also be straight O&M outsourcing.
Despite these perceived benefits, prison P3s in the U.S. have had mixed results at best in part due to misaligned incentives. As mentioned, the primary impetus for the use of prison P3s in the U.S. was the need for a rapid, large-scale expansion of prison facilities and the lack of funds at the local and state levels to build new prisons and maintain the existing ones. By introducing private sector competition, the aim was to drive down costs, drive up the service quality, and encourage innovations.

Several recent studies have found, however, that cost savings from privatized prisons are not guaranteed and quality of services has not improved significantly when compared to government managed prisons [34]. This has been due in part to prison costs being already at its lowest, where not many costs could be cut from the start. In general, the highest cost item has been the labor costs, which accounted for about 60 to 70 percent of annual operating budget. Under P3, the private sector has derived cost savings largely by employing mostly nonunion employees and providing lower levels of staff benefits, salary, and salary advancements, which has often resulted in higher employee turnover rates. Private prison employees have also received 58 hours less training than their publicly employed counterparts. Due to these and other reasons, the private sector profit incentive has generally been incompatible with maintaining decent and tolerable service standards.

There have also been several other misaligned incentives that further worsened the situation. In a majority of cases, for example, occupancy guarantees have been in place for private prisons that required the public sector to pay even when cells were empty [33]. Publicly run prisons have also been generally left to take on a disproportionate number of expensive and high-risk inmates. For example, inmates with minimum or medium levels of security classification have made up 90 percent for the privately run prisons, compared to only 69 percent for the publicly run ones. In addition, for many private prison companies, their growth has been dependent on their ability to obtain new contracts and to develop and manage new correctional detention facilities. For them, less crime has meant fewer contracts and a shrinking market. Their tendency has been to contribute to politicians who supported harsh criminal and immigration detention laws. Competitive commercial practices and the influence of powerful lobbying from these companies thus have sometimes posed additional risks of promoting corruption [34,36].

When considering a P3 for correctional and detention facilities, local governments should be cognizant of these issues encountered in recent prison P3 experience. In particular, in designing performance-driven P3 contracts, the incentives should be properly aligned with the goals that drive the decision to pursue the P3 option in the first place.

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64 Governments also incur the cost of empty cells under traditional delivery methods. Under P3, as discussed later for the District’s plan for its correctional facilities P3, these low occupancy issues can be mitigated if flexible space that can serve other correctional needs is created, such as programs and services that help reduce recidivism.

65 To some extent, these concerns can be mitigated in a DBFoM prison procurement, in which the private concessionaire is primarily responsible for the prison design, development and maintenance, while the public sponsor retains the primary operational responsibility.
6.5 Waste-to-Energy (WTE) Conversion

Energy recovery from waste is part of the non-hazardous solid waste management hierarchy presented in Figure 8. Backed by the U.S. EPA and the European Union, this hierarchy provides an overall framework for waste management policy for local governments.

Currently, there are some 85 facilities in the U.S. for combustion of municipal solid waste (MSW) with energy recovery [38]. These facilities are located in 25 states, mainly in the Northeast. Most of them were built before 1995 and, since then, some plants have expanded to handle additional waste and create more energy. Of the 85 facilities, 40 are publicly owned and the rest are under private ownership. For the 40 publicly owned facilities, most of them (about 65%) are also privately operated. In Florida, the state with most number of WTE facilities, for example, all of them are owned by various county governments but operated by several private companies. For privately owned and privately operated facilities, some form of franchise (e.g., BOO or BOT/BTO) has been the predominant agreement structure with the private sector.

In the current wave of P3 undertakings in the U.S., there have been few WTE P3 projects in the pipeline being considered by local governments. Outside of the U.S., however, there has been a renewed interest in using P3 approach to deliver WTE facilities. In Canada, for example, although the WTE P3 market is still in its infancy, it has been growing very quickly. This growth

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For more detailed discussion on the latest trend in WTE P3s and experiences from the U.K., Australia, and Canada, see Reference [37]

In 2014, Prince George's County, Maryland, issued RFQ to explore WTE P3 option but has subsequently decided not to move forward with RFP.
trend has also been observed internationally. From 2006 to 2010, the global WTE market increased from $4.8 to $7.1 billion (i.e., an annual growth rate of about 8 percent). In the period of 2011 to 2021, this market is expected to grow even further from $8.5 billion to $27.2 billion (i.e., an annual growth rate of about 11 percent) [37].

In general, WTE procurements do not use traditional D-B-B because of technical, environmental, and operating complexities associated with the asset and the lack of internal operating capacity on the part of the public sector. Unlike the franchise model used predominantly in the U.S. in the past, however, more recent WTE P3 models considered in the U.K. and Canada have been P3 concessions. Also, although the WTE facility is considered economic infrastructure, the predominant procurement model has been that of AP P3. This is due largely to the significant risks associated with the WTE enterprise—whether technically, environmentally, and/or operationally—and the public sponsors’ having to step up to share some of the risks, including those pertaining to revenues and project financials. Because WTE projects are considered economic in nature, there is also no clear demarcation between core and ancillary services as mentioned earlier. As such, in terms of scope, the most predominant model has been DBFOM or DBOM with the big “O” included.68

For local governments, several factors must be considered in deciding between DBFOM vs. DBOM. In general, DBFOM is preferred because the private sector takes significant financial risk by contributing its own at-risk equity capital, which is normally higher than that of social infrastructure and, based on recent experience outside the U.S., can sometimes be as high as 30 percent. For this reason, DBFOM provides the greatest incentive for innovations and potential to capture private sector expertise much needed in a WTE project. Under DBFOM, the milestone and/or substantial completion payments are generally not made until construction is complete and they cover only 25 to 50 percent of the capital costs. DBFOM also offer maximum transfer of risk when compared to DBOM.

The greatest drawback for DBFOM, however, is the high financing cost that comes with maximum risk transfer. Public sponsors have in part addressed this drawback by choosing the AP P3 model (instead of the RR P3 typically associated with economic infrastructure) and contributing capital during construction through milestone and/or substantial completion payments to reduce amount of private sector financing needs as much as possible. Due to its complexity, DBFOM can also be more challenging from a procurement perspective. For example, the time lag between the commercial and financial close caused by the environmental clearance process can impact banks’ commitment on financing rate assumptions on the bid. Additional complexity also adds costs due to the increased due diligence needed for increased risk transfer. For these and other reasons, a project size below $75 to 100 million becomes uneconomical under DBFOM model.69

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68 Recent WTE P3 experience from UK, Canada, and other European countries such as Italy, Spain, and Poland indicate that AP P3 with DBFOM is the predominant model followed by DBOM [37].
69 In general, WTE facility would be only economical with waste flows of 100,000 metric tons per year or greater. Anything less may make it necessary to combine (“bundle”) waste streams and pool resources with neighboring communities. PPP Canada, for example, recommends the use of “hub-and-spoke” model and centralized collection/processing facility across multiple jurisdictions, especially if the minimum project size of $75 to $100 million does not materialize. Such hub-and-spoke approach, however,
DBOM is generally used when the cost of private financing is too high or private financing is unavailable due to project risk. DBOM is also more suitable for smaller projects below $75 to 100 million, where it becomes more difficult to attract long-term financing at competitive rates. As mentioned earlier, under DBOM, the private sector is only responsible for short-term financing to cover construction and the lag in substantial completion payment at construction completion. Typically, DBOM includes two separate contracts under a single consortium: (a) one for construction phase based on milestone and/or substantial completion payments and (b) the other for O&M phase based on performance-dependent annual service payments. DBOM offers lifecycle benefits when compared to traditional D-B-B approach but its main drawback is limited risk transfer and limited recourse available for the public sponsor when things go wrong. With no lender oversight and no at-risk capital (i.e., the private sector’s skin in the game), the private sector is less incentivized to develop innovations and to perform lifecycle maintenance and replacements, thus causing potentially higher hand back risks.

P3 structuring decisions for WTE projects are also dependent on several other key considerations that are unique to WTE assets, in particular, (a) the selection of appropriate technology, (b) potential revenue sources to offset costs, and (c) risks unique to the WTE P3s and their allocations. A brief discussion follows to address each of these areas.

**Technology Selection.** Whether the P3 concession or the franchise model is used, the most critical motivating factor in engaging the private sector for WTE is the need for innovation, not only from design, construction, and O&M perspective but also from environmental (e.g., residual management and air quality control) and organizational (e.g., business processes, contractual relations, and management systems) perspectives. Of particular importance in this regard is the selection of WTE technology. Several WTE technologies are currently available but the most predominant one is Mass Burn thermal treatment technology. Most of the 85 WTE facilities in the U.S. are of this type. The choice of technology is critical not only from the operational risk perspective but also from the prospect of raising financing. In Canada, for example, Mass Burn and Anaerobic Digestion are two proven thermal and non-thermal treatment technologies, respectively, recommended by PPP Canada when undertaking a WTE P3. These are proven technologies with lower operating risks than other emerging technologies that can improve the prospects of raising financing. The selection of an appropriate technology is dependent on local government’s waste management objectives and requirements, e.g., feedstock composition and availability, facility size, outlet market for end products, emission and environmental performance objectives, community and public viewpoints, and various other cost considerations [37].

**Revenue Sources to Offset Costs.** The upfront capital needed to build a WTE plant can be a significant hurdle when considering a new facility. A new plant typically requires at least $100

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70 This short-term financing is no different from construction loans used under traditional D-B-B approach.

71 Among others, current WTE technologies include: (a) mass burn, gasification, pyrolysis, and plasma for thermal treatment technologies and (b) mechanical biological treatment (MBT), fermentation production, and anaerobic digestion for non-thermal treatment technologies.
million upfront to finance the construction and larger plants may require double to triple that amount [38]. The economic benefits of WTE may also take several years to be fully realized. Long-term concessions or franchise agreements (generally 25 to 30 years) are often designed to secure a guaranteed waste stream from the local government to the private operator. As shown in Figure 9, there are also three potential sources of revenues that can help pay for the upfront investments: (1) tipping fees, (2) sale of energy (e.g., electricity or heat “off-take”), and (3) end product sales.

Figure 9: WTE Structure and Revenue Sources

Tipping fees (also known as “gate” fees) are charges levied for acceptance of waste at the WTE site for treatment. Tipping fees are generally collected by the owner of the facility. It is the main source of revenues to offset facility operating costs and they typically vary substantially both within and across states and internationally. Tipping fees generally reflect the capital and operating costs of a facility. Typically, they are pre-determined rather than project specific and thus are significantly impacted by the constantly changing market and regulatory conditions.

Sale of energy represents the second most important revenue stream. Revenues can vary depending on the types of energy produced (e.g., electricity, heat, and steam) and their respective market and regulatory environment. For example, revenues from electricity generation are often received through contracts or partnerships with local utility companies (“off-takers”) based on a long-term power purchase agreement (or PPA), as mentioned earlier. In general, the local public sponsor can help lead and facilitate the PPA negotiations between the WTE and local utility companies.

Revenues from the sale of other end products and residues (e.g., secondary aggregates made from bottom ash) can vary significantly because they are dependent on the quality of recovered

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[37] In the U.S., for example, tipping fees per metric ton can range from $46 in Virginia to $86 in New York. Interestingly, due to much higher tipping fees in Canada—e.g., $107 in Toronto—there has been significant shipping activities of solid waste across the Canada-U.S. border [37].
materials (i.e., the degree of contamination), market conditions and outlets, and regulations. In general, these revenues are not expected to off-set the costs as markets for such materials are not well developed.

Risk Allocation. The basic guideline for P3 risk allocation strategy as described in Section 4 applies for WTE P3s. As presented in Table 4, the private sector still assumes all design, construction, and O&M related risks. There are several other risks, however, that are particularly sensitive or unique to WTE undertaking. In particular, they include risks associated with political, regulatory, and public acceptance, site and site selection, procurement, financing, technology obsolescence, feedstock, residual management, and revenues. Table 6 provides a typical risk allocation guideline and identifies which risks can be retained by the public sponsor and which can be transferred to the private sector.

<table>
<thead>
<tr>
<th>Key WTE Risk Category</th>
<th>Typical Risk Allocation</th>
<th>Timing of Risk Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political, Regulatory, and Public Acceptance Risks</td>
<td>Retained</td>
<td>Development &amp; Planning Phases</td>
</tr>
<tr>
<td>Site and Site Selection Risks</td>
<td>Retained</td>
<td></td>
</tr>
<tr>
<td>Procurement Process Risks</td>
<td>Retained</td>
<td></td>
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<tr>
<td>Financing Risks</td>
<td></td>
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</tr>
<tr>
<td>Availability of Financing</td>
<td>Transferred (DBFOM); Retained (DBOM)</td>
<td>Construction Phase</td>
</tr>
<tr>
<td>Inflation/Interest Rate Change</td>
<td>Shared</td>
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<tr>
<td>Technology Obsolescence Risks</td>
<td></td>
<td></td>
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<tr>
<td>Technology Selection/Performance</td>
<td>Retained</td>
<td>Planning &amp; Construction Phases</td>
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<tr>
<td>Advances and Upgrades</td>
<td>Transferred</td>
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<tr>
<td>Feedstock Risks</td>
<td></td>
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<tr>
<td>Waste Input Volumes</td>
<td>Retained</td>
<td>O&amp;M Phase</td>
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<tr>
<td>Waste Composition</td>
<td>Shared</td>
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<tr>
<td>Residual Management Risks</td>
<td></td>
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<tr>
<td>Disposal Risk</td>
<td>Transferred</td>
<td>O&amp;M &amp; Asset Handback Phases</td>
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<tr>
<td>Fly Ash</td>
<td>Transferred</td>
<td></td>
</tr>
<tr>
<td>Revenue Risks</td>
<td></td>
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</tr>
<tr>
<td>Marketability of Outputs</td>
<td>Transferred</td>
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<tr>
<td>Quality of Outputs</td>
<td>Transferred</td>
<td></td>
</tr>
<tr>
<td>Market Volatility</td>
<td>Transferred</td>
<td></td>
</tr>
<tr>
<td>Price Risks</td>
<td>Transferred</td>
<td></td>
</tr>
</tbody>
</table>
6.6 FTTH/Broadband Networks\textsuperscript{73}

Fiber-to-the-Home (FTTH) and broadband network development is another growing sector of interest for potential P3 delivery where specific structures have varied widely, though few local governments in the U.S. have P3 experience with this asset type.\textsuperscript{74} Interest in municipal broadband P3s has also increased as political leaders have increasingly begun to consider internet access a public good in the modern digital economy. The sector has unique characteristics that could facilitate multiple potential structures for cities considering the development of additional broadband infrastructure. The challenge is that the fiber optics cable network (the physical asset layer) that supports the broadband internet service (the digital layer) is the high cost item that requires significant investment, either from the public or the private sector.

Figure 10 provides a broad spectrum of potential delivery options for FTTH/broadband network assets. More common delivery options have been either fully public (i.e., public both owns the fiber optics assets and operates/provides broadband internet services) or fully private (i.e., the private sector both owns and operates) approach. There are several examples of fully public model—e.g., Chattanooga Tennessee; Wilson, North Carolina; and Lafayette, Louisiana. In these cases, in addition to having the necessary capital budget to invest in a fiber optics cable network, the critical requisite has been for the local government to have a competent municipal electric utility to carry out all the necessary work.

Most municipal broadband programs in the U.S. have also been centered around efforts to incentivize greater investments in fiber optics/broadband network by private companies, most notably by Google Fiber and, to a limited extent, Ting Internet.\textsuperscript{75} Under a fully private model where the private sector provides the necessary investments for the fiber network, the public sponsors have facilitated the process by offering incentives in key areas such as tax benefits, physical access (e.g., existing fiber network for connectivity, conduit, building, other real estate), access to information (e.g., GIS data), and expedited permitting process. While the fully private option reduces the public sector’s cost and risk, the public sector has less control over the broadband access and related pricing and affordability issues, especially for the poor.

Municipalities are also experimenting with public owner-private operator initiatives where the public sector invests in the municipal fiber network and offer the asset as public infrastructure, i.e., provide open-access to internet service providers (ISP) who then compete to provide internet services to end users. In these initiatives, local governments use the P3 concession model to build fiber networks city wide or in rural areas that would otherwise be unable to attract private investment. Where additional structuring and partnerships with the private sector have been pursued by local governments, a core driver has been digital inclusion.

\textsuperscript{73} For more detailed discussion of broadband P3 experience in the U.S. and Europe, see References [39,40,41].
\textsuperscript{74} We use the term “FTTH” in this report to refer broadly to fiber network that can cover middle-mile to last mile assets.
\textsuperscript{75} While Google Fiber has focused on major cities, such as Austin, Kansas City, and Nashville, Ting Internet has focused on smaller markets using similar approach, such as Holly Springs, North Carolina.
The allocation of permitting and especially demand risk have been the core structuring issues for municipal broadband P3s to date. Municipal broadband projects are capital intensive and demand for network use is extremely uncertain for new projects. Thus the P3 concession model has primarily been used to mitigate the amount of demand risk that is transferred to the private sector in developing the network. Under the RR P3 model where the private sector assumes the demand risk, the private sector risk has typically been mitigated by some form of minimum revenue guarantees (MRG). Figure 11 provides a RR P3 case example for the local community based UTOPIA Network in Utah where the private sector (in this case, Macquarie Capital) built the fiber optics network and operated it (i.e., provided broadband internet service to the local communities with its own team, not open-access) on behalf of UTOPIA with the scope DBFOM [42]. In exchange, Macquarie was assured minimum revenue guarantees from the local communities for the internet service as part of their monthly utility bills.
When no demand risk is transferred to the concessionaire and the public sponsor effectively assumes the demand risk, FTTH/broadband P3s can be structured as an AP P3 (in its hybrid form) where availability payments are funded through a property tax or a general appropriation. The local sponsor is then responsible for using the FTTH asset to generate revenues, by providing access to local ISPs who provide broadband services to local customers using the fiber asset. Figure 12 shows two emerging AP P3 models in this regard.

Figure 12: AP P3 Models for FTTH/Broadband Network Assets

In most cases, in conjunction with an AP P3 concession, local sponsors would make separate but open-access arrangements with multiple local ISPs to receive guaranteed payments for providing the fiberoptic asset, similar to the “off take” PPA contract mentioned earlier for WTE (except that the contract is with the public sponsor instead of the concessionaire). In this case, the scope of an AP P3 concession would be DBFM for fiber assets only and the operational responsibility (“O”), i.e., providing the broadband internet service, would fall in the local sponsor’s hands together with the local ISPs serving the community.

Also shown in Figure 12 is AP P3 DBFOM model, where the private sector has a formal partnership with one or more ISPs of their choice as part of its P3 team (as was the case for Macquarie in the UTOPIA example) and assumes the operational responsibility. Under this model, the public sponsor can recover its FTTH investments through minimum payment guarantees and/or revenue sharing arrangements with the P3 private partner as part of an AP P3 concession agreement.

One notable example of an AP P3 DBFM structure being implemented is the KentuckyWired P3 project, which reached financial close in late 2015 and is scheduled for completion in 2018 [43]. Under this structure, a concessionaire will build and maintain a “middle mile” 3,000 mile fiber network connecting various public agencies across the state under a 30 year concession. The P3 concessionaire will not act as an ISP (i.e., operator) for the end users, but the state intends to allow current and new ISPs to connect to the network and thus build out the “last mile” of broadband infrastructure in the state, increasing competition and improving connectivity. The
concessionaire will be remunerated via an escalating availability payment of $28.5 million per year.

The AP P3 model is effective in transferring the construction and maintenance risk of a fiber network to a private concessionaire, but, because no revenue risk is transferred, the concessionaire is not aligned with the sponsor to generate demand for the fiber network to make the investment economically viable. For this reason, some communities have experimented with models that share small components of demand risk between the concessionaire and the city. The City of Westminster, Maryland, for instance, used a unique lease agreement structure to operate its network (see Figure 13) [39]. The city first built the fiber network (“dark fiber”, i.e., fiber asset that is built but unused) using traditional contracting, and financed it with a general obligation bond offering. Through a competitive procurement, the city then leased the asset to an ISP to “light” the fiber and operate the network (in this case, Ting Internet). Under this operating lease, the ISP will operate and maintain the network and provide internet service to local residents. The ISP’s “lease” payment to the city for accessing fiber asset will be two-tiered based on (1) a flat fee per property that the fiber passes and (2) the number of subscribers they are able to acquire, comprising both minimum guarantee threshold and revenue sharing arrangement above the threshold. Thus the city and ISP are sharing some of the demand risk and responsibility to make the network economically viable. This model is in essence a form of O&M Concession (or OMM) described in Section 5.

6.7 Street Light Modernization

Street light modernization initiatives are another relatively new sector in which P3 structures have been utilized in the U. S. The sector lends itself to the P3 concession model in part because street light improvements generate benefits in terms of energy reduction and cost savings over a long period of time, but also because the assets require regular maintenance and monitoring.

Street light modernization P3s may combine several different technical components. The replacement of existing bulbs with energy efficient LED lights is the primary component, but the projects often also entail the installation of smart lighting controls and other Internet of Things (IoT) devices that control lights, monitor energy usage, and communicate when outages or other problems occur. Many of the P3s also use the project to install other technologies while the concessionaire is accessing the poles, such as urban sensors or wireless internet devices.
Regardless of the technical components included in the project, most current street light modernization P3s in the U.S. have been procured as an AP P3 model funded via the reduction of energy costs for the local government. An example of an energy saving AP P3 project is the recently procured Metro Region Freeway Lighting P3 in Michigan. The project, which was awarded in May 2015, will replace nearly 15,000 lighting fixtures in the Detroit metropolitan area. The contract was procured by the Michigan Department of Transportation (MDOT), which owns all of the freeway lighting that will be upgraded. The concessionaire is partially remunerated by two, $6 million milestone payments—at a partially complete construction milestone and at substantial completion. The remainder of the concessionaire’s funding is structured as a quarterly availability payment over the 15-year term. The availability payment for each quarter is calculated in part by the capital costs of the rehabilitation, which were included in each competitor’s bid during the procurement, and also by the energy efficiency gains the concessionaire is able to achieve. Thus MDOT pays the concessionaire more when it saves more on its energy costs. The availability payment calculation also includes potential deductions for delays in responding to maintenance issues, any lane closures required by the concessionaire to perform maintenance and other minor infractions.

Similar street light modernization P3s have been procured or proposed in Chicago, San Jose, and Washington, D.C., among others. The Chicago project, awarded in early 2017 to replace 270,000 streetlights in the city, has a more straightforward remuneration structure, with the city agreeing to component prices for lights to be replaced and ordering replacements as needed, with the selected partner invoicing for the costs of making the replacements. The project will also install a central lighting management system for the city, which will be operated and maintained by the city. The city will retain the right to order other maintenance work from the private partner once the new system is in operation.

The sector has also experienced some fits and starts, in part because it is a relatively new sector for P3 procurements. The D.C.’s first attempt to procure a comprehensive street light management contract was cancelled in 2015 after starting in late 2011, following years of bid protests and appeals by the two companies competing for the contract. San Jose’s procurement was also cancelled in 2017 after one of the proposing companies protested the award of the contract to a competitor. In both situations, the protests stated that the municipality had not correctly scored their proposals based on the RFP’s evaluation criteria.
7. DISTRICT OF COLUMBIA: PROJECT STRUCTURING OPTIONS FOR THE PLANNED P3 PROJECT PIPELINE

7.1. General Setting

The District of Columbia (“The District”) is a unique jurisdiction in the U.S. In many ways, it functions both as a city and a state with three branches of government—an 87-agency executive branch led by the mayor, a 13-member unicameral legislative branch known as the DC Council, and a judicial branch. In addition to being the nation’s capital, the 68-square mile District accommodates almost 700,000 residents, 800,000 workers, and over 21 million visitors every year, generating a gross domestic product of $127 billion in 2016, which is more than three times the national average on a per capita basis [44]. Although all District legislation must undergo a 30-day passive review period by the U.S. Congress before taking effect, the District has largely been self-governing since 1973 and also has budget autonomy that allows spending of its local revenues without inclusion into its approved federal budget.

The independent Chief Financial Officer (CFO) manages the fiscal affairs of the District in close coordination with the executive and legislative branches. For the FY2018 financial plan, the Office of the CFO (OCFO) projects an operating budget of $13.8 billion derived largely from local ($7.7 billion, 55 percent) and federal ($3.4 billion, 25 percent) sources [45]. Of the local sources, over 80 percent is tax based, comprising property ($2.6 billion, 35 percent), income ($2.5 billion, 32 percent), and sales ($1.3 billion, 17 percent) taxes. Aside from its enterprise-related activities, a major part of the District’s operating budget is spent on human support services ($4.7 billion or 34 percent, of which over 75 percent is on healthcare), public education system ($2.5 billion or 18 percent, of which almost 70 percent is on public and charter schools), and public safety and justice ($1.3 billion or 10 percent, of which almost 60 percent is on policing, fire emergency and medical services, and correctional services).

Unlike many cities and local governments of late, the District is in a solid fiscal position and has enjoyed a strong credit rating (AA or better) for many years. Its current fiscal health has been founded on a sustained balanced budget for more than 20 years, surpluses that allowed stable and healthy levels of reserves (currently over $2 billion in cash reserves), and limited revenue volatility concerns attributed largely to the steady and sustained growth in the local economy. As a result, unlike many other local governments, the District has very limited risk exposure to unfunded legacy mandates such as pension liabilities and other post-employment benefits (OPEB). With its strong fiscal position, a significant portion of past debt is also expected to be paid off in the coming years, providing additional borrowing capacity to fund the District's critical programs such as infrastructure.

The District also has a sound debt management policy and operates within both federal and local statutory debt limits. Under the federal Home Rule Act, the annual debt service on the District’s General Obligation (GO) bonds must be no more than 17 percent of General Fund revenues. In 2009, the DC Council passed the local Debt Ceiling Act to establish a more restrictive limit on

76 The mayor of the District is popularly elected to a four-year term with no term limits. The current mayor, Muriel Bowser, has served in the role since January 2015.
the amount of debt outstanding. This Act limits the annual debt service on all tax and fee supported debt to no more than 12 percent of the District’s General Fund expenditures. This locally imposed limit is the true constraint under which the District’s borrowing activities operates. Although the 12 percent statutory debt limit is on the stricter side when compared to those of other state and local governments across the country, the District has a firm policy to stay within this limit to maintain its strong credit ratings and enable maximum borrowing capacity at the lowest cost possible.

7.2 Capital Improvements Plan and Long Range Capital Planning

The District addresses its continued infrastructure needs through its Capital Improvements Plan (CIP) that establishes the capital budget on a six year planning cycle. Its most current CIP covers the period FY2018-FY2023 with a capital budget of over $6.7 billion. The majority of this budget is expected to be debt-financed with general obligation (GO) and Income Tax (IT) revenue bonds ($4.2 billion or 63 percent), further supplemented by various federal grants ($1.1 billion or 16 percent) and pay-as-you-go (“paygo”) transfers from the District’s General Fund ($0.7 billion or 10 percent).

In 2014, as part of the FY 2015 Budget Support Act, the DC Council required the OCFO to develop and report annually on a long-term replacement schedule for the District’s capital assets. In response, the OCFO developed a long-range capital financial plan (LRCFP) for the District that included capital asset replacement needs beyond the normal 6-year capital planning period. A critical part of this LRCFP exercise was the development of a formalized approach to assessing the true conditions of the District’s capital assets to determine both the new capital investment and long-term maintenance needs. This exercise was motivated, in part, to deal explicitly with years of deferred maintenance on these assets. As a result, the District is one of few governmental entities in the U.S. that has established a formal lifecycle cost accounting approach as part of its long range capital planning process to minimize the costly deferred maintenance risks in the future.

Specifically, the OCFO employed a rigorous approach to developing the LRCFP by integrating a state-of-the-art asset management system called CARSS (capital asset replacement scheduling system) with a long-range financial planning model. CARSS is an asset management planning tool that provides a comprehensive view of the District’s capital asset health with a detailed inventory data on each capital project or asset. Based on such inventory and condition

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77 Statutorily, the local debt management practice is based on the statutory debt policy (D.C. Code § 47-334 and 335) and anti-deficiency act (D.C. Code § 47-355).
78 As an example, if the District were to raise its debt limit or reduce its reserves to 2009 levels, the resulting downgrade in its credit ratings (from the high ‘AA’ to the single ‘A’ category) would increase its borrowing costs by about 15 percent, effectively reducing the bond funded capital budget by 15 percent (equivalent to about $750 million), thereby causing even fewer capital projects to be funded.
79 Discussion in this section is largely derived from the District’s Capital Improvements Plan and Long Range Capital Financial Plan Report [46,47].
80 Using CARSS, the OCFO is in the process of developing a comprehensive asset management planning system to gather and house detailed asset data. Currently, more than 96 percent of District assets have had a full and detailed inventory and needs assessment. This inventory/assessment is expected to be completed for all key assets over the next few years.
assessment data, CARSS can prioritize and rank all of the District’s various capital projects, and determine which projects can be funded in each CIP year and which projects will not receive funding due to their lower priority ranking. The unfunded capital projects are then analyzed in the long-range financial planning model, where, using a linear optimization technique, the optimal financing solution is developed subject to capital budget constraints and specific priority ranking assigned to each project.

The model allows the OCFO to optimize and project the maximum amount of debt that can be issued in each fiscal year while remaining below the 12 percent cap, and to simultaneously determine the earliest possible fully-funded year of all unfunded capital projects. In addition to the debt, the model also quantifies 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 has been the basis for developing a complete long-term capital financing plan over the 15 year forecast period.

In assessing which capital projects might be funded as part of the LRCFP, the District explored both the traditional and other less-traditional means of financing capital projects, such as P3. Based on an extensive internal review between the OCFO and the District’s Office of P3 (OP3), certain high-cost capital projects—though determined to be high priorities for the District—were identified as unlikely to receive the full amount of traditional funding in the normal CIP process and were considered to be excellent candidates to explore the P3 option. Collectively, these candidate P3 projects were estimated to be about $1 billion to $1.5 billion in capital funding needs and were added to the OP3’s P3 project pipeline to be pursued over the next several years. Since a P3 may incorporate additional financing mechanisms outside of the traditional methods, including the use of unused public land to offset capital costs in procurement, these projects were excluded from consideration the long-range capital plan pending further progress in procuring the projects and reaching specific structuring decisions.

For the recent FY2018-FY2023 CIP planning cycle, outside of the P3 capital needs and the District’s obligations to Washington Metropolitan Area Transit Authority (WMATA or “Metro”), CARSS analysis determined that the total long range capital infrastructure needs of the District are approximately $10.9 billion. For this CIP cycle, the District identified a capital budget of $6.7 billion to be available for funding the highest priority projects, which resulted in a long range funding shortfall of about $4.2 billion. This shortfall included both unfunded new capital projects to support the growing population ($1.9 billion or 45 percent), as well as unfunded capital maintenance projects for the upkeep of the existing assets ($2.3 billion or 55 percent).

Because most of the $6.7 billion capital budget for this CIP cycle will be debt-financed with GO and IT revenue bonds, it is expected that these new bond issuances will add almost 50 percent more to the existing debt, making the District’s annual debt service percentage cap increase from

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81 Including, for example, a replacement of the Henry J. Daly building (which houses the headquarters of the District’s Metropolitan Police Department), a new correctional facility, and a number of other high-cost facilities and projects, which will be further discuss in a later section.

82 The District’s obligations to Metro are expected to be met by several region-wide funding solutions, including federal cost sharing and/or one-percent dedicated sales tax.
9.7 percent in 2018 to 11.9 percent in 2023. While these municipal bonds remain a key source of funds for infrastructure investments into the future, the key challenges for the District will thus be to ensure that the total debt burden remains at a sustainable level so that the strong credit ratings can be maintained and the overall cost of borrowing be kept as low as possible.

The District has concluded that the most cost-effective solution to the $4.2 billion funding gap is incremental increases in paygo funding beginning in FY 2019.³³ Paygo funding is a transfer of funds, or cash, from the operating budget to the capital budget for spending on new capital projects or maintenance. 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 that can meet the amount and timing of the unfunded capital needs. The District plans to increase paygo funding each year until 2027, when it will be capped at the District’s annual depreciation. This increase in annual paygo funding will be the primary source of additional capital to reduce the District’s unmet capital needs by 2028. The planned increases in paygo funding would come from new revenues passed by the District, a significant portion of which will be allocated to paygo funding to buy down the District’s unmet capital needs.

The District has developed several scenarios with different potential paygo funding disbursement levels to assess the timing of fulfilling the unfunded capital funding shortfall.³⁴ Although candidate P3 projects have already been identified, P3 options, especially the AP P3, can potentially offer additional financing solutions that can deliver the unfunded capital projects (both new and maintenance) in timely manner and provide complementary solution to the paygo approach adopted by the District for its other unmet capital needs.

For example, despite the fact that the District’s school modernization program is well underway and most of the 88 schools that have been modernized to date have used traditional financing and delivery approach, there remains almost $850 million of unfunded capital projects for 22 additional elementary and secondary schools. As discussed earlier, AP P3s for school projects typically do not involve lump sum milestone payments during construction and annual availability payments do not start until the date of beneficial occupancy. AP P3s also allow capital and O&M costs to be spread out over the 25- to 30-year concession term, imposing less burden on the District’s fiscal position when compared to the paygo funding option. In addition, schools P3s have often been bundled to gain economies of scale and reduce procurement costs. Additional discussion is provided later on the potential use of P3 option on the District’s public educational facilities.

7.3 P3 Setting

The District is not new to involving the private sector in infrastructure delivery. Among others, the bus shelter and bike share project implemented in 2005 by the District Department of

³³ In addition to existing paygo funding, starting in FY 2019, DC Law 18-223, as amended in Law 21-36, requires that the District dedicate 25 percent of any incremental increases in revenues to paygo funding of capital projects.
³⁴ The timing is of significance in view of the fact that, in the long-range capital financial analysis, the costs of deferred capital projects beyond the six-year CIP cycle are inflated at 3 percent annually until those projects are funded.
Transportation (DDOT) represents a best combination of franchise agreement with various leasing, marketing (advertising), and revenue sharing arrangements that continue to provide positive cash flow to the District. Through the Office of the Deputy Mayor for Planning and Economic Development (DMPED), the District also works with the private sector on a regular basis to undertake various real estate development projects to help trigger economic growth and for value capture using, among others, various leasing and air rights arrangements.

In line with this tradition, the District has been able to establish several building blocks conducive to a favorable environment for P3 implementation. Launched in 2015, the District’s Office of Public-Private Partnerships (OP3) is one of very few independent P3 offices at local government level with dedicated and qualified staff. OP3 enjoys a strong backing from the Mayor’s office, which has championed the District’s P3 initiative and provided the executive level leadership often critical to P3 success, as discussed in Section 3. The District has already established P3 statutes that help to streamline P3 governance and processes. As mentioned earlier, the District has also incorporated a formal lifecycle accounting approach to long range capital planning that helps to highlight the P3 value proposition to minimize deferred maintenance risks. Finally, because of the District’s strong fiscal position, P3 pursuits are viewed not only as an alternative financing approach but as a potential avenue for providing the best value for money in infrastructure delivery.

We discuss below a few key P3 building blocks for the District, in particular, P3 policies and statutes, interagency coordination needs, and unsolicited proposal process.

7.3.1 P3 Policies and Statutes

The basic statute that governs the District’s P3 activities is the Public-Private Partnership Act of 2014 (D.C. Act 20-595), which formally created OP3 and standardized P3 procurement process [48]. The statute specifies the type of eligible P3 projects, P3 procurement guidelines, handling of unsolicited proposals, basic terms to be included in P3 agreements, transparency and public input requirements, and the DC Council’s review and approval process, including their timelines. Serving as the in-house consultant and liaison, OP3 is charged with building collaborations between the District government and the private sector to help deliver major infrastructure projects and other programs through long-term, performance-based P3 procurements. Through these P3 procurements, OP3’s mission is to deliver infrastructure and other government services sought by District residents with the highest VfM while also expanding economic opportunities for the District.

OP3 was launched in late 2015 and it has since developed OP3 Rules and OP3 Guidelines and Procedures to implement the P3 Act, both of which took effect in late 2016 [49,50]. Developed through a transparent and collaborative process that included public inputs and comments, these rules, guidelines, and procedures outlined the process for the development, solicitation, evaluation, award, delivery, and oversight of solicited and unsolicited P3 projects for the District. As mentioned previously, in coordination with OCFO, OP3 has also been able to identify and develop a pipeline of P3 projects to be procured through competitive and transparent processes as specified in its guidelines.
7.3.2 Interagency Coordination Needs

In Section 2.1, we discussed interagency coordination challenges for P3 implementation at local government level. The need for interagency coordination is also critical for the District for successful P3 implementation. As will be discussed in some detail in Section 7.4, OP3 has developed and made public a proposed pipeline of P3 projects, and every potential project selected will involve two or more sponsoring agencies as primary clients for the procurement.

Currently, three departments are primarily responsible for capital project delivery and asset management for the District: the Department of General Services (DGS), DDOT, and DMPED. DGS currently provides capital project delivery and O&M services for all of the District’s buildings and vertical facilities, whether with their own resources or through outsourcing. DDOT currently provides capital project delivery and O&M services for the District’s roads and other transportation and related horizontal infrastructure assets. For any projects involving real estate, DMPED is currently responsible for overseeing the process as mentioned above, including providing real estate asset management and divestment decisions for the District. In addition, Office of the Chief Technology Officer (OCTO) is responsible for providing IT infrastructure and related services for all of the District’s capital assets, whether they are under the DGS, DDOT, or DMPED oversight.

For both DGS and DDOT, the primary procurement approach in the past has been the traditional design-bid-build approach. With the establishment of OP3, any P3 procurements in the future for the capital assets under DGS and DDOT delivery oversight need to be coordinated with OP3 along with the sponsoring agencies. For example, DDOT is the lead agency, along with OCTO and OP3, for the streetlight modernization project. For all of the public buildings P3s in the OP3’s pipeline, both DGS and OP3 would need to be involved in the procurement process. In addition, the process will also require a close coordination with the primary building tenants who are the sponsoring agencies, such as the Metropolitan Police Department (MPD) for police stations and facilities, Department of Corrections (DOC) for correctional facilities, Deputy Mayor of Education (DME) and the District of Columbia Public Schools (DCPS) for schools and public educational facilities, to name a few. Other proposed P3 projects, such as the solid waste recycling center will require the coordination between the Department of Energy and Environment (DoEE) and the Department of Public Works (DPW), in addition to DGS and OP3. In addition, each P3 procurements would require the involvement of other city agencies, such as the OCFO and DMPED. Interagency coordination for the District’s P3 procurements will be a critical determinant of the program’s success.

The unique factors affecting successful P3 implementation for local governments drive the need for new P3 programs, agencies, and institutions. To date, few major local governments in the U.S. have created dedicated P3 offices or programs to centralize P3 assessments for projects and manage alternative procurements. For the District, the establishment of OP3 has been the critical factor in managing interagency coordination for the P3 procurements. OP3 is centrally located

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85 The District has other “enterprise” agencies, such as DC Water and its university system, that procure and deliver their own projects and maintain their assets internally. The enterprise-level capital debts are included within the varied enterprise funds and are treated separately outside the general fund and thus excluded from our discussion.
within the executive office and able to work closely with the District’s OCFO, Mayor’s Office, and infrastructure line agencies (such as DGS, DDOT, OCTO, and DMPED) to assess potential projects for their viability as P3s and, if selected, manage the procurement process.

As points of reference, other notable examples of independent P3 offices include:

- The City of Denver, Colorado, which is currently designing a new municipal P3 office and program for the City
- The Office of Extraordinary Innovation (OEI), which was created recently by Los Angeles County Metropolitan Transportation Authority (“LA Metro”) to manage alternative procurements like P3s and also facilitate the adoption of new technologies for the County’s transportation system
- The Mayor’s Office of Civic Innovations (MOCI), which was established in 2012 by the City of San Francisco to introduce new approaches, resources, and technology for meeting the City’s priorities, including using P3 delivery option for the one-of-a-kind FTTH and broadband network with universal coverage
- The Chicago Infrastructure Trust, which was created in 2012 to assist the city government and agencies in assessing alternative financing project delivery for critical infrastructure.

These new offices and initiatives are notable because they indicate that some local governments, including the District, are taking a programmatic approach to leveraging P3s and other alternative procurement models for infrastructure. Initial attempts by local governments in the U.S. to utilize P3s for infrastructure can be broadly characterized as moving directly from policy changes to project implementation, while skipping over the institutional reforms required to enable to procurement model.

Without creating a new P3 office or agency with the expertise to assess and manage P3s, many local governments have simply tasked existing agencies to adapt to using a procurement model they have not used in the past and were not designed to implement. Such adaptation and learning is only possible if significant investment in external advisory services are made and in cases where the existing agency already has the capacity and experience to manage multiple, similar procurements over time. That model inhibits learning and knowledge management across projects and sectors for the local government, and increases the potential for procurements to get cancelled or, much worse, for poorly structured P3s to be implemented.

In addition to knowledge management and the reduction of transaction costs over time, new P3 agencies or offices to manage P3 procurements can also be effective in mitigating many of the interagency coordination issues inherent to P3s implemented at local level. They can do so both by designating a primary point of responsibility for procurements and by creating a conflict resolution point that is not the Mayor’s office or City Council. The former mitigates the lack of “ownership” for complex government endeavors like infrastructure projects that involve multiple public agencies or offices. The latter should help reduce delays or the costs of coordination when inevitable conflicts between various agencies involved in a project arise because elected officials will not need to be brought in repeatedly to make decisions or resolve disputes.
Finally, new P3 offices can benefit local infrastructure initiatives by enhancing transparency and public reporting. Because the procurement model is commonly used for complex, expensive infrastructure projects and also often entail long term agreements or concessions, there is a higher need for transparency and public reporting. At the same time, any public procurement program, for infrastructure or otherwise, requires some information to be held confidential in order to maintain a competitive procurement process. Dedicated P3 offices can help cities strike that balance by providing public reporting at both the project level and programmatically separate from other government agencies.

OP3’s project pipeline is relatively new and optimal practices relating to interagency coordination will need to be assessed and streamlined as the current procurement efforts proceed. OP3’s current policies and guidelines place an emphasis on interagency work, though with the OP3 as an advisor to other parts of the city government as opposed to a direct signatory to a P3 transaction. Along with the OCFO and other agencies, OP3’s procedures include designating an “owner agency” for each procurement, such as the sponsoring agencies identified above, which OP3 will work with to manage the procurement and develop a project agreement. The owner agency may also provide funding to cover the costs of the procurement process. In addition to drafting the final project agreement, OP3’s role involves working with the owner agency to draft the RFQ and RFP for the procurement and manage the evaluation process. OP3 also provides reports for the City Council before releasing the RFP and finalizing the project agreement. The Council must approve both documents during the procurement process.

7.3.3 Unsolicited Proposals

Formal unsolicited P3 proposal programs for local governments balance incentives for private companies to innovate to solve local infrastructure problems while still maintaining a transparent and competitive procurement process for projects. While any local government can accept an unsolicited P3 proposal, formal processes and programs can help proposers understand the needs and priorities of the government and build certainty into the procurement process without constraining innovation. Some common components of local unsolicited P3 proposal programs include:

- Structure or required information to include in an unsolicited proposal
- Assessment criteria for unsolicited proposal
- A nominal fee for the city to review the proposal
- A defined procurement process once a proposal is accepted
- A specific time window in which a city will accept proposals
- A prioritized list of projects or unmet city needs that the city is requesting proposals to deliver or develop

One issue that is addressed in a local unsolicited proposal program is whether the government should, or should not be authorized to, accept unsolicited proposals from private companies outright or enter into a direct negotiation for a project. When this is permitted, it can increase the incentives for private companies to innovate and invest in unsolicited proposals, but it can also lead to a lack of transparency and a less-competitive procurement process. For this reason, many local unsolicited proposal programs advertise either a Request for Alternative Proposals (RFAP)
or manage a competitive procurement for a project even when the innovative concept or idea originated from one of the companies unsolicited. In practice, this can still provide some incentives for companies to make unsolicited proposals because they will have a fairly large competitive advantage over other companies with whom they will need to compete because they will already be familiar with the project. This is counter-balanced by providing enough time for competitors to review the potential project and provide alternative proposals to ensure a competitive process.

Regardless of how procurements for unsolicited proposals are structured, the process must balance incentives for innovation with the need for a transparent and competitive procurement process, along with the fact that any re-advertisement or request for alternatives may further delay the project and generate some transaction costs. A hybrid approach would request alternative proposals as a standard rule but would include the potential to directly award a project to a proposer under exceptional circumstances or when there is a strong indication that no other company would be able to provide a competitive alternative. This could be the case if one company, for instance, already owned part of the land required for the project in question or adjacent property, or would otherwise have a clear competitive advantage. In cases where a direct award or direct negotiation is used, the municipality would need to publish a clear project report or justification to ensure transparency around the project decision making process.

The OP3 currently maintains a process for accepting, evaluating, and potentially moving forward with unsolicited proposals from private companies to meet the District’s infrastructure needs. Proposals are accepted during March and September each year and OP3 publishes the required contents and format that proposals must adhere to. Any proposals must identify any proprietary information that is included, and proposers must also pay a $5,000 evaluation fee.

If an unsolicited proposal passes a preliminary evaluation, OP3 publishes a RFAP with a minimum of a 30-day window for competing proposals that meet the same needs for the District as the original unsolicited proposal. The original proposer is also able to modify their project proposal during that period. Proposals are then reviewed by technical and financial review committees and a preferred bidder is selected. The District’s OCFO and general counsel must then review and approve the proposed project before a project agreement is negotiated and executed by the District and the winning proposer.

The District’s current process is clearly designed to foster innovation from the private sector in meeting its infrastructure needs. The OP3 also publishes a project pipeline to inform potential proposers of the needs in which the District is interested in utilizing P3 proposals. The RFAP process additionally strikes a balance between creating an incentive to make unsolicited proposals and maintaining a competitive procurement. Proposals accepted in a preliminary evaluation are opened and available up to competition, but for a relatively short competitive window. This gives the original proposer a clear advantage in winning the competitive process and thus still gives companies a strong incentive to utilize the unsolicited proposal process.

86 While 30 days is the minimum, in most cases, the more likely window has been 45 to 60 days and, for particularly complex projects, even longer.
Especially for proposals that are deemed exceptional or to have strong competitive advantage, OP3’s current process could be enhanced further by first conducting a brief competitive assessment once an unsolicited proposal passes the initial screening. The purpose of the competitive assessment would be to determine whether or not it would be unlikely that the District could possibly receive a more advantageous proposal by re-advertising the project and accepting alternate proposals. If the OP3 concludes that it is unlikely to receive a better proposal through the RFAP process, it would publish a report for the DC Council approval to proceed with a direct negotiation of the project agreement with the original proposer. Figure 14 illustrates the current initial steps in DCOP3’s unsolicited proposal process and our recommended changes.

This alternate process addresses unique circumstances in which the RFAP process, which itself entails transaction costs in addition to at least a 120 days delay to allow time for the submission of alternative proposals and a review process, would unlikely result in a more optimal proposal. Conditions for skipping the RFAP process would need to be fairly explicit, such as the original proposer owning the rights to a particular technology or operating an adjacent asset to the proposed project. The unsolicited proposal format would also need to be adjusted to give proposers an opportunity to provide a justification for the purposes of the competitive assessment.

Figure 14: Unsolicited Proposals - Current and Recommended Models

7.4 P3 Structuring Options for the OP3 Project Pipeline

As mentioned earlier, as part of the long range capital planning process, the OP3 has established a healthy set of P3 project pipeline in close coordination with the OCFO to be implemented in the next several years. Specifically, these projects include [51]:

1. Henry J. Daley Building (houses the headquarters of the District’s Metropolitan Policy Department (MPD))
2. New Corrections Center
3. Public Libraries
4. West Virginia Avenue Public Works Campus
In the following section, we identify potential project structuring options that the OP3 can consider as candidate P3 models as it prepares for the formal procurement process in the future. These candidate P3 options can be subject to further screening based on, as desired, the qualitative and/or quantitative assessments we present in this report in order to (a) compare with the traditional approach to reaffirm the P3 value proposition and (b) select the best P3 model for the procurement. Because P3 project structuring decisions can differ significantly between social vs. economic infrastructure, we categorize these projects into these two categories. Broadly, as mentioned earlier, “standard” P3 options for social and economic infrastructure have tend to be, respectively, AP P3 DBFM (with some variations regarding ancillary HFM and SFM services) and RR P3 DBFOM.

### 7.4.1 Social Infrastructure P3 Projects

Table 7 provides a summary of project structuring options for each social infrastructure projects in the OP3’s project pipeline. For each project, we also present basic project parameters that can potentially impact the project structuring decisions. As mentioned earlier, in general, the standard P3 procurement model for social infrastructure is the AP P3 with DBFM.
### Table 7: Project Structuring Options for Social Infrastructure P3 Projects

<table>
<thead>
<tr>
<th>Project Parameters:</th>
<th>Daly Building</th>
<th>Correctional Center</th>
<th>Educational Facilities</th>
<th>FEM Facilities</th>
<th>Other Public Buildings</th>
</tr>
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<tbody>
<tr>
<td>- Asset Ownership</td>
<td>Public</td>
<td>Public</td>
<td>Public</td>
<td>Public</td>
<td>Public</td>
</tr>
<tr>
<td>- Greenfield vs. Brownfield</td>
<td>Brown</td>
<td>Green</td>
<td>Brown &amp; Green</td>
<td>Brown &amp; Green</td>
<td>Brown &amp; Green</td>
</tr>
<tr>
<td>- Repayment Source</td>
<td>General Fund</td>
<td>General Fund</td>
<td>General Fund, Energy Cost Savings, Other Auxiliary</td>
<td>General Fund, Other Auxiliary</td>
<td>General Fund, Other Auxiliary</td>
</tr>
<tr>
<td>- Coordinating Agencies</td>
<td>MPD, DGS</td>
<td>DOC, DGS</td>
<td>DCPS, DME, DGS</td>
<td>FEMS, DGS</td>
<td>DCPL, DPW, DPR, MPD, DGS</td>
</tr>
<tr>
<td>Project Structure:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Candidate P3 Procurement Model(s)</td>
<td>- AP P3</td>
<td>- AP P3</td>
<td>- AP P3</td>
<td>- AP P3</td>
<td>- AP P3</td>
</tr>
<tr>
<td></td>
<td>- Lease/Leaseback</td>
<td>- Lease/Purchase</td>
<td>- ESCo</td>
<td>- Lease/Purchase</td>
<td>- Various leasing arrangements</td>
</tr>
<tr>
<td></td>
<td>- LDO</td>
<td></td>
<td></td>
<td>- Lease/Leaseback</td>
<td></td>
</tr>
<tr>
<td>- Potential Scope</td>
<td>DBFM (RME)</td>
<td>DBFoM</td>
<td>DBFM (AP P3)</td>
<td>DBFM or DBFoM</td>
<td>DBFM or DBFoM (RME)</td>
</tr>
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<td>- Potential Bundling?</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>- Ancillary (HFM vs. SFM)</td>
<td>HFM</td>
<td>HFM &amp; SFM</td>
<td>HFM</td>
<td>HFM &amp; SFM</td>
<td>HFM &amp; SFM (various)</td>
</tr>
<tr>
<td>- O&amp;M/Auxiliary Opportunities?</td>
<td>ESCo/ITP</td>
<td>ESCo/ITP</td>
<td>ESCo/ITP, Real Estate/Marketing</td>
<td>ESCo/ITP, Real Estate/Marketing</td>
<td>ESCo/ITP, Real Estate/Marketing</td>
</tr>
<tr>
<td>- Potential use of 63-20 hybrid?</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
The Daly Building, located at 300 Indiana Avenue, NW, functions as the headquarters for the Metropolitan Police Department (MPD). The 450,000 sq. ft. building is a historic landmark that was built in 1939 and located in the thriving Chinatown neighborhood within a block of Judiciary Square Metro Station, Pennsylvania Avenue, the US Department of Labor, and several local and federal courts. The OP3 currently envisions the P3 scope for this building to include the design, build, finance, and maintenance (DBFM) of the building to house MPD and other government agencies. The project also requires approximately 100,000 sq. ft. of swing space to house MPD during the construction process. The OP3’s coordinating agencies with the District are MPD and DGS.

The Daly building is largely rehabilitation, modernization, and/or expansion (RME) of the existing building (i.e., brownfield) that will house MPD and other public agencies. The building would be under the District’s ownership and the primary use of the building would be to provide basic government services without any major auxiliary functions that could generate additional revenues. There is also limited potential for the incorporation of unused land on the parcel into the procurement to offset project costs. The primary source of the repayment of any P3-generated debt would thus come from the District’s General Fund.

As shown in Table 7, P3 structuring for the Daly building could take the standard social infrastructure P3 form, i.e., an AP P3 with DBFM as the scope, similar to the UC Merced example (or LBCC example without the real estate component). Given that it is a brownfield project, other leasing options such as Lease/Leaseback or Lease-Develop-Operate (LDO) options could also be explored. One comparison of relevance between these three options might be the repayment schedule. For example, if the AP P3 option requires substantial milestone payments during construction, the impact on the paygo funding strategy adopted by OCFO on the unfunded capital projects may be more significant than when compared to the two leasing options.

The specific P3 scope related to ancillary services may depend on the District’s existing policy, both in general and specific to the Daly Building, pertaining to hard facility management (HFM) (e.g., HVAC, escalators, other building related routine maintenance activities) vs. soft facility management (SFM) (e.g., custodial, security, parking, etc.) services. It would largely be determined by whether these services are provided internally by the District’s own staff or outsourced externally, and which part could potentially be transferred to the P3 private partner without major risk or controversy. At minimum, it is recommended that the HFM services be included as part of the overall P3 scope.

As part of the P3 O&M scope, it would be also beneficial to explore the potential benefits of applying energy savings concepts such as ESCo and/or partnering with technology solutions providers for innovations in smart building operations and management (e.g., using smart sensors, etc.). Finally, for potential savings in financing costs and flexibility during O&M phase, the use of a hybrid model, such as “63-20” described earlier, should also be explored, especially if the lease/leaseback option were considered to be a viable option.

87 Although DBFM is envisioned, the more likely model for the Daly Building would be DBFoM with the private concessionaire providing non-core facility-related services.
Consolidated Correctional Center. The District’s Department of Corrections (DOC) is in need of a new corrections center that consolidates existing Correctional Treatment Facility (CTF) and Central Detention Facility (CDF) located at 1901 D Street, SE. The new facility must be able to accommodate the current inmate population, with the flexibility to efficiently adjust for future populations during the lifetime of the facility. This secure environment must include various support services and inmate treatment-related programs and activities (e.g., counseling, substance abuse treatment, education, job training, recreation, religion, work assignments, health and dental care, food service and laundry, among others).

The new facility could be located on the existing site or another property owned by the District or a third party, but continuous availability during the transition between facilities is considered critical. The DOC’s administrative offices, which are currently housed in the Reeves Center located at 2000 14th Street, NW could also be consolidated into the new facility for more efficient operations to house approximately 80 staff in 20,000 square feet. The OP3’s coordinating agencies with the District are DOC and DGS.

The Correctional Center is envisioned to be under the District’s ownership and, as such, P3 structuring could be an AP P3 with DBFoM scope, as discussed in some detail in Section 6.4 for publicly owned correctional facilities. Under this option, as desired the P3 private partner could also potentially take on (a) some (not all) non-security “core” services related to rehabilitation provisions, such as counseling, substance abuse treatment, education, job training, recreation, religion, work assignments, and health and dental care as listed above (and thus the small “o”), (b) all other accommodation services such as food service, laundry, transportation, etc., typically associated with SFM, and (c) all other facility related services associated with HFM.

As shown in Table 7, another P3 option used commonly for correctional facilities is the Lease/Purchase option, which is one of a capital lease as discussed earlier. This option could particularly be attractive if property owned by a third party is considered. Under this option, the private partner can build and finance the new consolidated center on their own and leases to the District for the DOC’s use for the duration of the lease, with the option for the District to purchase the asset at the end of the lease with minimum additional cost implication. Under this option, the same non-security core and HFM/SFM services could be provided by the private partner and the scope can be DBFoM as was the case for AP P3 discussed above. As was the case for the Daly building, both ESCo and ITP concepts can be explored as part of the P3 O&M scope.

Public Schools and Educational Facilities. The Office of the Deputy Mayor for Education (DME) serves as a coordinator for public school facilities planning for the District in collaboration with District of Columbia Public Schools (DCPS), public charter schools, and other agency partners. DCPS currently operates more than 110 buildings serving 87,000 students and public charter schools operate approximately 98 buildings across the District. For the public schools under the DCPS purview, significant investments have already been made to modernize these schools and the District has experienced steady increase in student enrollments and improved outcomes as a result. However, there are still opportunities for improvements, including almost $850 million of unfunded capital projects for an additional 22 elementary and secondary schools mentioned earlier.
In coordination with DME, DCPS, and DGS, the OP3 is currently considering comprehensive energy efficiency upgrades and other sustainability improvements for both existing facilities as well as for future upgrades using performance-based energy savings contracts (ESCo). On a case-by-case basis, the OP3 is also looking into additional opportunities to complete the comprehensive modernizations of schools facilities using one or more P3 delivery options. Although most of these facilities would be used primarily for educational purposes, on a limited basis, the OP3 is also exploring potential private sector auxiliary opportunities that can support the educational activities but also generate additional revenues to help reduce any P3 financial obligations.

As discussed earlier, most of the ESCo upgrades can pay for themselves from energy cost savings without additional burden on the District’s finances.\(^{88}\) For existing facilities, these ESCo upgrades would be an O&M performance contract with a FOM scope, whereas for the new school modernization opportunities, ESCo would be part of a larger P3 undertaking, such as an AP P3 with DBFM as the scope. As discussed earlier, from cash flow standpoint, AP P3s for new modernization efforts may be a better financing option than direct paygo option using traditional delivery model (as envisioned by OCFO for currently unfunded capital projects) because AP P3s for elementary and secondary schools typically do not involve lump sum milestone payments during construction. The total capital and O&M costs under the AP P3 option can thus be spread out over 25 to 30 years as annual availability payments starting from the date of beneficial occupancy. Often, P3s for elementary/secondary schools also offer potential opportunity to bundle multiple projects—typically, for a minimum combined value of around $100 million—to gain additional economy of scale and also reduce procurement costs. As mentioned earlier, such bundling opportunities are often accompanied by the private partner’s ability to accommodate local community involvement in design across multiple schools, including each community’s interest in the multiple use of school facilities.

As was the case for the Daly building, the specific P3 scope related to ancillary services may depend on the District’s existing policy on school facilities pertaining to both HFM and SFM services. For elementary/secondary schools P3s, SFM services are typically provided by internal resources and are excluded from the P3 scope. For the P3 O&M scope, in addition to ESCo, various ITP opportunities can also be explored both as an O&M only contract for existing facilities or as a part of a larger AP P3 undertaking for new modernization effort. As currently envisioned by OP3, where deemed appropriate, additional real estate development or other related auxiliary opportunities discussed in Section 5.3 (e.g., air rights, retail concession, sponsorships, naming rights, etc.) should also be explored on a case-by-case basis for additional revenue generating potential.\(^{89}\)

Fire and Emergency Medical Facilities. The mission of the District’s Fire and Emergency Medical Service Department (FEMS) is to preserve life and promote health and safety through pre-hospital treatment and transportation, fire prevention, fire suppression and

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\(^{88}\) For GAO’s review of the use of ESCos for federal government, see Reference [52].

\(^{89}\) Additional factors for education P3s include the need to ensure continuing availability of space during the school year, placing added importance on construction scheduling and possibly swing space plans during development.
rescue activities, and homeland security awareness. Modern and efficient facilities to house more than 1,800 uniformed and civilian personnel are critical to these life-saving functions. The District is currently looking to the private sector to design, build, finance, operate and maintain these FEMS facilities, including private sector auxiliary opportunities (e.g., residential, commercial and retail uses), the revenues from which could be used to offset the P3 financial obligations. Of particular importance for these assets is the operational continuity during all phases of project delivery to ensure that FEMS’ critical health, safety, and security functions are not jeopardized.

For this asset category, the specific project parameters are still being defined and there may be several delivery options that could be explored at the outset. Because the District’s FEMS facilities are primarily fire stations and fleet maintenance facility that are required to be spread out across the city to ensure rapid response times, exploring bundling opportunities under P3 options would be somewhat limited. In addition to the standard AP P3 with DBFM scope, some private ownership of the mixed use assets could be beneficial as are various leasing arrangements through the private sector, such as Lease/Purchase or Lease/Leaseback. Given that there may potentially be a large role for a developer to secure residential, commercial, and retail tenants, the hybrid 63-20 model may also prove to be a viable option, especially under Lease/Leaseback option.

Regarding the P3 scope, it is assumed that the core services of FEMS would remain in the public domain but most of the HFM and SFM ancillary services could potentially be transferred to the private partner, especially given that the facilities represent new greenfield projects. In addition, as was the case with others, both ESCo and ITP opportunities could be explored as part of the P3 O&M scope.

Other Public Buildings in OP3 Project Pipeline. In OP3’s current project pipeline, there are several other public buildings projects being considered for P3 delivery option. For all, a mixed use real estate development component (residential, commercial, and retail) is considered as an important auxiliary opportunity to generate additional revenues to potentially offset P3 financial obligations. These public building projects include:

- For the DC Public Library (DCPL), the modernization of its libraries, some located in close proximity to Metro stations, where potential bundling with other library facilities in need of modernization is being considered

- For the Department of Public Works (DPW), consolidation of all of its facilities into a single campus that include a 165,000 sq. ft. maintenance facility, a 123,000 sq. ft. of office space for an administrative headquarters, a 30,000 sq. ft. fueling and vehicle washing station, and parking facilities to accommodate 930 light, medium, and heavy fleet vehicles as well as 550 employee vehicles

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90 If some of the FEMS core services—such as pre-hospital treatment and transportation and homeland security awareness—can be transferred to the private partner, the P3 scope would be DBFoM with the small “o”.

96
• For the Department of Parks and Recreation (DPR), modernization of various DPR facilities that include recreation/community centers, parks, athletic fields, playgrounds, spray parks, tennis courts, community gardens, dog parks, and aquatic facilities

• For the Metropolitan Police Department (MPD), modernization of MPD stations and substations that house 4,000 sworn and civilian members located across seven Police Districts

Most of these projects are existing brownfield facilities requiring rehabilitation, modernization, and/or expansion (RME). In its basic form, these projects can be delivered as an AP P3 with DBFM scope. Given the strong real estate component, AP P3s should be structured in a similar manner as the LBCC example discussed earlier, including, to the extent possible, bounding the availability payments within the District's affordability limit, requiring strong developer capability within the P3 team, and encouraging different revenue generating opportunities from the real estate component to offset the P3 debt obligations.

In addition to an AP P3, various leasing arrangements should also be examined for potential application in each of these buildings, including Lease/Purchase, Lease-Develop-Operate (LDO), Lease/Leaseback, and where applicable, Buy-Develop-Operate (BDO) or Sale/Leaseback. As was the case for the educational facilities, one of the criteria for considering these options in comparison to the AP P3 might be the required availability vs. lease payment schedules and the extent to which they might impact the paygo strategy adopted by the District.

The scope of the P3 undertaking for these public buildings can vary between DBFM and DBFoM, depending on whether some of the support “core” services provided by the sponsoring agencies—in this case, DCPL, DPW, DPR, and MPD—could be transferred to the private sector. The ancillary scope could also vary depending on how HFM and SFM services are currently provided by DGS for these agencies and whether some (or all) of the services could be transferred. At minimum, it is recommended that a majority of HFM services should be transferred to the private sector. In addition to the real estate development, to the extent that they don’t interfere with the sponsoring agencies’ basic missions, various marketing agreements (e.g., advertising) should be also explored to maximize additional revenue potential. Finally, for the O&M phase, potential benefits from applying various ESCo or ITP related concepts should also be considered as part of the P3 scope.

### 7.4.2 Economic Infrastructure Projects

Table 8 provides a summary of project structuring options for each economic infrastructure projects in the OP3’s project pipeline. As was the case for the economic infrastructure, for each project, we also present basic project parameters that can potentially impact the project structuring decisions. In general, potential P3 procurement models for economic infrastructure can extend from the RR P3 with DBFOM scope to various franchise agreement models we discussed earlier in this report.
<table>
<thead>
<tr>
<th>Project Parameter:</th>
<th>Street Light Modernization</th>
<th>Waste Management and Recycling</th>
</tr>
</thead>
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<tr>
<td><strong>- Asset Ownership</strong></td>
<td>Public</td>
<td>Public or Private</td>
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<tr>
<td><strong>- Greenfield vs. Brownfield</strong></td>
<td>Brown</td>
<td>Green</td>
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<tr>
<td><strong>- Repayment Source</strong></td>
<td>Energy Savings, User Charges, Other Auxiliary</td>
<td>Tipping Fees, User Charges, Material Sales</td>
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<tr>
<td><strong>- Coordinating Agencies</strong></td>
<td>DDOT, OCTO</td>
<td>DPW, DOEE, DGS</td>
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<table>
<thead>
<tr>
<th>Project Structure:</th>
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</thead>
<tbody>
<tr>
<td><strong>- Candidate Procurement Model(s)</strong></td>
<td>- OMM/ESCo (LED lights only)</td>
<td>- AP P3 (publicly owned)</td>
</tr>
<tr>
<td></td>
<td>- AP P3</td>
<td>- BOO (privately owned)</td>
</tr>
<tr>
<td><strong>- Potential Scope</strong></td>
<td>- FOM (OMM/ESCo)</td>
<td>- AP P3: DBFOM or DBOM</td>
</tr>
<tr>
<td></td>
<td>- DBFOM or DBFM (AP P3)</td>
<td>- BOO: DBFOM</td>
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<tr>
<td><strong>- O&amp;M/Auxiliary Opportunities</strong></td>
<td>ITP Real Estate/Marketing</td>
<td>TBD</td>
</tr>
<tr>
<td><strong>- Use of P3 Hybrid?</strong></td>
<td>Public Sector Credit Enhancements</td>
<td>Public Sector Credit Enhancements</td>
</tr>
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</table>

**Streetlight Modernization.** The District has more than 71,000 lights installed on its streets, alleys and other public spaces. The lights use a variety of inefficient bulb technologies, including incandescent and high-pressure sodium. Through a private partner, the District is currently looking to retrofit the lights with more energy efficient light-emitting diode (LED) bulbs, install a remote monitoring and control system, and repair and maintain the facilities under a long-term performance-based contract. In addition, the District is envisioning future installation of smart city technologies in the light facilities that provide, among others, broadband Wi-Fi, enhanced cell phone services, information kiosks, and smart sensors. Such technologies would be able to leverage the District’s 100-gigabit fiber network, DC-Net, or utilize privately owned data facilities. While street lights are not generally revenue producing infrastructure projects, we include street light modernization under economic infrastructure here because the projects often significantly reduce the energy costs for the city and future incorporation of smart city technologies can also provide potential to generate additional revenues.

In January 2017, the District Department of Transportation (DDOT), in coordination with the Office of the Chief Technology Officer (OCTO) and the OP3, hosted an industry forum to provide an opportunity for potential bidders to learn about the project goals and anticipated procurement process and share their feedback [53]. Based on the industry feedback, in June 2017, the District initiated the procurement process for the streetlight modernization project (current scope excluding the smart city technology installation) and issued a Request for
Qualifications (RFQ) for submittal in late August 2017. The District is currently in the process of reviewing and evaluating Statements of Qualifications (SOQs) and plans to prequalify a shortlist of teams, who will be the only proposers invited to participate in a subsequent Request for Proposal (RFP) process. Final technical and performance specifications are currently under development by the District to be made available in the RFP.

A majority of successful streetlight modernization programs have been publicly funded, e.g., Los Angeles, and their financing approaches have varied significantly—e.g., GO or revenue bonds, paygo funding, loans, etc.—and, in most cases, the resulting energy cost savings more than paid off the public investments. These publicly funded projects were focused primarily on LED light installations only without consideration for the use of streetlight assets for other larger purposes, such as providing critical sensor network for smart city technologies as envisioned by the District.

Given that LED lights have a proven cost savings record, for LED lights alone, the most efficient delivery approach may be a performance-based ESCo-like O&M concession that is funded with low-cost public sector financing. Under this approach, with the basic infrastructure asset (i.e., light posts) already in place, the District would award a long-term performance contract for the private sector to install LED bulbs along with a remote monitoring/control system and to repair and maintain these assets (i.e., LED bulbs and remote control/monitoring system) based on some agreed-upon payment schedule that is tied to energy cost savings. Depending on the size of the payments, the District can choose either paygo funding or issue revenue bonds based on the energy cost savings as specified in the contract.

With the expanded usage of the streetlight assets envisioned for the future, the District is currently considering an AP P3 project structure with DBFOM as the scope. As discussed in Section 6.7, P3 procurements for streetlight modernization has been relatively recent and the results have been somewhat varied. Where there have been successes, the scope has also varied significantly, from replacing 15,000 light fixtures for Michigan DOT to more than 270,000 streetlights with centralized lighting management system for Chicago. Most of these undertakings have been an AP P3 with the scope ranging between DBFOM, DBFM, or DBF. In the case of Chicago, for example, the city decided to operate and maintain the centralized lighting management system with the city's own staff. As discussed in Section 6.7, a critical consideration for these P3 arrangements is tying the payment schedule to the energy cost savings to balance and minimize the financial risk assumed by both the public and private partners.

In the long run, however, the challenge for the District for this project would be to determine how (both in terms of approach and timing) to integrate the future installation of smart city technologies with the current LED lighting P3 undertaking. The potential P3 approach to fully integrated lighting system would be somewhat similar to the FTTH/broadband network P3 models discussed in Section 6.6, which could include the RR P3 with DBFOM (with minimum revenue guarantees), the AP P3 with DBFM or the DBFOM, or the OMM concession with revenue sharing arrangement. The selection of a particular P3 procurement model for the fully

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91 The City of Los Angeles was one of the first cities in the U.S. to successfully retrofit their legacy street light system with LED system with public funds, achieving almost 65 percent savings in energy usage and triggering many other cities to follow suit.
An integrated system would depend on the ability to identify potential 3rd party revenue sources for various smart city technologies enabled by the networked lighting system and the demand risks associated with these 3rd party users. This is a challenge faced not only by the District itself but by the proponents of smart city technologies in general.

With the smart city technology applications for the fully integrated system, there may be ample opportunities to explore potential additional revenue generation from the real estate around the lighting posts, various ITP arrangements, and other potential marketing agreements. To the extent feasible, and depending on revenue viability, various P3 hybrid models should also be explored to lower the financing costs for the fully integrated system, including various credit enhancements provided by the federal and state governments on P3 projects as well as P3 financing approaches that leverage the public sector creditworthiness described in Section 5.4.1.

**Waste Management and Recycling Center.** In coordination with Department of Energy and Environment (DOEE) and the DPW, the OP3 is currently exploring better ways to utilize various types of waste collected in the District to encourage recycling, energy production, and other environmentally friendly uses. As an example, the District collects more than 20,000 tons of recyclables from single-family homes and other residential buildings each year with limited ability to fully process this material. In order to achieve these objectives, the District is considering a P3 approach to deliver and operate a municipal waste management and recycling center, also known as a materials recovery facility (MRF).

The P3 delivery approach envisioned by the District for its MRF is in line with various P3 models available for waste-to-energy (WTE) conversion facilities discussed in Section 6.5. As mentioned, in the U.S., there are precedents for the WTE assets being owned and operated by both the public and the private sector. The decision on the asset ownership would depend on various risk exposures (financial, environmental, technological, etc.) and any statutory constraints within the District that may preclude private ownership.

Under public ownership, an emerging and more prevalent model has been the AP P3 with DBFOM as the scope. As discussed in Section 6.5, where it is difficult to secure private financing due to the perception of high risk for the project, the preferred model has been the AP P3 with DBOM as the scope and the public sector assumes the financing risk. The choice between DBFOM and DBOM would depend on the extent to which the District is willing to assume the financing risk and the criticality of the MRF project with respect to competing priorities within the overall long range capital program.

In general, if there is sufficient private sector appetite, private ownership would minimize the risk exposure for the District, including the financing risks. Under private ownership, one or more forms of franchise agreement can be considered, such as Build-Own-Operate (BOO) if the private ownership is allowed in perpetuity or Build-Operate-Transfer (BOT) or Build-Transfer-Operate (BTO) if the District desires the transfer of ownership at some point. Under these franchise models, the District can enforce various public interest consideration on the project—e.g., environmental or labor standards—both through performance specifications in the agreement and as well as pertinent regulations in the District.
The extent to which the project can explore various ways to improve O&M efficiency and other auxiliary opportunities would depend on the specific project location, size, and the nature of the project structure and agreement. Especially when private sector financing costs are high, as was the case for streetlight modernization, various credit enhancements provided by the federal and state governments on P3 projects as well as P3 financing approaches that leverage the public sector credit worthiness described in Section 5.4.1.
What is a Public-Private Partnership?

A Public-Private Partnership (P3) is a widely used term for an alternative procurement model for infrastructure in which additional risk and responsibilities are transferred to the private partner. The term P3 is used to describe many different types of infrastructure procurement structures, however, and this can lead to some confusion regarding the specific structure used for a given project.

Infrastructure development entails five different primary activities – an asset must be designed, built, financed, operated and maintained. Under traditional procurement, the public sponsor will use its engineering staff or higher an engineering firm to design the project, select a construction firm to build the designed system, finance the investment by issuing public bonds, and then operate and maintain the system using either public staff or a maintenance contractor. Under a P3, more of these functions are allocated to the private consortium developing the asset, which takes on some of the project risks.

The procurement model itself can be used for economic infrastructure like roads or transit systems but also projects in the water sector and social infrastructure like public buildings. The viability of a given infrastructure project for procurement via a P3 structure only depends on the level of risk that can be transferred to the concessionaire weighed against the level of control and flexibility desired by the sponsoring government.

In many P3s, a performance-based procurement is used to procure an infrastructure asset that is designed, built, financed, and maintained by a concessionaire for a long-term contract. The concession could also include components of operations for the system, depending on the nature of the project itself. P3s also commonly entail financing that is secured by the project or concession itself, as opposed to financing backed by the general obligation of the state or city sponsoring the project. Detailed components of project risk that are addressed via P3 procurements, and other common aspects of P3 structures for infrastructure are reviewed below.

Core Infrastructure Project Risks and P3s

Infrastructure projects are complex enterprises that entail significant risks. Those risks are ultimately borne by the taxpayer initially, but some of those risks may be transferred to the private sector depending on the structure used to procure and maintain the asset. We highlight three categories of risk that are commonly transferred or shared between the public and private parties to a P3 transaction, defining these broadly as Development Risk, Demand Risk, and Maintenance Risk.

Development Risk

We define development risk as a broad category of risk that, when not accurately assessed or managed, may result in an infrastructure project exceeding its budgeted capital costs or taking
significantly longer to develop than initially anticipated. These development risks are also highly correlated with one another. By that we mean that infrastructure projects that experience schedule delays also often experience cost overruns and vice versa. Under traditional procurement and construction contracting, some of these risks are still transferred to the private construction firm, but only to meet the technical specifications provided by the public sponsor at the finalized project budget. If there is a requirement to alter the projects technical specifications during construction, a change order must be made to the contract and a new construction budget negotiated. This occurs frequently for complex infrastructure developments. It is also important to note that most studies of various development risks have found a correlation between the size or complexity of the project initially and the frequency and magnitude of cost overruns. Thus, larger or more complex infrastructure projects entail significantly more development risk than smaller, more routine projects.

P3 structures for infrastructure transfer this risk by utilizing performance-based contracting as specified below. Under a P3 procurement, the sponsoring government will prescribe its desired outcomes, whether the number of lanes for a road or the amount of office space for a city hall, as opposed to a technical design of the project itself. The private partner is thus responsible for designing the project and meeting the development budget and timeline, reducing the potential for change orders in general, and making the private developer responsible for managing the interface between the project’s technical design and its construction, as opposed to the government.

**Demand Risk**

Demand risk exists for projects that are funded by user fees, as opposed to general taxation. The most common example is a toll road or bridge funded by users, but water or energy projects may also derive some or all of their funding from the use of the asset and most transit systems are all or partially funded by user fees. Demand risk is thus a category of risks that result in a lack of funding for the project over the long-term due to lower than expected use. Some or all of demand risk can be transferred to the private partner in a P3 structure if funding for the project is user fees. Most P3 concessions only partially transfer demand risk and control by, for instance, placing a cap on the amount a concessionaire can charge users, or by providing a minimum revenue guarantee combined with excess revenue sharing if demand exceeds expectations.

Demand risk is highly uncertain for greenfield infrastructure projects that are not yet developed, despite significant investment in demand or economic forecasts for most projects. Thus, the transfer of demand risk can significantly increase the financing costs of a particular project. Still, the transfer of some or all demand risk can align the incentives of the private developer to achieve the outcomes desired by the public sponsor in designing and maintaining the asset to optimize its use. A simple example of this is observed in P3s in the airport sector, which are often remunerated in part by airline service fees and in part by retail and concessions within the airport. The transfer of some demand risks aligns incentives for the private partner to efficiently manage the airport and get users safely and quickly through security, which in turn will increase demand and their revenues.
For project structures that keep demand risk with the public sponsor, or are simply not funded via user fees, an Availability Payment (AP) is a common remuneration mechanism. Under an AP structure, the public sponsor agrees to pay the private concessionaire a pre-defined, regular fee for making the infrastructure asset “available” over the life of the concession. Thus, under an AP structure the sponsoring government does not make payments until the asset is developed and in operation.

*Maintenance Risk*

Maintenance risk is another broad category of long-term risks in maintaining infrastructure that we define as the implications of maintenance costs exceeding projections or the deferral of routine maintenance over time, which in turn compounds to increase costs over the long term or decrease the useful life of the asset. Many P3 structures transfer some components of maintenance risk to the private concessionaire but also share some maintenance requirements with the public sponsor, all depending on the public sponsor’s needs and capabilities. For many P3’s, the project agreement specifies the detailed maintenance tasks and the parties responsible for them.

P3 structures that transfer maintenance risk to the private concessionaire do so primarily via two mechanisms: a performance-based component of the availability payment for the project and handback requirements. For projects that include an availability payment, the calculation of the availability payment takes maintenance performance into account. Thus, if parts of a facility are unavailable due to maintenance or key components such as elevators are down for maintenance, the availability payment is reduced accordingly. Other mechanisms could include a reduction of the availability payment if a facility doesn’t meet its energy efficiency targets. Handback requirements are enforced at the end of a P3 concession, and require a government inspection that the facility remains in good working order, including a requirement to reinvest or replace components of the asset that don’t meet the specified conditions for handback.

*Common Aspects of P3s for Infrastructure Development*

In transferring and mitigating some of the project risks discussed in the preceding section, P3’s for infrastructure entail often entail other key characteristics that are relevant for municipalities or other public sponsors considering an alternative procurement model for an infrastructure project.
**Project Financing**

P3s are commonly financed at the project level, as opposed to general obligation financing that is backed by the credit of the sponsoring government. Thus, the lenders to the project do not have recourse to other funding sources if risks come to fruition and the project is not economically viable. It is important to note that project financing can be used for an infrastructure project regardless of whether some of the other components common to a P3 are used in procurement, but its use has been fairly limited for public infrastructure in the United States outside of P3s.

Project-level non-recourse financing impacts infrastructure development in several key ways. It is naturally more expensive than general obligation financing, but is also an effective tool in applying scrutiny to early project planning. Because financing for the project is non-recourse, the project itself must be made economically viable and account for all of the long-term costs of developing and maintaining the asset, as opposed to just capital costs. This added scrutiny also may entail a longer project planning and procurement process for the contract itself in order to effectively assess and allocate project risks and make the project financeable.

**Performance-Based Specification**

P3s also commonly use performance-based specifications for projects, as opposed to technical specifications and designs. The public sponsor simply states the performance requirements that need to be met, and bidders during the procurement process are thus incentivized to be innovative in designing a project that meets those requirements. Performance-based specifications are also necessary to effectively transfer components of development risk to a concessionaire.

**Life-Cycle Based Procurement**

Many P3 structures include as requirement to both develop an infrastructure asset and also maintain it over a long-term concession. This life-cycle aspect to the project contract differs from traditional procurement in several aspects. First, since one concessionaire is responsible for both development and maintenance, they are incentivized to optimize the life-cycle costs of the project in a way that would not be possible if those tasks were managed separately. Thus a concessionaire might over-invest during development to make a facility more energy efficient in the long run. A life-cycle contract may also reduce the potential for deferred maintenance by separating a facility’s maintenance from an annual budget cycle appropriation. Under annual budget cycles, maintenance funding is appropriated at the beginning of each year, which creates a risk that maintenance projects could be deferred in years in which maintenance costs exceed expectations for any reason.
### APPENDIX B: SAMPLE INITIAL SCREENING MATRIX [6,54]

#### Criteria 1: Investment Size

<table>
<thead>
<tr>
<th>Metric</th>
<th>Project of sufficient size to offset high transaction cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question</strong></td>
<td>What is the estimated capital cost of the proposed project?</td>
</tr>
<tr>
<td><strong>Response Indicator</strong></td>
<td>1  2  3  4  5</td>
</tr>
<tr>
<td>&lt;$50M</td>
<td>&lt;$50 (O&amp;M 3-4x)</td>
</tr>
</tbody>
</table>

#### Criteria 2: Asset Life

<table>
<thead>
<tr>
<th>Metric</th>
<th>Expected useful life</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question</strong></td>
<td>What is the anticipated useful life (service life) of this asset?</td>
</tr>
<tr>
<td><strong>Response Indicator</strong></td>
<td>1  2  3  4  5</td>
</tr>
<tr>
<td>&lt;10 years</td>
<td>10-14 years</td>
</tr>
</tbody>
</table>

#### Criteria 3: Asset Complexity

<table>
<thead>
<tr>
<th>Metric</th>
<th>Project complexity (e.g., nature asset, site, no. of asset classes)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question</strong></td>
<td>How complex is the asset both wrt construction and O&amp;M</td>
</tr>
<tr>
<td><strong>Response Indicator</strong></td>
<td>1  2  3  4  5</td>
</tr>
<tr>
<td>Single asset of low complexity</td>
<td>Two asset classes of low complexity</td>
</tr>
</tbody>
</table>

#### Criteria 4: Outputs and Perf. Specs (Construct)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Availability/accessibility of perf-based output specs for construction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question</strong></td>
<td>What is the current availability of output specifications for construction?</td>
</tr>
<tr>
<td><strong>Response Indicator</strong></td>
<td>1  2  3  4  5</td>
</tr>
<tr>
<td>New perf-based output specs need to be developed</td>
<td>Existing conventional specs can be converted into perf-based output specs with some difficulty</td>
</tr>
</tbody>
</table>
### Criteria 5: Stability of Operational and Maint. Req’mnts

<table>
<thead>
<tr>
<th>Metric</th>
<th>Stability/predictability of O&amp;M requirements for the asset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question</td>
<td>Are long-term operations and maintenance needs of planned asset relatively stable and predictable?</td>
</tr>
<tr>
<td>Response Indicator</td>
<td>1</td>
</tr>
<tr>
<td>O&amp;M req’mnts cannot be predicted and are unstable over the useful life</td>
<td>Operations requirements are unstable and maintenance requirements are somewhat predictable</td>
</tr>
</tbody>
</table>

### Criteria 6: Perf. Specs and Indicators (Operation)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Ability to monitor based on key performance indicators (KPIs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question</td>
<td>Are O&amp;M-based performance specs and indicators available?</td>
</tr>
<tr>
<td>Response Indicator</td>
<td>1</td>
</tr>
<tr>
<td>Perf. specs and indicators need to be developed</td>
<td>Perf. specs and indicators exist for comparable assets but not readily available</td>
</tr>
</tbody>
</table>

### Criteria 7: Lifecycle Costs

<table>
<thead>
<tr>
<th>Metric</th>
<th>Availability of sufficient information to develop lifecycle cost profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question</td>
<td>Can most of full lifecycle costs (mainly related to construction, fitup, and long-term O&amp;M) be quantified upfront with reasonable assumption and historical data?</td>
</tr>
<tr>
<td>Response Indicator</td>
<td>1</td>
</tr>
<tr>
<td>Total lifecycle costs are not well understood and cannot be estimated by public sponsor</td>
<td>There is some understanding of lifecycle costs but costs cannot be accurately estimated</td>
</tr>
</tbody>
</table>
## Criteria 8: Revenue Generation

<table>
<thead>
<tr>
<th>Metric</th>
<th>Revenue generating capability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question</strong></td>
<td>Does the planned investment have inherent scope to generate any revenue?</td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td>Indicator</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Unlikely to generate revenues</td>
<td></td>
</tr>
<tr>
<td>Could generate minimal revenues but private sector unlikely to accept revenue risk</td>
<td></td>
</tr>
<tr>
<td>Could generate revenues and private sector’s willingness to accept risk is unknown</td>
<td></td>
</tr>
<tr>
<td>Could generate revenues and private sector may be willing to share risk</td>
<td></td>
</tr>
<tr>
<td>Will generate revenues and private sector may be willing to assume revenue risk</td>
<td></td>
</tr>
</tbody>
</table>

## Criteria 9: Private Sector Expertise

<table>
<thead>
<tr>
<th>Metric</th>
<th>Private sector capacity to create healthy competition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question</strong></td>
<td>How many firms have capacity to deliver this type of project?</td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td>Indicator</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>&lt;3</td>
<td>3-5 DBM</td>
</tr>
</tbody>
</table>

## Criteria 10: Market Precedents

<table>
<thead>
<tr>
<th>Metric</th>
<th>Have projects with similar requirements (size, scope) been delivered thru P3?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question</strong></td>
<td>Sufficient P3 market experience</td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td>Indicator</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>None</td>
<td>Lower scope or size (international)</td>
</tr>
</tbody>
</table>

## Criteria 11: Type of Infra Site

<table>
<thead>
<tr>
<th>Metric</th>
<th>Risk transfer opportunity from infra site</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question</strong></td>
<td>How much of project is new construction on undeveloped site?</td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td>Indicator</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Minor renovation/integration with existing site</td>
<td>Expand or refurbish</td>
</tr>
</tbody>
</table>
### Criteria 12: Gains from Private Sector Innovation

<table>
<thead>
<tr>
<th>Metric</th>
<th>Private sector innovation inversely related to public sector’s need to be prescriptive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question</td>
<td>To what extent will the performance-based contracts specify deliverables?</td>
</tr>
<tr>
<td>Response Indicator</td>
<td>1</td>
</tr>
<tr>
<td>Must define prescriptive input specification for all</td>
<td>Design &amp; construction based in prescriptive input specification</td>
</tr>
</tbody>
</table>

### Criteria 13: Potential for Contract Integration

<table>
<thead>
<tr>
<th>Metric</th>
<th>Potential for integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question</td>
<td>Which elements of P3 (D,B,F,O,M) integrated into one contract?</td>
</tr>
<tr>
<td>Response Indicator</td>
<td>1</td>
</tr>
<tr>
<td>Only 2 elements</td>
<td>At least DBF</td>
</tr>
</tbody>
</table>

### Criteria 14: Security Req’mnts

<table>
<thead>
<tr>
<th>Metric</th>
<th>Potential impediments to P3 procurement due to security requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question</td>
<td>Are there considerable and complex security requirements associated with functioning of this asset?</td>
</tr>
<tr>
<td>Response Indicator</td>
<td>1</td>
</tr>
<tr>
<td>Security req’nts exceed federal norm, include IT or protection of TS info</td>
<td>Access to site is limited to secret pass holders and contractors, and their organizations are required to be secret cleared</td>
</tr>
</tbody>
</table>
## APPENDIX C: SAMPLE QUALITATIVE FACTORS [8]

<table>
<thead>
<tr>
<th>Factor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment with investment objectives</td>
<td>The extent to which each procurement option aligns with the objectives of the investment</td>
</tr>
<tr>
<td>Time to deliver asset</td>
<td>The extent to which each procurement option is likely to achieve operations by a specified date</td>
</tr>
<tr>
<td>Private sector market interest/capacity</td>
<td>The extent to which each procurement option generates market interest in the investment among the appropriate players possessing the relevant skills, expertise and capacity to deliver the infrastructure, while promoting fair and transparent competition</td>
</tr>
<tr>
<td>Budget certainty</td>
<td>The extent to which each procurement option assists in providing earlier cost certainty to the department or agency</td>
</tr>
<tr>
<td>Corporate risk</td>
<td>The extent to which each procurement option has the ability to meet departmental mandates</td>
</tr>
<tr>
<td>Operational flexibility (future scope changes)</td>
<td>The extent to which each procurement option allows, over time, the department or agency to manage and implement changes to the functional requirements of the planned investment (particularly in relation to any variation in the required capacity of the infrastructure) as compared to the forecasted need to make such changes</td>
</tr>
<tr>
<td>Stakeholder management</td>
<td>The extent to which each procurement option enables the department or agency to address stakeholder issues and needs throughout the life of the asset</td>
</tr>
<tr>
<td>Political constraints</td>
<td>The extent to which each procurement option can address political issues and manage approvals</td>
</tr>
<tr>
<td>Economic factors</td>
<td>The extent to which each procurement option is able to handle factors such as financing availability, employment and exchange rates</td>
</tr>
<tr>
<td>Social factors</td>
<td>The extent to which each procurement option addresses social and community needs</td>
</tr>
<tr>
<td>Sustainable development factors</td>
<td>The extent to which each procurement option aligns with economic, environmental and social initiatives outlined in the Treasury Board of Canada Secretariat’s Sustainable Development Strategy</td>
</tr>
<tr>
<td>User considerations</td>
<td>The extent to which each procurement option addresses concerns and expectations of the user (e.g. access, service satisfaction)</td>
</tr>
<tr>
<td>Strategic alignment</td>
<td>The extent to which each procurement option aligns with the program delivery strategies of the department or agency (e.g. those set out in the departmental plans and priorities)</td>
</tr>
<tr>
<td>Implementation and capacity considerations</td>
<td>The extent to which each procurement option aligns with the departmental or agency’s capacity to oversee or manage the infrastructure investment</td>
</tr>
<tr>
<td>Factor</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Regulatory and legal considerations</td>
<td>The extent to which each procurement option addresses regulatory and legal considerations in terms of risk, cost, public policy, etc.</td>
</tr>
<tr>
<td>Technological factors</td>
<td>The extent to which each procurement option offers an element of innovation</td>
</tr>
<tr>
<td>Public acceptance considerations</td>
<td>The extent to which each procurement option is viewed positively among stakeholders (i.e. end users, the City and the media)</td>
</tr>
<tr>
<td>Security factors</td>
<td>The extent to which information, services and assets are reasonably protected, employees are not exposed to workplace violence and governance structures are implemented to manage security as outlined in the Treasury Board of Canada Secretariat’s Policy on Government Security</td>
</tr>
</tbody>
</table>
APPENDIX D:
BASIC COST COMPONENTS OF PSC AND P3 SHADOW BID

In evaluating a P3, governments develop a Public Sector Comparator (PSC) which is a risk-adjusted estimate of the costs to develop and maintain the project in question using traditional procurement. The PSC is then compared with the P3 alternative to estimate the Value for Money achieved by developing the project as a P3.

1. PSC Cost Estimates
   1.1. Construction Costs
       1.1.1. Construction S-curve (i.e., cumulative cash disbursements)
       1.1.2. Funding for Construction Costs (i.e., public sector financing cost)
   1.2. Operations, Maintenance, and Lifecycle Service Costs
   1.3. Contingencies
   1.4. Cost Inflation
   1.5. Transaction Costs
   1.6. Competitive Neutrality
       1.6.1. Taxes
       1.6.2. Payment in Lieu of Taxes (PILT)
       1.6.3. Insurance
   1.7. Revenues
   1.8. Retained Risks
   1.9. Residual Value

2. P3 Model Cost Estimate (“Shadow Bid” if Pre-Procurement)
   2.1. Substantial Completion Payment and Milestone Payments
   2.2. Capital Annual Service Payment
       2.2.1. Construction Costs
           2.2.1.1. Private Sector Ancillary Cost
               2.2.1.1.1. Legal Costs
               2.2.1.1.2. Bid Preparation
               2.2.1.1.3. Special Purpose Vehicle (SPV) Costs
               2.2.1.1.4. Financing Fees and Financial Guarantees
               2.2.1.1.5. Insurance and Bonding
               2.2.1.1.6. Reserve Accounts
           2.2.1.2. Construction Efficiencies
       2.2.2. Inflation
       2.2.3. P3 Financing
   2.3. Non-Capital Annual Service Payment
       2.3.1. Operation, Maintenance, and Lifecycle Costs
       2.3.2. Revenues
       2.3.3. Operating Efficiencies
   2.4. Transaction Costs

92 Derived from PPP Canada’s guidelines [8].
2.5. Honoraria

3. Discount Cash Flow Consideration
   3.1. Net Present Value Calculations
   3.2. Discount Rate
   3.3. Concession Period

4. Sensitivity Analysis
   4.1. Discount Rate
   4.2. Cost Assumptions
   4.3. Cost of Debt
   4.4. Revenue Assumptions
   4.5. Indexation Assumptions
   4.6. Private Sector Efficiencies
   4.7. Risk Valuation
# APPENDIX E: GLOSSARY OF P3 PROCUREMENT MODELS

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publicly Financed P3</td>
<td>Enhanced performance contract with DB, DBO, DBM, or DBOM scope where the private sector assumes no financial risk (i.e., no at-risk equity capital) but still provides lifecycle efficiency not offered in the traditional D-B-B approach</td>
<td>DBOM—airport people mover systems</td>
</tr>
<tr>
<td>AP P3</td>
<td>Long-term financial liability reside with the public sponsor; private sector provides nominal at-risk equity capital and receives milestone/substantial completion payments during construction and regular disbursements during O&amp;M phase that are performance based;</td>
<td>More prevalent for social infra but used for economic infra as well thru hybrid AP P3</td>
</tr>
<tr>
<td>RR P3</td>
<td>Private sector is wholly responsible for achieving revenue levels from 3rd party user charges to make them whole; private sector provides higher at-risk capital compared to AP P3 due to higher probability of default and generally receives more government support as a result</td>
<td>Can be used for all economic infrastructure assets</td>
</tr>
<tr>
<td>Hybrid AP P3</td>
<td>Used when difficult to engage private sector to assume revenue risk on economic infrastructure; public sector takes revenue risk by collecting/administering user charges but engages private sector via AP P3</td>
<td>Primarily used for economic infra assets</td>
</tr>
<tr>
<td>Brownfield P3</td>
<td>Private sector has long term lease and right to collect 3rd party user charges in exchange for capital improvements and O&amp;M on existing assets; public sector takes no financial risk and received initial “brownfield” proceeds to recover sunken investments; essentially RR P3 model</td>
<td>Mostly for economic infra assets</td>
</tr>
<tr>
<td>BOT/BOO T</td>
<td>Private sector builds the underlying infra asset, owns the asset and earns revenues by operating it, and transfers the asset ownership at the end of franchise term</td>
<td>All utility-like economic infra assets with public sector ownership</td>
</tr>
<tr>
<td>BTO</td>
<td>Private sector builds the underlying infra asset, transfers the ownership after construction is complete (i.e., turnkey-based construction), and obtains operating right to earn revenues during the franchise term</td>
<td>All utility-like economic infra assets with public sector ownership</td>
</tr>
<tr>
<td>BLT/BLOT</td>
<td>Private sector finances/builds underlying infra assets, sells it to public sector, and leases it back to operate it until the end of the lease</td>
<td>utility-like economic assets with public ownership</td>
</tr>
<tr>
<td>Model</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>BOO</td>
<td>Private sector builds, owns, and operates underlying infra asset; private sector owns the asset in perpetuity</td>
<td>All utility-like economic infra assets with private sector ownership</td>
</tr>
<tr>
<td>BBO</td>
<td>Private sector buys public asset, builds major improvements, and operates it; private sector owns the asset in perpetuity</td>
<td>All utility-like economic infra assets with private sector ownership</td>
</tr>
<tr>
<td>Lease-Based Agreements</td>
<td>Private sector finances/builds a new asset, leases to public sector for its use for the duration of the lease, who then has the option to buy the asset at the end of the lease term using their accrued lease payments as equity; either public or private sector can operate the asset</td>
<td>Greenfield projects, state prisons/correctional facilities</td>
</tr>
<tr>
<td>LDO/BDO</td>
<td>Private sector leases (LDO) or buys (BDO) existing public asset to finance/develop (rehabilitate, modernize, expand, etc.), operate and maintain it; similar to federal enhanced use lease (EUL) model used by DoD and VA</td>
<td>Brownfield projects, can be used for both economic and social infra assets</td>
</tr>
<tr>
<td>Sale/Leaseback</td>
<td>Public sector sells existing asset to private sector to make needed capital improvements, then leases back and continues to operate it, while making lease payments to the private sector for its upkeep</td>
<td>Primarily for brownfield and social infra assets</td>
</tr>
<tr>
<td>Lease/Leaseback</td>
<td>Public sector leases existing asset to private sector to make needed capital improvements, then leases back and continues to operate it, while making lease payments to the private sector for its upkeep</td>
<td>Primarily for brownfield and social infra assets</td>
</tr>
<tr>
<td>O&amp;M Services Only</td>
<td>Public sponsor contracts private sector to operate, maintain and manage infra assets to provide service; public sponsor retains asset ownership and provide capital improvements but do not have operational or managerial competency; can have various operating revenue sharing arrangements; private sector can also choose to invest in the asset</td>
<td>Wastewater treatment; broadband service</td>
</tr>
<tr>
<td>ESCO</td>
<td>A form of OMM, energy savings/service company (ESCo) assumes upfront costs for a broad range of energy efficiency upgrades (inc. equipment lease) in exchange for a performance-based contract; ESCos are paid a fee but energy savings are guaranteed to exceed the fee, thus no additional cost to the public sponsor</td>
<td>All public buildings</td>
</tr>
<tr>
<td>Model</td>
<td>Description</td>
<td>Examples</td>
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<tr>
<td>TNC</td>
<td>Transportation network companies do not provide direct services but link other service providers to maximize operational efficiency through integration and networking</td>
<td>Uber, Lyft</td>
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</table>
APPENDIX F:
EXAMPLES OF O&M SERVICES AND OTHER AUXILIARY OPPORTUNITIES\textsuperscript{93}

To better understand O&M service only contracts and other auxiliary opportunities, a few representative real case examples are provided below. Most of these project are either on-going or recently completed and represent those cases where significant financial risks were transferred to the private sector with the public sector contributing very little investments of their own. Although most of these examples are transit-oriented development (TOD)-related small- to medium P3 projects, the basic underlying concepts still apply in local P3 context.

O&M Services Only: Innovative Technology Partner (ITP) Examples

Transportation Network Companies

• California’s Metropolitan Transportation Commission (MTC) in San Francisco partnered with Lyft, Carma, and Scoop in 2016 to launch a new carpooling service to relieve highway traffic congestion for regional commuters in the Bay Area. By using one of three TNCs, commuters are rewarded with toll-free access in Bay Area Express Lanes and reduced toll rates on state-owned Bay Area bridges.

• Pinellas Suncoast Transit Authority (PSTA) partnered with Uber, United Taxi, and Left to launch a pilot program in 2016 to offer riders a subsidized on-demand service for underserved transit areas in Pinellas County, Florida. The pilot program was one of the first of its kinds in the U.S. as of its launching date. In 2015, PSTA identified Pinellas Park and East Lake as two areas in Pinellas County where fixed-route bus service was experiencing low ridership. PSTA is considering to eliminate the fixed-route services and replace them with the on-demand service. During the six-month pilot, PSTA has agreed to pay half of the taxi or Uber fare with a maximum cap.

Innovative Technology (Energy Savings)

• Alameda-Contra Costa Transit District (AC Transit), Alameda and Contra Costa counties, CA, recently partnered with SunPower Access to install solar panels in two of its locations in Oakland and Hayward. For AC Transit, the project provides energy savings of $5 million over 25 years and, for SunPower, 100 percent of the energy they need to run their hydrogen fuel facility. The project was completely funded by SunPower.

\textsuperscript{93} For more detailed discussion on these and other O&M service and auxiliary opportunities, see Reference [55].
Other Auxiliary Opportunities:

*Real Estate Development (Joint Development, Air Right, Station Access, Easement)*

- NB Development Group (NBDG, a development entity affiliated with the athletic company New Balance) entered into an agreement in 2013 with the Massachusetts Department of Transportation (MassDOT) and Massachusetts Bay Transportation Authority (MBTA) to design, build, and fund an approximately $20 million commuter rail infill station. The station (currently under construction) is part of a larger development of approximately $500 million to deliver New Balance’s new world headquarters building and other commercial and sporting components. In addition to covering 100 percent of the station and track construction costs, NBDG also agreed to fund a portion of the operating and maintenance costs of the station for the first 10 years of operations. The new infill station provided much needed commuter station for MBTA that it could not afford, while allowing convenient access for NB’s employees.

- The Metropolitan Atlanta Rapid Transit Authority (MARTA) entered into a joint partnership with KDC Real Estate Development & Investments (KDC) to deliver an expansion to the existing MARTA Dunwoody Station. KDC is charged with developing a four-office tower campus for State Farm Insurance, the largest corporate office project in metro Atlanta’s history. The first of the four towers is located adjacent to the Dunwoody station. The station extension will include a new access point, a structure connecting the station to the new office building, providing access to the existing platform. In return for station access, KDC (on behalf of State Farm’s) agreed to finance and deliver the station expansion project under a developer’s agreement and, in exchange, MARTA granted the needed easement and supervised the construction in the active right of way. MARTA is responsible for owning and maintaining the public property while KDC will own and maintain the private portion of the extension.

*Marketing (Advertising)*

- Hillsborough Area Regional Transit (HART) in Tampa, Florida, has recently partnered with the private firm Commuter Advertising to provide GPS-enabled advertising technology, including digital onboard media and public rider announcements to generate additional revenue for its system. HART grants Commuter Advertising exclusive access to install its technology to play both public service and paid advertising announcements on all of its vehicles. The partnership, which bears no cost to HART, generates monthly revenue for the system by securing paid private advertisements. With this technology, businesses can chose specific stops for targeted advertising using an online map. HART and Commuter Advertising have a revenue sharing agreement with a minimum guarantee for first five years.
References


