Maximizing the value of New York's investment in public construction:

THE ROLE OF Design-BUILD PROCUREMENT

Revitalizing. Rebuilding. Rethinking.

New York infrastructure needs improvement and expansion. Greater investment is likely required and current tax dollars must be used more effectively. One solution: Design-Build.

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This report has been researched, authored and published by The NYU Rudin Center for Transportation Policy and Management. This report was made possible through generous sponsorship from RBC Capital Markets and the Association for a Better New York. Sponsors were not asked to endorse the report nor are they responsible for any errors or omissions contained in the report.

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This report is meant to shed light on the history, implementation, and outcome of Design-Build construction, and to make recommendations on where this process might provide a more efficient and effective method for investing public resources in infrastructure projects throughout the state.

Cover image: Tappan Zee Bridge, Hudson River, NY

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EXECUTIVE **SUMMARY**

In 2011, the New York State Legislature approved and Governor Andrew Cuomo signed into law the New York State Infrastructure Investment Act. The new law authorized five state agencies – the Department of Transportation, the Department of Environmental Conservation, the Office of Parks, Recreation and Historic Preservation, the New York State Thruway Authority, and the New York State Bridge Authority – to manage the delivery of construction projects using a method known in the industry as "Design-Build."

Design-Build is a form of project delivery in which a public agency or private sector owner enters into a single contract with a single entity (usually a construction firm) that takes full responsibility for both design and construction of the project. The 2011 law also authorized the five agencies to hire firms based on qualifications and innovation, not just the lowest bid.

When used appropriately, Design-Build can effectively reduce the time required to complete a project, reduce the cost of a project, provide clearer accountability for a project, and encourage more innovation in design and construction.

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Design-Build had extremely limited use in New York prior to the 2011 legislation, which was written to expire at the end of 2014. In January 2014, the Governor proposed that Design-Build be made permanent, and that it be extended to other state agencies. The State Legislature did not, however, act on that recommendation in 2014. In March 2015, lawmakers approved the extension of the five agencies' Design-Build authority through March 2017, but did not expand it to include other State agencies or any local governments.

Forty-one states and many countries have authorized the use of Design-Build for all or most public construction. New York lags behind in utilization of Design-Build due, in part, to the restrictive nature of New York's legislation.

The need has never been greater for New York State's agencies and local governments to use Design-Build procurement. Across the state, key pieces of infrastructure are crumbling and need to be rebuilt. The funds are available, whether from increased federal subsidies that aim to repair damages caused by Hurricane Sandy and harden against future storms, or from ad hoc funding sources like recent settlements with financial institutions. Further, capital market conditions are currently favorable. Interest rates are low and private investors are poised to participate in the financing of public infrastructure projects. Accelerating the pace and improving the efficiency of public construction will allow taxpayer dollars to stretch further and will put more New Yorkers to work in high-quality jobs paying good wages.

This report provides background information on the growth of Design-Build procurement, provides examples of its use in New York and other states, assesses the benefits and limitations of Design-Build, explains why New York should move quickly to enact legislation permanently authorizing

the use of Design-Build by all State agencies and local governments, and provides recommendations on several issues that have arisen in connection with the use of Design-Build.

Key Findings & Highlights

- Design-Build can streamline the procurement process and save taxpayers time and money.
- As of 2014, 41 states authorized the use of Design-Build for all or most public construction.
- New York State is one of only nine states to have limited Design-Build procurement.
- The Federal Highway Administration has found that Design-Build reduced a project's completion time by 14 percent and on average shrunk costs by three percent.
- The New York State Department of Transportation saved nine percent on the first nine Design-Build contracts it entered into after the 2011 legislation was passed.
- The new Tappan Zee Bridge is being constructed for about 30 percent less than the New York State and Federal Highway Administration's early estimates.
- The Center for an Urban Future estimates that New York City needs $47.3 billion to repair its infrastructure. Increased use of Design-Build would allow the City to meet this need more efficiently and would help ensure that the City's taxpayers obtain better value for their money.

PART ONE: DESIGN-BUILD – AN OVERVIEW

Starting in the 1930s, federal agencies were generally required to contract separately for the design of building and infrastructure projects, and for the construction of those projects. Since the late 1990s, however, federal procurement rules have allowed the use of Design-Build and it is now regularly used by many federal agencies.

Design-Build is a method for delivery of construction projects in which the responsible public agency or private sector owner contracts with a single entity that takes on full responsibility for both the design and construction of the project. This differs from the more traditional "Design-Bid-Build" method, in which the public agency or private owner first selects a design contractor (or has the design work done in-house), and solicits bids from construction contractors only after the design is substantially completed.

Design-Build procurement is often (although not always) combined with other approaches to improving project delivery, such as "qualifications-based" or "best-value" selection. Rather than requiring selection of the contractor who offers the lowest price, best-value selection allows the responsible agency to choose the contractor or team that offers the best overall value, taking into account factors such as qualifications, proposed use of innovative approaches to helping the agency meet its objectives for the project, and past performance on similar projects, as well as cost.

Other variations on Design-Build include:

- Design-Build-Finance projects, in which the contractor is responsible not only for designing and building the project, but for financing its construction. This approach is most commonly used with projects that produce an ongoing, fairly predictable stream of revenue, such as new toll roads or bridges.

> ***"Design-Build procurement is often (although not always) combined with other approaches to improving project delivery, such as "qualifications-based" or "best-value" selection."***

- Design-Build-Operate projects, in which the public agency contracts with a firm or team not only for design and construction of the project, but for its ongoing operation as well.

Design-Build-Finance and Design-Build-Operate are particularly well-suited for (and are often used in) public-private partnerships – contractual arrangements that allow public agencies to take advantage of the private sector's resources, profit motive and market discipline to increase needed investment in public facilities.

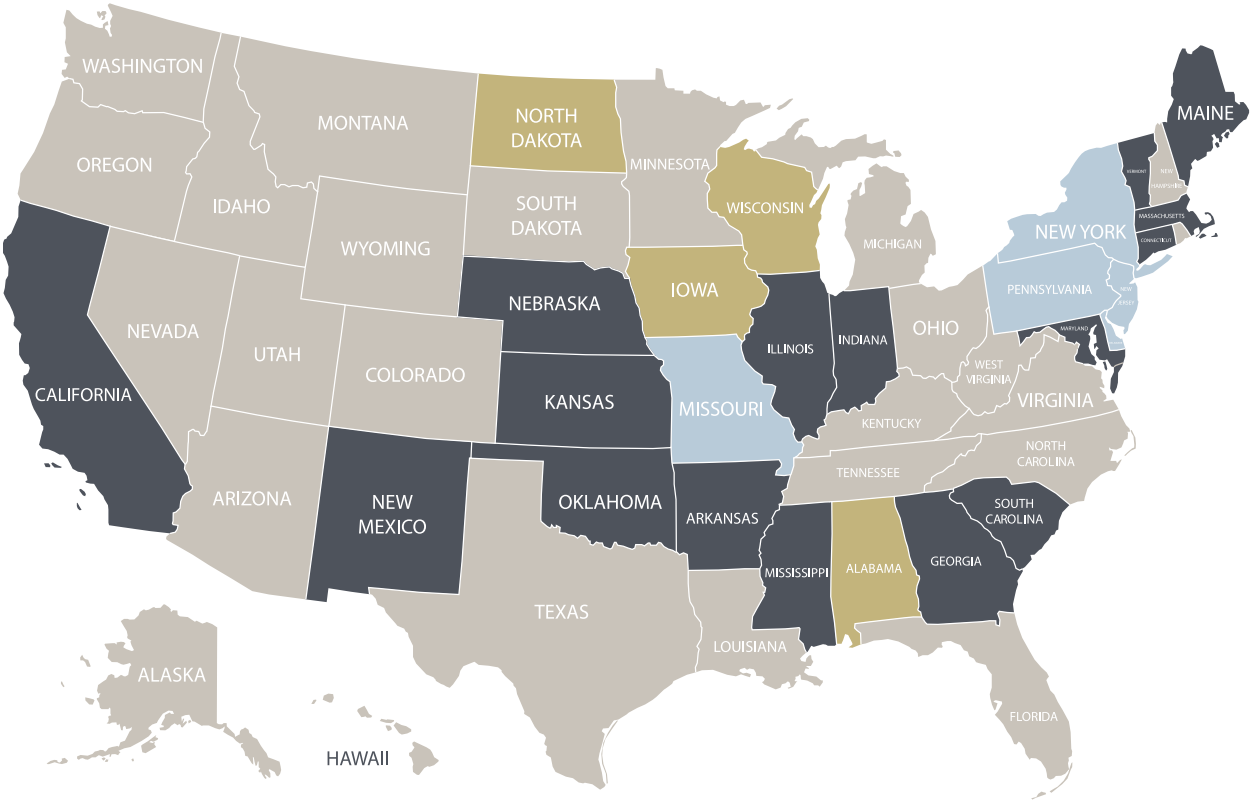
The growth of Design-Build procurement

What today is called Design-Build procurement was the norm throughout most of history, as "master builders" were responsible for both functions. Separation of design from construction began in the second half of the nineteenth century, with the emergence of architecture and engineering as recognized professions. With the passage of the Miller Act in 1935, Congress effectively required separate contracting for design and construction on federal projects, and many states followed the federal lead. During the Second World War, the federal government often reverted to Design-Build arrangements to expedite military construction, but after the war, Design-Bid-Build once again became the standard approach to public construction.

Design-Build procurement never disappeared, however, and in the 1970s some states began to use this method of project delivery to expedite construction of schools and university buildings.

In the 1990s, the federal government began to focus once again on the potential advantages of Design-Build as part of the Clinton administration's efforts to streamline government operations. It has been used with greater frequency since the late 1990s, when federal rules governing procurement of construction services were amended to provide a common framework for use of Design-Build contracts. By 2010, for example, Design-Build contracts accounted for about 75 percent of all new construction work done for the U.S. Navy and the Bureau of Prisons was using Design-Build on nearly all of its projects.[1]

Figure 1: Design-Build authorization by state, February 2014



- Design-Build is limited to one political subdivision, agency or project
- Design-Build is a limited option
- Design-Build is widely permitted
- Design-Build is permitted by all agencies for all types of design and construction

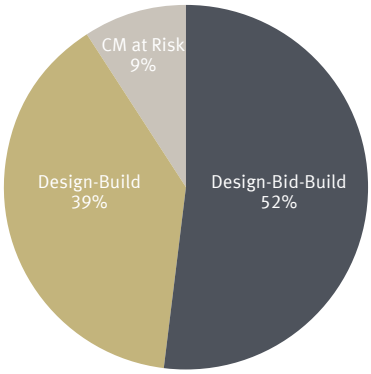
Source: The Design-Build Institute of America

At the same time, the Design-Build method of project delivery was becoming more widespread at the state level.

- As of 1993, only two states – Virginia and Idaho – specifically authorized regular use of Design-Build, while Florida allowed its use only in limited circumstances.
- By 2000, nine states allowed widespread use of Design-Build on state construction projects and 13 (including New York) allowed its use on a highly limited basis.
- As of February 2014 (as shown in Figure 1), 25 states authorized all state agencies to use Design-Build for all types of construction, and 16 allowed it to be used widely. Five states (including New York) allowed its use by some agencies for some types of projects; and four states limited the use of Design-Build to a single agency, locality or even a single project.[2]

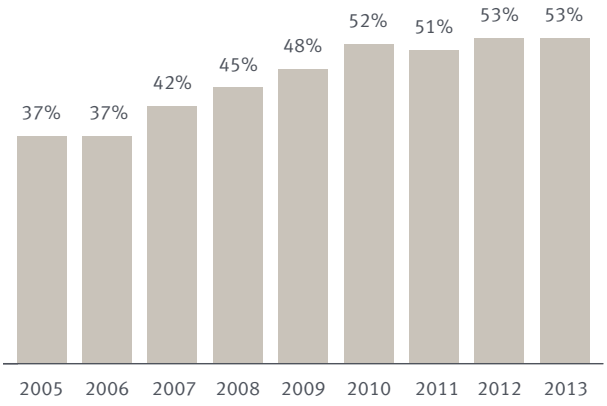
Growth in the use of Design-Build is evident in data published in 2014 by R.S. Means, a leading provider of information on construction costs. For all public and private construction work (excluding single-family homes) in the U.S., R.S. Means found that Design-Build projects increased from 28 percent of the total dollar value of construction in 2005 to 39 percent in 2013. During the same period, Design-Bid-Build projects fell from 67 to 52 percent of the market; and a third method of project delivery, known as "Construction Manager (CM) at Risk," grew from four percent to nine percent (as shown in Figure 2).[3]

Figure 2: Design-Build projects as a share of total U.S. construction spending, 2013



Source: R.S. Means

Figure 3: Design-Build projects as a percentage of the total value of U.S. construction projects of more than $10 million, 2005-2013



Source: R.S. Means

1. Susan Hines, "10 years of Design-Build: federal agencies tally the benefits," Government Product News, April 1, 2010
2. Design-Build Institute of America

Growth in the use of Design-Build procurement is even more evident when we focus on larger projects. R.S. Means reports that on projects with a value of more than $10 million, Design-Build projects increased from 37 percent of all U.S. construction (excluding single-family homes) in 2005 to 53 percent in 2013 (as shown in Figure 3).[4]

While its use is now widespread throughout the construction industry, in recent years the use of Design-Build has grown most rapidly in the transportation infrastructure sector. Both the number and the total dollar value of Design-Build transportation projects in the U.S. (including roads, bridges, rail transport and airports) doubled between 2009 and 2014.[5]

3. R.S. Means, Design-Build project-delivery market share and market size report, May 2012, p. 6
4. Ibid, p. 7
5. Design-Build Institute of America, "Fact Sheet: Design-Build Transportation," 2015

PART TWO: DESIGN-BUILD PROCUREMENT – SELECTED EXAMPLES

In recent years, both public agencies and private-sector owners have used Design-Build on a wide range of construction projects. Some particularly notable examples are cited below.

New York State: Building a new Tappan Zee Bridge

After more than a decade of planning, deliberation and debate, the New York State Thruway Authority in 2012 solicited proposals for design and construction of a new bridge to replace the 58-year-old Tappan Zee Bridge. A 2006 engineering report found that the bridge was "vulnerable to local or major collapse from a number of different causes;" and a 2009 assessment found that the rate at which the bridge was deteriorating was "unusually high." The strain on the bridge was intensified by the volume of traffic it carried – an average of about 140,000 vehicles each day — roughly five times the volume it carried in 1960.[6]

In July 2012, the Thruway Authority received proposals from three consortia of bridge-builders, and in October 2012 selected Tappan Zee Constructors (TZC), a group that includes Fluor Enterprises, the American Bridge Company, Granite Construction, Traylor Brothers, HDR, Buckland & Taylor, URS, and GZA. TZC's price for construction of the 3.1-mile-long, eight-lane, twin-span crossing was $3.14 billion – the lowest of the prices proposed by the competing teams. With an additional $700 million budgeted for contingencies and $100 million for the Thruway Authority and other agencies involved in managing the project, as of January 2013 the total cost for construction of the new bridge was estimated to be $3.9 billion – about 30 percent below the State's and the Federal Highway Administration's $5.6 billion estimate for the project cost; and 15 percent below the total cost estimate of $4.64 billion that had been used in the Draft Environmental Impact Statement, which, unlike the early estimate, had assumed the use of Design-Build.

After a contract was executed and a formal "notice to proceed" was issued, TZC began work on the long-awaited new bridge in January 2013. The first span is scheduled to be completed and opened to westbound traffic in December 2016. By February 2017, eastbound traffic will also move from the old bridge to the first new span. By late 2017, the second (eastbound) span will also be completed, and eastbound traffic will shift from the westbound to the eastbound span. Any other remaining construction work, as well as demolition of the existing bridge, is scheduled to be completed by April 2018.

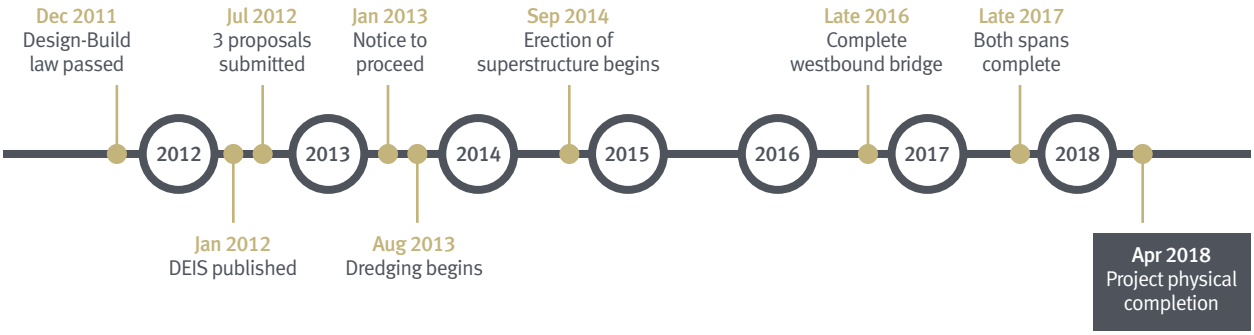
At five years and three months, TZC's schedule for completion of the project was about 18 months shorter than the time that would have been required to complete a new bridge using the Design-Bid-Build method.

Elements of TZC's proposal that are helping to reduce the time needed to complete the project include the off-site pre-fabrication of large sections of the bridge, which are then lifted into place using one of the world's largest and most powerful floating construction cranes, dubbed "I Lift NY." TZC credits this approach with shaving several months off its schedule. Use of "I Lift NY" will similarly help speed the dismantling of the old bridge after its replacement is completed.

While the impact of Design-Build on the construction of a new Tappan Zee Bridge cannot be fully evaluated until the

6. Andrew Rice, "Falling Down," New York, January 27, 2013

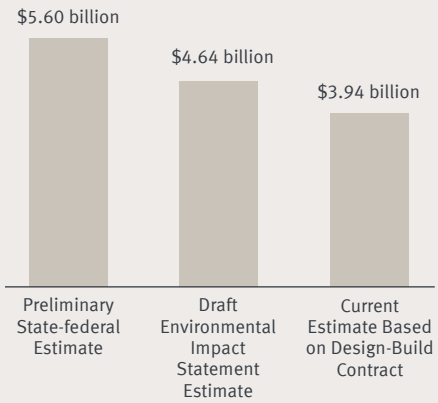
Figure 4: TZC's schedule for completion of the Tappan Zee Bridge project



Source: Tappan Zee Constructors

Design-Build Procurement—Breakdown of Savings—New Tappan Zee Bridge

- **$1.7 billion:** Construction Cost Savings ($5.6 billion reduced to $3.9 billion)
- **18 months:** Construction Time Savings
- **$150 million:** Additional savings from quicker elimination of the cost of existing bridge maintenance



project is complete, clearly, the combined impact of using Design-Build procurement and best-value pricing will be positive. Assuming, for example, that construction costs escalate at five percent annually, reducing the completion time by 18 months should by itself translate into a cost savings of more than $200 million.

Similarly (as noted above), completing the project 18 months earlier than would have been possible under a Design-Bid-Build scenario will allow the Thruway Authority to save money – on the order of $150 million – that would otherwise have been necessary to maintain the existing bridge before it was able to be torn down.

Estimating the total dollar savings that can be attributed to the use of Design-Build on this project is complicated by the fact that the new bridge is also being built under a project labor agreement (PLA). A project labor agreement is a formal agreement between an owner (in this case the Thruway Authority) and the relevant labor unions that spells out the rules governing employment on the project. PLAs essentially involve a trade-off. The participating unions agree to a series of provisions aimed at improving the efficiency of day-to-day operations, achieving savings

on labor costs, and minimizing the risk that the project could be disrupted by strikes or jurisdictional disputes. In exchange, the owner agrees that all of the on-site work will be done using union labor, paying union wages.

In June 2012, the Thruway Authority, the New York State Building & Construction Trades Council and union locals in Westchester and Rockland Counties entered into a PLA governing the construction of the new Tappan Zee. The agreement:

- Standardized hiring procedures;
- Incorporated previously-established goals for employment of minorities and women;
- Required that at least 25 percent of work on the project (by trade) be done by apprentices;
- Provided increased flexibility on scheduling and work hours;
- Set out common procedures for expedited resolution of disputes; and
- Barred strikes, work stoppages or other disruptions of work on the project.

When the agreement was signed, the State estimated that these and other provisions taken together would reduce the cost of the new bridge by $452 million. While the Tappan Zee PLA will no doubt produce significant savings, the State's estimate is not easily verified – especially since some of the savings attributed to the PLA may overlap with those subsequently attributed to the use of Design-Build.

> ***"In addition to other advantages regularly associated with Design-Build procurement, this public-private partnership ensures that the long-awaited construction of a replacement for the Goethals Bridge can proceed without up-front financing from the PANYNJ..."***

Nevertheless, it is important to note that the PLA will provide a variety of other benefits – for example, with regard to the hiring of minorities and women, and the use of apprentices – that go beyond direct cost savings. In this regard, the PLA is vital to providing job training and ensuring important populations are being employed.

Port Authority of New York and New Jersey: Goethals Bridge

The Goethals Bridge is a 1.3-mile, four-lane vehicular crossing that connects the west shore of Staten Island to New Jersey. The Goethals has long been one of the Northeast's most important bridges, connecting Staten Island, Brooklyn, Queens and Long Island to the massive Newark-Elizabeth port and airport complex, the New Jersey Turnpike and the interstate highway network. While structurally sound, the Goethals, which was built in 1928, is functionally obsolete.

In 2012, after years of planning, The Port Authority of New York and New Jersey (PANYNJ) — which built and still owns and operates the Goethals — solicited proposals for design, financing and construction of a replacement bridge. In April 2013, the PANYNJ awarded a forty-year contract to NYNJLink, a collaboration between Macquarie Group, a global infrastructure financing and asset management firm, and Kiewit Development Corporation. NYNJLink is responsible for financing construction and maintenance of the facility in return for annual payments from the PANYNJ over the life of the contract.

Under this agreement, a contract for design and construction of the new bridge was awarded to Kiewit-Weeks-Massman, a joint venture of Kiewit Infrastructure, Weeks Marine and Massman Construction, with Parsons Transportation Group as the lead design partner. Work on the new bridge commenced in May 2014 and is scheduled for completion in 2018.

The total cost for replacement of the bridge will be $1.5 billion, about 10 percent below what the Port Authority

estimates it would have spent to build the new bridge as a conventional public construction project.

In addition to other advantages regularly associated with Design-Build procurement, this public-private partnership ensures that the long-awaited construction of a replacement for the Goethals Bridge can proceed without up-front financing from the PANYNJ – an agency whose capital capacity is already under pressure from the demands of rebuilding the World Trade Center, reinvesting in the region's airports, subsidizing the PATH system and financing other projects of interest to the governors of New Jersey and New York. The PANYNJ is obligated to pay NYNJLink over the next forty years for building and maintaining the new crossing, but that obligation is subordinate to the Authority's obligation to its bondholders.

Rebuilding other New York highways and bridges

Since the Infrastructure Investment Act was signed in December 2011, the New York State Department of Transportation (NYSDOT) has entered into 11 Design-Build contracts covering a wide-range of projects, with a total dollar value of more than $900 million. These projects have included:

- The bundling of 54 bridge projects into three contracts;
- Two projects on Route 347 in Suffolk County;
- Access improvements to I-390 in Monroe County;
- Renovation of the Rochester Train Station; and
- Construction of a new bridge to replace the existing Kosciuszko Bridge, which carries the Brooklyn Queens Expressway across Newtown Creek.

For the first nine of the 11 contracts awarded under the 2011 legislation (as of the fall of 2014), Design-Build contract prices totaled $777 million – 8.8 percent below the Department's initial cost estimates.

By far the largest of the 11 is a contract for construction of a new bridge to replace the existing Kosciuszko Bridge, the span that carries the Brooklyn-Queens Expressway across Newtown Creek. As of 2014, the Kosciusko Bridge carried about 160,000 vehicles per day – even more than the Tappan Zee. Prior to enactment of the 2011 legislation, NYSDOT engineers had estimated that construction of a new bridge and removal of the old structure would cost more than $1 billion, and that the project would not be completed until at least 2021.

After soliciting Design-Build proposals from three pre-qualified contractors, the Department selected a team that included Skanska, Kiewit and ECCO III, with HNTB as lead design firm. The Skanska-Kiewit-ECCO team proposed that the project be done in two phases. In the first phase, a new eastbound span would be built with sufficient capacity to carry current traffic volumes in both directions, and the existing bridge would be dismantled. In the second phase, a second span would be constructed, which would then carry westbound traffic. NYSDOT contracted with the winning team to complete the first phase of the project by the spring of 2018, at a price of $555 million.

The NYSDOT has signed PLAs on several, but not all, of its Design-Build projects. The use of a PLA on the construction of the new Kosciuszko Bridge – a large, complex, multi-year project – helped to ensure that the potential benefits of Design-Build were fully realized.

Construction started in the fall of 2014. As of April 2015, the project is on-budget and slightly ahead of schedule. NYSDOT now expects the first new span to be substantially completed before the end of 2017. The second phase – which will be contracted separately – could begin early in 2018 and be completed by mid-2020.

Using Design-Build, NYSDOT will have a new, fully functioning two-way bridge completed and open three years earlier than it had originally expected, at a significantly lower cost, with the option to add a second span immediately thereafter.

NYSDOT emphasizes that while there can be real cost savings from using this form of project delivery, other benefits derived

from using Design-Build and best-value selection can be greater than any direct cost savings. For example:

- Best-value selection allows the Department to take into account factors such as the use of innovative techniques for minimizing disruption of traffic. Using pre-cast concrete segments, Design-Build contractors completely reconstructed a bridge on the Hutchinson River Parkway in just 96 hours.
- Shortening time to completion means that NYSDOT can more quickly deliver the public benefits of new and improved facilities, including reduced travel times, greater safety, greatly improved traffic monitoring technology, etc.

NYSDOT's experience also demonstrates that lessons learned in managing Design-Build projects can be applied to more traditional Design-Bid-Build projects. Rather than viewing project planning, design and engineering, contractor selection and project implementation as separate, sequential tasks, all managed by different groups of people, the Department has recognized the importance of treating them as part of an integrated, collaborative process. Within this framework, the Department's planners and engineers, the design firm and the contractor all work together to produce the best possible result. Design-Build contracts may be particularly well-suited for this approach – but experience with Design-Build can also shape the management of projects on which the Department contracts separately for design and construction.

With the extension of the Design-Build provisions of the Infrastructure Investment Act into 2017, NYSDOT will soon be moving ahead with other projects. As of April 2015, the Department had thirteen additional Design-Build contracts in its project pipeline.

Replacing Minnesota's busiest bridge

On August 1, 2007, a portion of the I-35W St. Anthony Falls Bridge in Minnesota — the state's busiest bridge that carried eight lanes of interstate highway traffic across the Mississippi River — suddenly collapsed, sending 13 people to their deaths and injuring 145. Within days, the Minnesota Department of Transportation (MnDOT) had begun planning a replacement for the failed bridge, arranging federal funding and securing regulatory approvals.

The Department quickly issued a request for qualifications, and solicited Design-Build proposals from several qualified contractors. Using a "best value" selection process, MnDOT awarded the contract to a joint venture of Flatiron Construction and Manson Construction, with FIGG Bridge as the designer. Flatiron-Manson's price was not the lowest, nor was its proposed schedule the quickest but the Department concluded that the joint venture's proposal offered the best overall value in terms of quality, cost and time to completion for finishing ahead of schedule.

The Flatiron-Manson team started in October and moved quickly. As design work was completed and construction was getting underway, Flatiron-Manson negotiated a PLA with the Minneapolis Building and Construction Trades Council. In exchange for a commitment that all work on the project be done with union labor, the Council agreed that there would be no strikes or other work stoppages during the life of the project, and agreed to changes in work rules that allowed construction work to continue 24 hours a day, seven days a week.

The replacement for the failed bridge was built as two parallel spans, each with five lanes and shoulders of 13 to 14 feet. Both were built wide enough to allow MnDOT at some point in the future to convert one lane in each direction to bus rapid transit or light rail. The new bridge was completed and opened to traffic on September 18, 2008 – less than 14 months after the old bridge collapsed, and three months ahead of the schedule called for in Flatiron-Manson's contract. The final cost of construction was $251 million, including bonuses paid to the contractors for finishing ahead of schedule. Even after payment of these bonuses, the final cost of the project came in well below early estimates of $300 to $350 million.

Building a new hospital at Camp Pendleton

In 2009, the U.S. Navy authorized construction of a new hospital at Camp Pendleton, California, as a replacement for an older, outdated facility. The planning, design and construction of new military hospitals is typically a five-to-seven year process; but because it was being funded under the American Recovery and Reinvestment Act, development of the new Camp Pendleton Hospital was subject to tighter time limits. The Navy chose Design-Build as the most expeditious way to complete the project.

Ensuring that the new facility met all of the Navy's programmatic requirements – and the needs of the medical personnel who would staff it – was a priority. Toward that end, before it selected a contractor, the Navy retained HDR Architects to define in detail the owner's programmatic and technical requirements. These documents gave prospective bidders a head start on design and a clear definition of the Navy's priorities, without hindering the opportunity to provide efficiencies and other technical expertise through the remainder of the design work.

The Design-Build contract was awarded to a joint venture of Clark Construction, the McCarthy Building Company, and AKS Architects. To ensure as smooth a transition as possible, members of the Navy-HDR team co-located and worked side-by-side with the designers.

In the end, the Clark-McCarthy team completed a new 518,000 square-foot hospital, a 21,000 square-foot utility building and a 546,000 square-foot parking structure in 49 months (six months ahead of schedule), at a cost of $447 million – more than $82 million below the amount budgeted by the Navy. Although change orders often add five to 10 percent to the original contract price of major construction projects,[7] change orders requested by Clark-McCarthy on the Camp Pendleton replacement hospital amounted to less than two percent of total cost.

> *"While [in the Camp Pendleton project] the savings achieved through the use of Design-Build were significant, the project's ultimate beneficiaries are the 70,000 active-duty and veteran service men and women who, along with their dependents, rely on the hospital for high-quality healthcare."*

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Improving mobility in Maryland

For the past twenty years, the area between Baltimore and Washington D.C. has driven much of the growth of Maryland's economy. Along with that growth, however, have come increased travel demand, traffic congestion and stress on local roadways. To improve mobility in this critical area while also protecting the environment, in 2007 the Maryland State Highway Administration launched the Intercounty Connector (ICC) project.

The ICC is a $1.5 billion, 18.8-mile, six-lane limited-access toll road that connects the Shady Grove area in Montgomery County (the heart of Maryland's booming life sciences sector) with I-95 in Prince George's County. To manage the flow of traffic more effectively – both on the new highway itself and on the roads to which it connects – the ICC combines all-electronic toll collection with variable pricing.

The State Highway Administration used a best-value selection process to choose five Design-Build teams,

7. Engy Sevag and Amr Oloufa, "Change Orders' Impact on Project Cost," American Society for Engineering Education, 2007

Camp Pendleton Hospital,
Camp Pendleton, CA

Chobani Production Facility,
Twin Falls, ID

Goethals Bridge Rendering,
New York-New Jersey

St. Anthony Falls Bridge,
Montgomery County, MD
(before and after)

with each team responsible for design and construction of a specific segment of the new highway. While cost and schedule were important considerations, perhaps even more important was the State's desire to take advantage of the winning teams' innovative approaches to designing and building complex interchanges, protecting environmentally sensitive areas, and addressing local community concerns.

For one particular section of the Connector, for example, the Design-Build team developed a stormwater management system designed to minimize impacts on the watersheds the new highway traverses; permanent fencing to keep deer off the highway; a series of escape ramps designed to make it easier for animals that did get onto the right-of-way to find their way off; and culverts that allowed fish and small animals to pass under the roadway.

The first section of the ICC was completed and opened to traffic in February 2011, with other sections following in 2012 and 2013. Final connections to several other major highways were completed in the fall of 2014.

Seizing an opportunity for growth in Idaho

Since its founding in 2005, Chobani has emerged as one of the leading producers of yogurt in the U.S. To keep up with rapidly-growing demand for Greek yogurt, in 2011 New York-based Chobani decided to build a second production facility in the western U.S., and selected Twin Falls, Idaho as its preferred location.

Chobani's initial feasibility studies had concluded that using a Design-Bid-Build approach, the project would take two years to complete. Believing that time-to-market was critical to its success, the company's leaders instead pushed to have the new plant completed in 10 months. After interviewing eight firms, Chobani chose Indiana-based Shombaugh & Sons to deliver the project under a Design-Build contract.

To shorten the time needed to begin construction, Chobani gave the Shombaugh team a detailed set of functional requirements, but no drawings. Working together, the owner and the contractor identified major elements of the project that could be moved quickly, including utilities and the construction of warehouse and distribution space, while the plant's production facilities were still being designed. Owner and contractor representatives worked closely together throughout the process to identify and discuss issues as they arose, and to make quick decisions.

After the groundbreaking in December 2011, foundation work started in January 2012. Construction of the one-million-square-foot, $450-million facility – the world's largest and most efficient yogurt plant – was completed n 326 days, less than half the time originally envisioned. The plant was up and running by mid-December 2012. As of mid-2014, the Twin Falls plant employed more than 500 people.

PART THREE: LESSONS LEARNED – THE BENEFITS & LIMITATIONS OF DESIGN-BUILD

As the preceding examples attest, Design-Build offers a variety of benefits to public construction agencies, private-sector owners, and to the public at large. Nevertheless, it is not in every circumstance the most suitable method for procuring construction services. This part of the report briefly highlights the principal benefits of Design-Build, and notes, as well, several situations in which other project delivery methods may be preferable.

The benefits of Design-Build procurement

Practitioners of Design-Build procurement, owners who have used it and other advocates have cited a variety of benefits.

Reducing time to completion

Reducing the time required to complete construction projects is the clearest benefit provided by Design-Build. With Design-Build, the sponsoring agency undergoes the public procurement process only once rather than twice. This by itself will typically shave months off a project's schedule.

Other features of Design-Build can also produce time savings.

- With a single Design-Build contract in place, the contractor can often begin work on early-stage construction tasks – such as organizing the construction team, site preparation, and ordering materials – before design work is completed.
- Having a single, integrated team responsible for the entire project increases the likelihood that problems that could potentially delay completion of the project will be identified and addressed up front.

In a study of Design-Build highway projects conducted in 2006, the Federal Highway Administration found that the use of Design-Build reduced the duration of the projects surveyed (relative to similar Design-Bid-Build projects) by 14 percent.[8]

The time savings associated with Design-Build have made it especially attractive in situations where completing construction as quickly as possible is critically important – as it was, for example, in the case of the I-35W Bridge in Minnesota (described in Part Two).

Reducing project costs

Design-Build similarly offers several ways to reduce total project costs.

- Reducing time to completion can in itself be an important source of savings. When construction costs are escalating at five percent annually, reducing the time required to complete a $1 billion project by one year can translate into a savings of $30 million or more.
- Public construction in New York offers numerous examples of projects that incurred major cost overruns due in part to problems of cost and constructability that only became evident after construction was underway. Having the project managed from the outset by a single, integrated team increases the likelihood that such problems can be identified and resolved at an earlier stage in the development of the project.
- Closer coordination throughout the project also explains why Design-Build is widely seen as the most effective project delivery method for minimizing change orders. In a survey of building construction market participants conducted in 2014 by McGraw-Hill Construction, Design-Build was the method most frequently cited by contractors and architects as being most effective in reducing the need for change orders.[9]

8. Federal Highway Administration, Design-Build Effectiveness Study: Executive Summary, January 2006.

The 2006 Federal Highway Administration study cited above found that the use of Design-Build on highway construction projects reduced costs relative to the cost of similar design-bid build projects by three percent.[10]

Greater cost-certainty, clearer accountability

Both public agencies and private-sector owners may prefer Design-Build as a way to provide greater cost-certainty. In the McGraw-Hill survey cited above, contractors and architects both cited the need for a fixed construction budget or a guaranteed maximum price as an important reason for selecting this method.[11] New York State officials have also cited protection against cost overruns as one of the benefits of the Thruway Authority's contract with Tappan Zee Constructors.

It is important to acknowledge, however, that such protection is rarely absolute. Especially in the case of large, complex projects, problems can arise for which the contractor alone cannot be held responsible. Design-Build, best-value contracts are perhaps best viewed as a construct in which owner and contractor explicitly define how risks are to be shared, which provides clear lines of accountability.

Reductions in the volume and value of change orders along with contractors' claims against owners offer one indication of the effectiveness of Design-Build in making costs more predictable and more clearly defining who is responsible for them. In the case of the Camp Pendleton replacement project (described in Part Two), contractor-initiated change orders amounted to less than two percent of total contract value, and the 2006 FHwA study cited above found that both the number and value of contractors claims were "significantly lower" on Design-Build projects. The study suggested that the reduction in claims reflected the development of more collaborative, less adversarial relationships between contracting agencies and contractors under Design-Build.[12]

"Reductions in the volume and value of change orders and contractors' claims against owners offer one indication of the effectiveness of Design-Build in making costs more predictable and more clearly defining who is responsible for them."

Encouraging innovation

Coupling the Design-Build method of project delivery with best-value selection allows public agencies to take into account factors that low-bid procurement rules generally don't allow them to consider.

- Perhaps the most important such factor is the ability of a Design-Build team to offer innovative solutions to critical problems, or other innovations that offer long-term value. In the case of Maryland's Intercounty Connector, for example, the State emphasized the need for innovative approaches to the design and construction of the network of complex interchanges that the project required.
- Best-value selection also allows an agency to take into account the proposed use of new construction methods or materials that may not directly affect project cost, but can help the agency achieve other objectives, such as improved safety and greater durability of new construction.
- On a major highway or bridge rehabilitation project, the sponsoring agency might similarly want to take into account a contractor's proposed approach to maintaining the flow of traffic during the life of the project, or to minimizing the project's impact on the environment or on the surrounding community.

Benefits to users

While the direct cost savings that Design-Build provides can be substantial, the benefits that accrue to facility users may

9. McGraw Hill, p. 46 10. Federal Highway Administration, op cit. 11. McGraw Hill p. 22 12. Federal Highway Administration, op cit.

in many cases be even more significant. This is especially evident in cases where time to completion is particularly critical.

- The Minnesota Department of Transportation, for example, estimated that the collapse of the I-35W St. Anthony Bridge cost the surrounding region $400,000 a day in increased travel time, increased travel costs and lost productivity. If the use of Design-Build cut at least a year off the time needed to build a new bridge (probably a conservative estimate), by this measure the benefit of faster completion to the region's economy totaled at least $146 million.
- As described in Part Two, for Chobani the real value in using Design-Build for the construction of its new Twin Falls facility was to get the plant built and operating as quickly as possible and to increase its capacity to serve a rapidly-growing market.
- For many agencies that manage local water supply and wastewater treatment systems (including the New York City Department of Environmental Protection), federally-mandated or otherwise required capital spending is often the single most important factor driving increases in local water and sewer rates. To the extent that Design-Build can help these agencies reduce the cost of required improvements, it can over time help to hold down future rate increases as well. Moreover, because such projects are often undertaken pursuant to consent degrees or other court orders, Design-Build teams can, by delivering projects on or ahead of schedule, help the responsible local agencies avoid potentially costly penalties.

The complementary value of Design-Build and project labor agreements

New York State law currently permits but does not require the use of PLAs on Design-Build projects. As the Thruway Authority's experience building a replacement for the Tappan Zee Bridge and the Department of Transportation's experience replacing the Kosciuszko Bridge demonstrate, from the owner's perspective Design-Build contracts and project labor agreements are often complementary.

Especially on large, complex projects that can take several years to complete, both Design-Build and PLAs offer similar benefits, including:

- Potential cost savings;
- A more integrated approach to day-to-day management; and
- Reduced risk of conflicts or disruptions that might delay completion of the project.

On projects where time-to-completion is especially critical – such as the replacement of a failing bridge or the rebuilding of a highway severely damaged by a natural disaster -- the increased flexibility in scheduling and the protection against work stoppages that a PLA can provide may be virtually essential to realizing the full value of Design-Build procurement.

Design-Build: recognizing when it should not be used

Design-Build's advantages do not mean that it offers the appropriate solution for all projects. There are sound reasons why public agencies and private owners prefer other project delivery methods for certain projects.

- Design quality is sometimes a critical element in the success of major projects. Educational or cultural institutions, for example, may find it easier to secure commitments from major donors for a new building that is to be designed by a highly regarded architect. Similarly, an outstanding design by a well-known architect may aid a commercial developer in attracting a blue-chip anchor tenant, or allow a residential developer to set a higher price on apartments. In cases such as these, the owner may prefer both to select and to maintain a direct contractual relationship with the project architect – even if this requires some trade-offs on schedule and cost.
- At the other end of the spectrum, Design-Build contracts offer no real advantage on projects that require relatively little design work. In contrast to building a new highway, roadway resurfacing may not offer many opportunities to reap the benefits of Design-Build. Similarly, a park agency might already have a standard design template for new construction or renovation of playgrounds. In

cases such as these, selection of a contractor through a more traditional bidding process may be the quickest and most cost-effective way to complete the work.

- Design-Build works best when the public agency is able to define up-front, in as much specificity as possible, its programmatic, functional and design requirements, and to remain consistent in those requirements throughout the life of the project. In cases where the owner does not yet know what those requirements will be, a traditional Design-Bid-Build approach may make more sense from both the owner's and the contractor's perspectives.
- Projects that entail other types of risks and uncertainties – for example, if the owner does not fully control the site, or the project could be significantly delayed by litigation – may be better suited to Design-Bid-Build. Under Design-Build contracts, it is difficult to apportion risks such as these between the owner and the contractor. It may therefore make sense to have design work proceed under a separate contract, and wait to contract for construction until outstanding issues are resolved.
- Design-Build is thus not the right solution for every type of construction or every situation. It is, however, a tool that public agencies should have available.

PART FOUR: DESIGN-BUILD PROCUREMENT – ISSUES AND OPTIONS FOR NEW YORK

The New York State Legislature's recent two-year extension of Design-Build and value-based selection provides a near-term fix for the expiration of the Infrastructure Investment Act at the end of 2014. However, several important issues still need to be addressed.

Which agencies should be authorized to use Design-Build – and when

Design-Build is by no means a panacea – but it is a method that has proven its value over many years, in numerous states, on several types of projects and in a wide variety of circumstances. There is no real rationale for limiting its use to the agencies that are now covered by the Infrastructure Investment Act or other agency-specific statutory authorizations. All State agencies that procure construction services – and all of the State's local governments – should have the authority to use this method whenever in their judgment it makes sense to do so.

While the New York State Legislature failed to enact a broader statute in 2015, it should have, at a minimum, expanded the list of agencies covered under the law's recent extension. An expansion would have had immediate benefits for New York City agencies like the Department of Transportation (NYCDOT), Department of Environmental Protection, Department of Design and Construction, Housing Authority, and the Health and Hospitals Corporation.

Best-value selection

Experience in New York and other states shows that best-value selection is essential to fully realizing the advantages of Design-Build procurement. As is the case with the agencies now covered under the Infrastructure Investment Act, all State and local agencies should be authorized to use best-value selection as well.

Project labor agreements

In an amended budget bill submitted to the Legislature in the spring of 2014, Governor Cuomo proposed that on construction projects priced at $10 million or more, agencies' ability to use Design-Build contracts should be contingent upon entering into project labor agreements. This proposal encountered stiff resistance from upstate contractors, who saw it as an attempt by the building trades to require the use of union labor on all public-sector Design-Build projects. Their opposition to the PLA requirement was one of several reasons why the Legislature took no action in 2014 on the proposed extension of the Infrastructure Investment Act.

The building trades' interest in tying the use of Design-Build to a requirement for use of PLAs is understandable. Design-Build contracts may reduce public agencies' exposure to possible cost overruns – but they do so in part by shifting some of that risk to the contractor. Unions are concerned that contractors will try to mitigate their additional risk by exerting downward pressure on labor costs. They see PLAs in part as an opportunity to protect their members.

New York State law currently provides broad authorization for the use of PLAs but it requires that before entering into a PLA, an agency must assess its prospective costs and

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benefits on a case-by-case basis. This, in effect, leaves agencies free to be selective in their use of PLAs. NYSDOT, for example, has signed PLAs on some of its Design-Build projects, but not on others. Moreover, even when PLAs are justified in cost-benefit terms, they still have to be negotiated. Though both sides can potentially benefit, neither party is under any obligation to accept the other's terms.

Design-Build contracts and PLAs are both useful tools for achieving greater efficiency (as well as other policy objectives) in the management of public capital projects. State and local agencies should be able to use both – but neither should be contingent on use of the other.

Opportunities for small, minority and women-owned businesses

Design-Build procurement and best-value selection can provide greater overall efficiency and productivity in the delivery of capital projects, and when bundling multiple small projects into a single contract (as NYSDOT did with its three Design-Build bridge contracts) can reduce agencies' transaction costs. Such gains, however, should not come at the cost of restricting opportunities for small, minority and women-owned contractors to participate in the rebuilding of New York's infrastructure.

Agencies that use Design-Build can take several steps to address this issue. For example:

- Lack of prior experience in managing Design-Build projects should not disqualify otherwise-eligible contractors from bidding on Design-Build projects.
- Industry groups, state and local construction agencies and educational institutions that already offer programs in construction management should work together to develop and deliver training for small contractors in the planning, pricing and management of Design-Build projects.

In any legislation that expands or extends the use of Design-Build, the Legislature might also seek to address this issue – for example, by authorizing agencies to selectively "carve out" Design-Build projects below a certain threshold, on which pre-qualification and bidding could be limited to small firms.

> ***"There is no real rationale for limiting the use of Design-Build to the agencies that are now covered by the Infrastructure Investment Act or other agency-specific statutory authorizations. All State agencies that procure construction services – and all of the State's local governments – should have the authority to use this method whenever in their judgment it makes sense for them to do so."***

PART FIVE: WHY NEW YORK NEEDS DESIGN-BUILD NOW

While New York has until now muddled along without comprehensive Design-Build legislation, the need for the State's agencies and its local governments to have access to this method of project delivery is growing year by year. This is so for several reasons.

Addressing unmet needs

New York today is suffering the effects of many years of inadequate (and in some cases mismanaged) investment in its basic infrastructure and other essential public facilities. In New York City alone, a 2014 report prepared by the Center for an Urban Future estimated the investment needed to bring existing public infrastructure and facilities to a state of good repair (without adding any new capacity) was $47 billion, of which only $13 billion was funded.[13]

During the past few years, New York's backlog of construction and rehabilitation work has grown, especially due to the impact of Hurricane Sandy. If it is to sustain and (build on) the economic recovery that many parts of the State have experienced, and maintain and improve the quality of life its citizens enjoy, New York will have to address these unmet capital needs.

Utilizing available resources

Fortunately, New York is now better positioned to address these needs than it has been in many years.

- Several years of sustained recovery have strengthened State and local revenues. The State also has available to it a substantial pool of "one-shot" funds including several billion dollars from settlements with financial institutions.
- The federal government has approved several billion dollars in aid to local agencies to repair and upgrade buildings damaged by Hurricane Sandy. In November, for example, the Federal Emergency Management Agency (FEMA) committed at least $1.6 billion for major repairs, upgrading and improving storm protection at four New York City Health and Hospitals Corporation facilities – Coney Island Hospital, Bellevue, Metropolitan Hospital and Coler Specialty Hospital on Roosevelt Island. In March, FEMA also approved $3 billion for repairs, upgrading and improving resiliency at 33 public housing projects managed by the New York City Housing Authority.
- Real interest rates are low, and even if the Federal Reserve begins to raise rates later this year, they will still be low by historic standards. It thus makes sense to borrow now to help finance additional capital spending.
- Beyond the resources that public agencies can raise on their own, private investors have shown a growing willingness to participate in the financing of public infrastructure.

Improving New York's capacity to deliver capital projects

If New York is to address its pressing capital needs, and take full advantage of the resources presently available to it, the State and its local governments will have to become more efficient and more effective in planning, designing and delivering capital projects both large and small. There is no single solution to this problem – but greatly expanded use of Design-Build procurement, in tandem with best-value selection, can be a major contributor to this process.

13 Center for an Urban Future, Caution Ahead: Overdue Investments for New York's Aging Infrastructure, March 2014 p. 11

"To the extent that increased use of Design-Build and best-value selection can accelerate the pace of public investment – and also free up public capital for use on other projects – it will increase employment in construction and construction-related industries."

As the use of Design-Build and best-value selection has grown, contractors and design firms alike have developed a better understanding of how they can work together, Design-Build. The benefits that New York can derive from making greater use of the capabilities these firms have developed are far greater now than they were just a decade ago.

Moreover, as more and more firms have gained experience in the delivery of Design-Build projects, the number of qualified teams likely to be competing for state and local projects has also increased – and that too will help ensure that public construction agencies can get the best value for their money.

Creating opportunity

To the extent that increased use of Design-Build and best-value selection can accelerate the pace of public investment – and also free up public capital for use on other projects – it will increase employment in construction and construction-related industries. Jobs in these industries generally pay above-average wages. During the twelve months ending in September 2014, for example, the earnings of workers employed in New York State's construction industry averaged $64,398; and the earnings of New York City construction-industry employees, $73,206. Increasing public investment will help New York address one of the economy's most serious and most persistent problems – the continuing lag in workers' earnings.

For all of these reasons, New York should move quickly to authorize greatly expanded use of Design-Build procurement and best-value selection.

PART SIX: CONCLUSION

Today, New York is suffering from the cumulative effects of many years of inadequate (and sometimes mismanaged) investment in its basic infrastructure and other public facilities. While this is a problem not just for New York but also for the nation, it is one that Washington is unlikely to address in any significant way for at least the next few years. To remain competitive, to support future growth, to expand economic opportunity and to enhance the quality of life its citizens enjoy, the State and its local governments need to act on their own to invest more – and invest more productively – in these essential public assets.

Now is the time to increase State and local investment in public facilities. The resources that are or could be available to finance that investment will be greater in the next few years than they have been in some time. Nevertheless, the capacity of State and local governments to finance needed public investments – and their capacity to deliver public capital projects – is still limited.

It is therefore imperative that State and local agencies seek to maximize the value derived from every dollar of public capital spending. Increased use of Design-Build and best-value selection is one way to do that. Other states have used these tools much more extensively; and experience under the Infrastructure Investment Act has shown they can successfully be used here as well. It's time for New York to catch up, and to move ahead.

"It is therefore imperative that state and local agencies seek to maximize the value derived from every dollar of public capital spending. Increased use of Design-Build and best-value selection is one way to do that."

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