



**Construction+Finance in 2019  
DAY ONE: Traditional Delivery and Finance**

NYU/Tandon, 6 Metrotech, Maker Space, Brooklyn  
May 29, 2019, 8:00 a.m. to 12:00 p.m.

8:00 a.m. — 8:10 a.m.

**Registration and Welcoming Remarks**

Terri Matthews, Director, Town+Gown

8:10 a.m. — 9:00 a.m.

**The Big Picture: From Capital Planning to Project Construction**

*Moderator: Laura J. Steinberg, Professor, Syracuse/Civil and Environmental Engineering and Executive Director, Syracuse University Infrastructure Institute*

Francesco Brindisi, Deputy Director, Revenues, Economics and Policy, New York City Office of Management and Budget

Joan McDonald, Director of Operations, Office of the Westchester County Executive

Terri Matthews, Esq., Director, Town+Gown

Preston Niblack, Deputy Comptroller, New York City Comptroller’s Office

(1 CLE Credit of Professional Practice, NY Transitional & Non-Transitional)  
(1 AIA CUE Credit)



9:00 a.m. — 9:50 a.m.

**Issues in Traditional Public Infrastructure/Building Delivery: DBB, DB and O+M**

*Moderator: David Burney, Academic Coordinator of Urban Placemaking Management, Visiting Associate Professor, Pratt Institute/ Grad Center for Planning*

Mark Blumkin, Managing Director, Engineering & Construction Consulting, Deloitte Transactions and Business Analytics LLP

David Green, AREA Research

Dr. Michael Horodniceanu, Professor and Chair, Institute of Design & Construction Innovation Hub, NYU Tandon School of Engineering

Professor & Chair the Institute for Construction Innovations, Dept. of Urban and Civil Engineering, NYU/Tandon

Terri Matthews, Esq., Director, Town+Gown

David Piscuskas, FAIA, Principal, 1100 Architect

(1 CLE Credit of Professional Practice, NY Transitional & Non-Transitional)

(1 AIA CUE Credit)

9:50 a.m. — 10:40 a.m.

**New York Case Studies in Design-Build**

*Moderator: Maria Doulis, Vice President, Citizens Budget Commission*

*PANYNJ Newark Terminal 1 and DASNY ESCO Program:*

Matthew Neuringer, Esq., Managing Associate, Orrick

Herrington & Sutcliff, LLP, and Director and Co-Founder - Young Professionals in Infrastructure, Inc.

*NYS DOT Kosciuszko Bridge:*

Joan McDonald, Director of Operations, Office of the Westchester County Executive

*NYC Public Buildings:*

David Varoli, Esq., General Counsel, New York City Department of Design and Construction

*NYC Infrastructure:*

Tanvi Pandya, P.E., Senior Program Manager, New York City Department of Transportation

(1 CLE Credit of Professional Practice, NY Transitional & Non-Transitional)  
(1 AIA CUE Credit)

10:40 a.m. — 10:50 a.m.

**Break**

10:50 a.m. — 11:40 a.m.

**Issues in Traditional Public Infrastructure/Building Finance**

*Moderator: Michael Jacobson, Executive Director, CUNY Institute for State and Local Governance and Professor, Sociology Department CUNY Graduate Center*

Kenneth Bond, Esq., Adjunct Professor, Albany Law School  
Damian Busch, Director, Public Finance, Barclays

(1 CLE Credit of Professional Practice, NY Transitional & Non-Transitional)  
(1 AIA CUE Credit)

11:40 a.m. — 12:00 p.m.

**Discussion: Issues with Q and A**

*Moderator: Laura J. Steinberg, Professor, Syracuse/Civil and Environmental Engineering and Executive Director, Syracuse University Infrastructure Institute*

With All Panelists

(3.5 PDH Credits for entire Day 1 event)



**Construction+Finance in 2019  
DAY TWO: Innovative Delivery and Finance**

New York Law School, 185 West Broadway, Room WA10,  
May 30, 2019, 8:00 a.m. to 12:00 p.m.

8:00 a.m. — 8:10 a.m.

**Registration and Welcoming Remarks**

Terri Matthews, Director, Town+Gown

8:10 a.m. — 9:00 a.m.

**The Big Picture: Bringing Forward Concepts from Day One**

*Moderator: Joan McDonald, Director of Operations, Office of the Westchester County Executive*

Kenneth Bond, Esq., Adjunct Professor, Albany Law School  
Ali Chaudhry, Senior Vice President and Chief Development Officer, AECOM  
Richard J. Sobelsohn, Esq., Adjunct Professor, Center for Real Estate Studies, New York Law School, and Vice President, Legal, Cohen Brothers Realty Corporation

(1 CLE Credit of Professional Practice, NY Transitional & Non-Transitional)  
(1 AIA CUE Credit)

9:00 a.m. — 10:45 a.m.

**Case Studies in Design Build Operate Maintain**

*Co-Moderators: Kenneth Bond, Esq., Adjunct Professor, Albany Law School, and Steven Charney, Esq., Chairman, Peckar & Abramson*

*P3 101: Matthew Neuringer, Esq., Managing Associate, Orrick Herrington & Sutcliff, LLP*



*Port Authority of New York and New Jersey: Goethals Bridge:*

Jim Blackmore, Program Director, PANYNJ, and Director of the Goethals Bridge project

Stephen Howard, Director, Infrastructure and Project Finance, Barclays

Brian Smith, Esq., Special Infrastructure Counsel, Peckar & Abramson

Gerald Stoughton, Principal, Stoughton Consulting, LLC

*Port Authority of New York and New Jersey Projects (Newark Terminal 1, LGA, JFK, and Farley Station):*

Vincent Casey, Esq., Partner, Orrick, Herrington & Sutcliffe LLP

Stephen Howard, Director, Infrastructure and Project Finance, Barclays

Matthew Neuringer, Esq., Managing Associate, Orrick Herrington & Sutcliffe, LLP, and Director and Co-Founder - Young Professionals in Infrastructure, Inc.

*Multi-Utility Corridor Infrastructure and 63-20 Finance:*

Terri Matthews, Esq., Director, Town+Gown

Mitch Rapaport, Esq., Nixon Peabody, LLP

(2 CLE Credits of Professional Practice, NY Transitional & Non-Transitional)

(2 AIA CUE Credits)

10:45 a.m. — 11:00: a.m.

**Break**

11:00 a.m. — 12:00 p.m.

**Discussion: Issues with Q and A**

*Moderator:* Dr. Michael Horodniceanu, Professor and Chair, Institute of Design & Construction Innovation Hub, NYU Tandon School of Engineering

With All Panelists

(1 CLE Credit of Professional Practice, NY Transitional & Non-Transitional)

(1 AIA CUE Credit)

(3.5 PDH Credits for entire Day 2 event)

**Construction+Finance in 2019  
Précis and Course Materials**

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## FACULTY BIOGRAPHIES

**James Blackmore** is a 24-year veteran of the Port Authority of New York and New Jersey (PANYNJ), currently serving as the Program Director of the Goethals Bridge Replacement (GBR) and the Lincoln Tunnel Helix Replacement (LTHR). While just starting on the LTHR, Jim has directed the GBR from its origin in 2002, through preliminary design, a comprehensive NEPA EIS process, resulting in Records of Decision from the US Coast Guard and the FHWA, initiation and development of the P3 concept for program delivery commencing in 2010, and then guiding the Program through procurement, award and construction. The dual cable stayed structures achieved Substantial Completion and final traffic configuration in June 2018. Project punch lists and other finishing activities will complete this year. At PANYNJ, Jim has also served as the Program Director for the AirTrain Newark DBOM project that connected the regional train system to Newark Liberty International Airport. Prior to PANYNJ, Jim worked in investment banking at Rothschild North America, acquiring and developing real estate assets for major pension fund investment. Earlier experience included key construction management positions with Bechtel Power, Bechtel International, and United Engineers & Constructors in several megaprojects that included conventional and nuclear power plants and a new city in Saudi Arabia. Jim holds a BS in Civil Engineering from Drexel University and an MBA with concentrations in Finance and Management from the Columbia University Graduate School of Business. Jim was recognized by Engineering News Record in March, 2017 as a “Top 25 Newsmaker of 2016” for his long-term efforts to produce the Goethals Bridge Replacement. The Goethals Bridge has won “ENR New York Region Project of the Year for 2018”, the “2019 ASCE NJ Section Project of the Year >\$100 Million”, and other regional recognitions and awards.

**Mark Blumkin** is a managing director in the Infrastructure & Capital Projects practice of Deloitte. Mark is a civil engineer and has more than 30 years of experience that includes working with companies, institutions, and public agencies across many industries. Throughout his experience in capital projects, he has focused on providing construction risk and cost assessments, as well as advising owners on how to improve the management, control, and execution of their capital projects. He was the leader of an engagement for the City of New York in 2006 that focused on identifying the key drivers of the New York City construction cost “premium.” He worked at NYC-OMB early in his career and has an MBA from Baruch College and a BS in Civil Engineering from Union College, in Schenectady, NY.

**Kenneth Bond** is a former partner at Squire Patton Boggs, LLP. He has 45 years of experience as transaction counsel involving infrastructure and project finance including economic and industrial development, public utility, privatization of public facilities and public purpose facilities. He has represented and advised public sector issuers, corporations and financial institutions in the areas of public funds and public debt management, public sector energy projects and policy, and the development of financial services products. Ken has served on the Executive Committee of the

Municipal Law Section of the New York State Bar Association. He has been a member of the Council of the State and Local Government Law Section of the American Bar Association, having served as chair of the Public Finance Committee of the Section from 2006 to 2011, and as a member of the Legal and Legislative Committee of the New York State Government Finance Officers Association. Ken has been a governor of The Municipal Forum of New York, Inc., having served as secretary from 1993 to 2010. He is a trustee of the Citizens Budget Commission. Ken is an adjunct professor of state and local government finance law at Albany Law School and is on the advisory board of the Government Law Center of Albany Law School. He is a Fellow of the American College of Bond Counsel. Ken is admitted to practice in New York and Florida.

**Francesco Brindisi** is Deputy Director for City Revenues, Economics, and Policy at NYC Office of Management and Budget. In this role, Dr. Brindisi oversees the forecast of the City's economy, tax, and non-tax revenues, and policy analysis across a wide range of subject areas. Previously, Dr. Brindisi was Chief Economist and Senior Vice President at NYC Economic Development Corporation. Dr. Brindisi teaches urban economics, public finance, and data analysis at the School of International and Public Affairs at Columbia University. He holds a Ph.D. in economics from Columbia University and a *laurea summa cum laude* from the University of Rome "Tor Vergata."

**David Burney**, FAIA, is co-founder and director of the Urban Placemaking and Management program at the Pratt Institute School of Architecture. The graduate MS program is the first in the country to focus on the emerging field of "placemaking" as an approach to urban and community design. Mr. Burney Chairs the Board of the Center for Active Design, which supports public health by increasing opportunities for physical activity and healthy eating through the design of the built environment. The Center was established in 2012 as one of the key initiatives to emerge from New York City Mayor Bloomberg's Obesity Taskforce. Mr. Burney was Commissioner of the New York City Department of Design and Construction ("DDC") from 2004 to 2014 where he launched a City-wide "Design and Construction Excellence Initiative" with the goal of raising the quality of design and construction of public works throughout New York City.

**Damian Busch** is a Director, Public Finance at Barclays, and is an adjunct lecturer at Columbia University School of International and Public Affairs, having advised on several completed Town+Gown experiential learning projects. He has a Masters in Financial Markets from Illinois Institute of Technology and a Finance degree from Loyola University Chicago.

**Vincent Casey** is a partner at Orrick, Herrington & Sutcliff, LLP. His practice is in infrastructure partner, with more than 25 years of experience working on projects in the United States and Latin America. He regularly advises developers, financing parties, (banks, note purchasers and underwriters), governmental authorities in Public Private Partnerships (PPP/P3), and developers and lenders in all types of other project financings. Vincent's practice covers all aspect of infrastructure and energy including roads, airports, water facilities, social infrastructure and wind farms. A graduate of Tulane University



Law School and a member of the New York State Bar Association, Vincent is admitted to practice in New York.

**Steven M. Charney** is Chairman of Peckar & Abramson, the nation's largest construction law practice, regularly representing contractors that are among the top ten as reported by Engineering News Record. Mr. Charney's background couples extensive academic and hands-on experience in the construction industry with decades of experience in litigating for and providing legal counsel to contractors and developers. Throughout Mr. Charney's career, he has handled numerous construction-related disputes, in court, arbitration or in alternative dispute forums, regularly involving multimillion-dollar delay, lien, default, equitable adjustment, termination, default and construction and design defect matters. Mr. Charney's experience includes the representation of contractors and owners in connection with some of the most prominent projects built throughout the United States, including the largest private building construction project ever built in New York City at the time and numerous professional sports facilities (such as the Arthur Ashe tennis stadium and National Football League and Major League Baseball stadiums). Mr. Charney regularly guides industry associations in addressing critical issues affecting construction and development, including serving as General Counsel to leading associations. Among these contributions he drafted the first standard form agreement for "Green" building and industry leading protocols related to "toxic" mold. Mr. Charney is also the founder of the Syracuse University Infrastructure Institute and serves as an Adjunct Professor in both the College of Engineering and College of Law at Columbia University. Mr. Charney is admitted to practice in New York and New Jersey.

**Ali Chaudhry** is Senior Vice President and Chief Development Officer at AECOM. Prior to AECOM, he served as Deputy Secretary for Transportation to New York Governor Andrew M. Cuomo, overseeing policy, funding, and operations at all transportation State agencies and public authorities, including the Department of Transportation, the MTA, the Thruway Authority, the Port Authority, and the Department of Motor Vehicles. In the past, Mr. Chaudhry has served as Governor Cuomo's Deputy Secretary for Economic Development, as well as Assistant Counsel to the Governor. He has provided counsel and leadership on various economic development and infrastructure projects across the State including the LaGuardia Airport redevelopment, the new Gov. Mario M. Cuomo Bridge, the Second Avenue Subway, the MTA Capital Plan, the DOT Capital Plan, the Empire Station Complex, the Broadband Initiative, and the expansion of the Javits Convention Center. Declared "Albany's Top 40 under 40 Rising Stars of 2017" by City & State, continues to serve as the policy lead on alternative project delivery procurements for infrastructure projects, and has been involved in every piece of Design Build legislation in the State of New York. Before joining public service, Mr. Chaudhry practiced civil litigation in the private sector, focusing on employment matters.

**Maria Doulis** is Vice President at the Citizens Budget Commission. She helps develop CBC's research agenda, supervises research, and directs communications efforts, including CBC's growing online and social media presence. She is a recognized expert on New York City economic and fiscal affairs, and has written extensively on government budgeting, municipal labor relations, the public workforce, infrastructure policy, and urban competitiveness. Prior to the Citizens Budget Commission, Maria

worked for the Council of Graduate Schools and the Government Performance Project. She has an MPA degree from George Washington University and a BA from Queens College, City University of New York. She was named one of City & State's "40 under 40: Rising Stars in New York City Politics" in 2011.

**David Green** is Principal and Global Practice Leader, Urban Design at Perkins+Will and leads its urban design group worldwide and focuses on large-scale master planning and urban design projects for the firm. He has been involved in hundreds of projects in the past twenty-five years, encompassing all scales of development from individual buildings to multi-thousand acre projects across the globe and is currently working on five continents. His work focuses on issues of broadly sustainable development, particularly the creation of health and research districts in urban areas and the design and metrics that facilitate the success of these districts. He further addresses the regulatory framework within which this development occurs, and provides innovative strategies for appropriate design and policy implementation that allows for the seamless incorporation of research and healthcare specific elements in new and existing districts. David was a member of Georgia Tech College of Architecture Faculty from 1992-2013, as a Professor of the Practice of Architecture, where he taught studios focused on research both at the building level and as urban design studios. He is the current CEO of AREA Research, the non-profit research arm of the company, and lectures and publishes widely on issues of urban design, planning and architecture.

**Michael Horodniceanu** is a professor at NYU Tandon's School of Engineering, Department of Civil and Urban Engineering, and he holds the IDC Design and Construction Innovation Hub Chair. In the latter capacity, he is overseeing a new institute aimed at actively engaging stakeholders across the construction industry, including government officials, developers, contractors, and consultants in formulating new approaches to the challenges facing the city and the wider world. The institute will allow NYU Tandon's graduate students to take an active role in hands-on research and a revitalized curriculum and allow them increased opportunities to network and make connections within the industry. Dr. Horodniceanu is a transportation executive with over 40 years of academic and industry experience, and over 30 years in executive management, leading major public and private entities. He has managed complex projects and operations, including leadership in public works infrastructure; holds expertise in motivating professional and unionized workforces and in overseeing megaprojects; and has a demonstrated history of delivering on customer commitments. Prior to his current tenure at the NYU Tandon School of Engineering, he undertook various roles in government, private enterprise, and academia. Dr. Horodniceanu has been highly successful in building relationships with private and public clients as well as elected and public officials. His business experience includes serving as chair and CEO of the Urbitran Group, providing leadership for a medium size multi-disciplinary, transportation planning, engineering, architectural, and construction management firm with offices throughout the U.S. His government experience includes serving as the NYC Traffic Commissioner (1986-1990), where he was charged with day-to-day traffic operations and the reconstruction of the roadway infrastructure throughout New York City, and President of MTA Capital Construction (2008-2017), where he was responsible for the nation's largest public transportation construction program, with over \$25 billion in construction. His presence as a Tandon faculty member represents something of a homecoming for

Horodniceanu, who in 1978 graduated with a doctoral degree in Transportation Planning and Engineering from what was then known as Polytechnic University. He has also taught at Manhattan College. Over the years, he has authored numerous reports, articles, and books, and has made many public presentations. His accomplishments and commitment to the industry have earned him numerous public recognitions in New York City, the eastern region, and elsewhere throughout the nation.

**Stephen Howard** is Director and Head of Infrastructure Project Finance at Barclays. Mr. Howard has over 35 years of experience financing a broad range of infrastructure projects for public and private clients. Mr. Howard's non-recourse project finance experience spans all sectors, including transportation, water, and social infrastructure. Most recently, Mr. Howard and his team acted as financial advisor to Axiom Infrastructure in its successful bid for acquisition of Brooklyn Navy Yard. Furthermore, Mr. Howard and his team acted as financial advisor for the \$1.015 billion Ohio State University Energy Management Project, structuring advisor and private placement agent for Northleaf/InfraRed consortium's successful bid to purchase the Norwest Parkway in January 2017, \$272 million private activity bond transaction for SH-288 Project in Harris County, Texas in April 2016 and as co-senior manager on the marquee \$2.4 billion bond issuance for the LaGuardia Airport Terminal B Redevelopment Project in May 2016. In 2015, Mr. Howard's team acted as financial advisor to ACS/TIAA-led consortium for the \$826 million I-595 Refinancing, which was the first major P3 transportation project in the U.S. to be refinanced into long-term bond market port-construction, as senior bookrunner to the private concessionaire for the \$557 million Portsmouth Bypass Project in Ohio and as joint bookrunner for the first U.S. broadband P3 project – Next Generation Kentucky Information Highway. Under Mr. Howard's direction, the Barclays team served as advisor or senior underwriter for projects such as the State Route-91 in California, the North Tarrant Expressway II in Texas, Goethals Bridge Replacement Project connecting Staten Island and New Jersey, Midtown Tunnel/Elizabeth River Crossing Project in Virginia, Denver FasTracks Eagle P3 Light Rail Project, Terminal 4 Redevelopment Project at John F. Kennedy Airport and Carlsbad Desalination Plant Project in California, among others. Mr. Howard is a graduate of the Columbia University Graduate School of Business Administration and University of New Hampshire Whittemore School of Business and Economics. Mr. Howard's certifications include the FINRA Series 7 and 63 examinations.

**Michael Jacobson** is Executive Director of CUNY's Institute of State and Local Governance. Prior to joining CUNY in May 2013 to help create the Institute for State and Local Governance, Michael Jacobson was president of the Vera Institute of Justice, serving from 2005 to 2013. He is the author of *Downsizing Prisons: How to Reduce Crime and End Mass Incarceration* (New York University Press 2005). Holding a Ph.D. in sociology, he has had an ongoing academic career coupled with more than 20 years of government service. From 1998 to 2005 he was a professor at John Jay College of Criminal Justice and the Graduate Center of CUNY. He was New York City correction commissioner from 1995 to 1998, New York City probation commissioner from 1992 to 1996, and worked in the New York City Office of Management and Budget from 1984 to 1992 where he was a deputy budget director. In 2010 to 2012, Michael served as the chair of Altus, a global alliance working across continents and from a multicultural perspective to improve public safety and justice.

**Terri Matthews** is Director of Town+Gown, an open platform Citywide university-community collaboration program, based at the New York City Department of Design and Construction that brings academics and practitioners together to create knowledge in the built environment. A graduate of Boston College, Boston College Law School and New York University Wagner Graduate School for Public Service, Ms. Matthews has worked in both the public and private sectors. In addition to her public finance law experience at several national bond firms, Ms. Matthews' governmental experience at New York City spans both the legislative and executive branches. Her areas of focus have included public budgeting, public finance, performance measurement, public procurement and built environment public policy. She is admitted to practice in Massachusetts and New York.

**Joan McDonald** is Director of Operations, Office of the Westchester County Executive. Previously, Joan served as the Commissioner of the New York State Department of Transportation and as the Commissioner of the Connecticut Department of Economic and Community Development and has a Masters from Harvard Kennedy School.

**Matthew Neuringer** is Managing Associate at Orrick, Herrington & Sutcliff, LLP. Matthew's practice specializes in energy, transport and infrastructure projects, particularly public-private partnerships (PPP/P3) projects. Prior to practicing law, Matthew worked as a hedge fund analyst and chief of staff in New York State government. Matthew's prior experience in finance and government enhances his ability to deliver legal advice through a commercial lens for private and public sector clients. Matthew has advised clients across a full spectrum of energy and infrastructure assets, including telecoms, rail, highways, airport, intermodal transit, combined heat and power, social infrastructure, and waste to energy. Matthew has also advised several key state and local governments on the sufficiency of their laws to produce P3 projects in their jurisdictions. Matthew is also Director and Co-Founder of Young Professionals in Infrastructure, Inc.

**Preston Niblack** is Deputy Comptroller for Budget, Office of New York City Comptroller. As Deputy Comptroller for Budget, Preston Niblack is responsible for overseeing the work of the Budget Bureau including monitoring of New York City's fiscal and cash position, analyzing and reporting on the City budget, and issuing reports on various budgetary and economic issues. Prior to joining the Comptroller's Office, Mr. Niblack served as Director of the Finance Division for the New York City Council for six years under Speaker Christine Quinn. In this capacity, he oversaw a staff of 30 in their annual budget review, budget approval process, and fiscal analyses of legislation and other proposals. He was also the lead negotiator on the City budget on behalf of the City Council, and developed legislative and policy initiatives in budget and tax policy, housing, economic development, and other areas. Prior to this role, Mr. Niblack was Deputy Director at the New York City Independent Budget Office for eight years providing fiscal oversight and analysis of the City budget. Most recently, Preston served as Senior Advisor within the New York City Government & Regulatory Division of Manatt, Phelps & Phillips, LLP. Mr. Niblack has a Ph.D. and MPA in Policy Sciences from the University of Maryland School of Public Policy and a B.A. from Middlebury College.

**Tanvi Pandya** is the Program Director for the Brooklyn-Queens Expressway Rehabilitation Project at the New York City Department of Transportation. The BQE renovation is the largest capital project ever undertaken by the NYCDOT. With over 20 years of experience, Tanvi began her career as an engineer within the private sector with bridge projects in NY and NJ. Her roles evolved to include extensive coordination with a variety of New York City (NYC) agencies as well as NYSDOT and various permitting agencies while leading the multidisciplinary design teams in complex projects. Her projects in the metropolitan area include the Unionport Bridge Replacement and the Willis Avenue Bridge. Her passion for project delivery led her to her current role as BQE Program Director, where she is leading the effort to complete the environmental review process and spearheading the Design-Build procurement. Tanvi has a Bachelor of Science in Civil Engineering from Stevens Institute of Technology and is a professional engineer licensed in New York and New Jersey.

**David Piscuskas** is co-founder of 1100 Architect in 1983. With a belief centered around the motivational optimism that accompanies a well designed, functional, astute and beautiful building, he believes architecture is a powerful catalyst of change and growth. David has taught at University of South Florida and is a member of the faculty at Parsons School of Design in New York. David is also a Fellow of the American Institute of Architects. Specialties include civic, cultural, educational, residential and institutional architectural design with a focus on design excellence and environmental sustainability.

**Mitch Rapaport** is a partner at Nixon Peabody, focusing in tax issues related to public finance and infrastructure finance transactions. During his 30 years in practice, Mr. Rapaport has participated in a wide variety of tax-exempt financings, with an emphasis on public-private partnership transactions and other project financings. Mr. Rapaport has worked on numerous public power financings; stadium and convention center transactions; and education, infrastructure and other industrial projects. He is admitted to practice in Washington, D.C. and New York.

**Brian F. Smith** is Special Infrastructure Counsel at Peckar & Abramson. Prior to joining Peckar & Abramson, Mr. Smith served as Attorney with the Port Authority of New York and New Jersey, where he was directly responsible for all aspects of the agency's construction contracts, including advising on contractual and commercial risk, contract negotiation and joint venture contracts. He and his team handled all contract drafting, negotiation, claim avoidance and dispute resolution, and he was responsible for oversight of legal issues arising out of project implementation. Throughout the course of his career with the Port Authority, he handled and had oversight for numerous engineering & construction contracts, including design-build and Public-Private Partnerships (P3s or PPPs). Among his more recent mandates at the Port Authority, Mr. Smith oversaw the replacement of the Goethals Bridge, a Public-Private Partnership, and the Port Authority's first cable-stayed bridge construction project. Involved since the project's inception, Mr. Smith led a team of attorneys involved in all facets of project implementation including environmental review and due diligence, issues of property ownership/rights, property acquisition, third party agreements, FHWA compliance, master utility and other third party agreements, risk allocation issues, as well as the RFP development and selection process. Beyond Design-Bid-Build and PPP, Mr. Smith has significant experience in Design-Build

projects, the most recent concerning the construction of Newark-Liberty Airport's new Terminal One where he acted on behalf of the Port Authority. Mr. Smith has served the Association of the Bar of the City of New York as Secretary of the Construction Law Committee. He is admitted to practice in the State of New York and received his J.D. from Brooklyn Law School and his B.E. in Marine Engineering from the State University of New York at Fort Schuyler, Maritime College.

**Richard Sobelsohn** is an Adjunct Faculty, Center for Real Estate Studies, New York Law School, and Vice President, Legal, Cohen Brothers Realty Corporation. As Adjunct Faculty at the Center for Real Estate Studies, he teaches on Sustainable Building Law and Commercial Leasing. A LEED Accredited Professional, United States Green Building Council, Richard speaks and writes extensively on Sustainable Building Law and ethics and is a member of both the National Legal Working Group for the U.S. Green Building Council and the Strategic Advisory Committee of the Sustainable Purchasing Leadership Council. In his practice, Richard focuses on real estate development/green real estate practice areas, with focus on analyzing, structuring, negotiating and closing sophisticated real estate transactions and strategic business facilitation to formulate strategies promoting growth and profitability. He is admitted to practice in New York, New Jersey, Connecticut and Washington, D.C.

**Laura J. Steinberg** is Executive Director of the Syracuse University Infrastructure Institute and Professor of Civil and Environmental Engineering at SU. She studies infrastructure planning and management with emphasis on alternative project delivery methods, design for resilience, asset management, and the uses of infrastructure for illicit purposes. As the Executive Director of the Syracuse University Infrastructure Institute, she brings together students and faculty from colleges across the campus to study infrastructure challenges at the local, national, and international levels. She is currently leading a team of faculty from the business, policy, engineering, architecture, and information studies schools to develop and deploy an undergraduate interdisciplinary minor in Public Infrastructure and an MS in Public Infrastructure, with launches expected in 2020 and 2021, respectively. Previously, Laura was Dean of the SU College of Engineering and Computer Science, and served as a consultant with several engineering firms, including Louis Berger Inc and Geraghty and Miller. She received her Ph.D. in Environmental Engineering from Duke University and her BSE in Civil and Urban Engineering from the University of Pennsylvania.

**Gerald Stoughton** is Principal at Stoughton Consulting LLC. He spent more than 30 years at the Port Authority of New York and New Jersey, working in a variety of financial and managerial capacities. As Assistant Director of the Office of Forecasting and Capital Planning, he oversaw the agency's long range financial forecasting model, which used to determine the PA's long-term capital capacity and demonstrate its ability to satisfy financial tests required to issue PA debt. His last role at the PA was as their Director of Financial Analysis, where he was responsible for the review of financial analyses of all major projects, contracts, agreements, and leases requiring Board authorization. He also served as financial member of the RFP selection committees for both the JFK AirTrain and Goethals Bridge Replacement. For the former, he developed the PFC funding plan for the project. On the Goethals, his office brought the P3 financing approach into the PA, which was applied to both the Goethals and the LGA CTB Modernization project.

He worked on the CTB project up through the shortlisting of the developer teams. After retiring from the PANYNJ in 2014, he formed Stoughton Consulting, where he has worked on project financings using public-private-partnership (P3) structures; operational/financial/business analyses of intermodal rail facilities; advising on aviation planning and development studies; and serving on financial dispute resolution boards. He also is a public-private infrastructure advisor with Strategic Rail Finance, a Philadelphia based consulting firm. Gerry has a BA in economics from Columbia, a Masters in City and Regional Planning from Harvard's Kennedy School of Government, and an advanced professional certificate in finance from NYU's Stern School of Business.

**David Varoli** earned his Bachelor of Science (B.S.) degree in Accounting and Finance from Fordham University. Varoli received his Juris Doctor (J.D.) from Pace University School of Law, where he graduated with three honors including Dean's Award. Varoli started his legal career as a construction law litigator before going back to school, earning a Master of Law (LL.M.) in Corporate Law and Taxation from Quinnipiac University School of Law. While pursuing his LL.M, Varoli interned with the Connecticut General Assembly in Hartford, CT. After graduation, Varoli was hired in the City to be the Deputy General Counsel for the New York City Mayor's Office of the Director of Construction (ODC) to work on creating a new City agency that would be focused on the delivery of capital programs (the future DDC). David later became the Deputy Director and General Counsel for the Mayor's Office of the Director of Construction. Varoli left City Hall to take a position as the Assistant General Counsel for Corporate Affairs for the New York City Housing Authority (NYCHA). Later on, David returned to City Hall as the Deputy Director and General Counsel of the Mayor's Office of Contracts (MOC). In 2001, David joined the Department of Design and Construction (DDC) as General Counsel. David was invited, along with the Commissioner of DOI, to testify in front of a Congressional Sub-Committee studying the City's successful efforts in cleaning up the World Trade Center (WTC) site under budget and ahead of schedule. Varoli is currently Deputy Commissioner and General Counsel at DDC overseeing DDC's Law Division, Discipline Unit, Labor Relations Unit, and Discretionary Program Unit.

## EDUCATIONAL OBJECTIVES FOR CONSTRUCTION+FINANCE: 2019

*Introduction.* Town+Gown has hosted several Symposium events focusing on service delivery methodologies. See links to past events below. A major thrust of these events has been to provide educational support for increasing service delivery methodology flexibility for all public owners, including local governments like the City, in New York State. While the State has authorized broad design-build authority for its construction agencies, it has only recently begun to authorize design-build for the City on specific projects, a discussion of which is part of the first day of this event.

This recent authorization serves as the occasion to explicitly link and focus, in a multi-disciplinary manner, on construction (service delivery methodologies) and finance together for the first time. “New York’s mid-20<sup>th</sup> century ensemble of public construction laws constrains the vast majority of its public owners with 21<sup>st</sup> century capital programs . . . [and] the State’s organic set of laws under which public capital programs at all levels of government in the State are conceived, financed, constructed and maintained during and beyond their useful lives, are not only archaic, but have steadfastly resisted modernization.”<sup>1</sup> One root cause is the “divide between public finance law and public construction law that goes beyond the different titles in the McKinney’s volumes and the use of terms such as ‘public works’ and ‘public improvement’.”<sup>2</sup> Both sets of laws “responded to different historical concerns, and evolved differently over time, though both are integral to public capital programs” . . . [which] require an set of integrated finance and construction laws for the most efficient and effective use of resources.”<sup>3</sup> “These outdated laws . . . limit the ability of public sector owners to avoid costs with modern service delivery techniques and tools, some of which are also financing techniques and tools.”<sup>4</sup>

The analytic touchstone for this event is the MIT Framework, a complete functional list of delivery methodologies with explicit links to related financing options that removes “the conceptual hard-stop between public finance law and public construction procurement law . . .

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<sup>1</sup> Terri Matthews, “Blueprint for Modernizing Built Environment Law: A View from the Budget”, *Albany Government Law Review*, Vol. 6, Issue 1 (2013), p. 149.

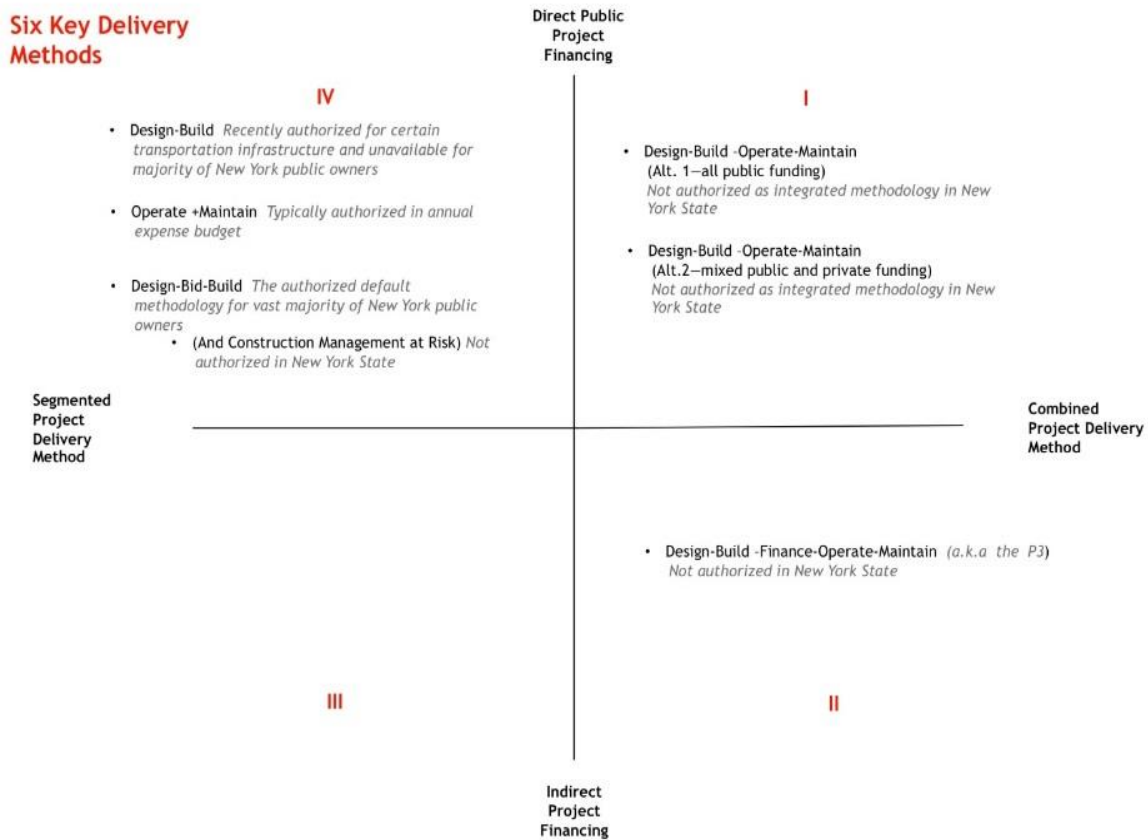
<sup>2</sup> *Ibid.*, p. 154.

<sup>3</sup> *Idem*, citing Jean-Etienne de Bettignies and Thomas Ross, “The Economics of Public-Private Partnerships”, 30 *Canadian Public Policy*, Vol. 30 (2004), p. 135 and New York City Bar Association, Construction Law Committee, *21<sup>st</sup> Century Construction, 20<sup>th</sup> Century Construction Law*, February 2008 (<http://www.nycbar.org/pdf/report/ConstructionLaw.pdf>) (hereafter referred to as “2008 Report”), p. 4.

<sup>4</sup> *Idem*, citing the 2008 Report, pp. 12-13, 16.



(which is also functionally public project delivery).”<sup>5</sup> “The MIT Framework underlies the 2007 Model Code for Public Infrastructure Procurement . . . and is consistent with economic analysis on public-private partnerships that locates the public-private partnership ‘somewhere between simple *contracting out* and a *fully private market* in the spectrum of private versus public involvement.”<sup>6</sup>



Dr. John B. Miller, “Life Cycle Delivery of Public Infrastructure: Precedents and Opportunities for the Commonwealth”, Pioneer Institute White Paper, No. 44, December 2008, p. 6 (emphases added).

“Financing and budgeting are isolated and esoteric academic and practice areas that prove difficult to link to discussions of non-budget practice, theory and law . . . [and this event] is an

<sup>5</sup> *Ibid.*, p. 160; citing John B. Miller, *Life Cycle Delivery of Public Infrastructure: Precedents and Opportunities for the Commonwealth*, White paper No. 44 (Boston: Pioneer Institute December 2008), p. 6.

<sup>6</sup> *Idem*; citing de Bettignies and Ross, *op. cit.*, p. 138 (emphasis in original).

exercise in linking to public budgeting a complex social system that is directly affected by statutory content.”<sup>7</sup>

*Continuing Educational Credit for Built Environment Professionals.* New York Law School (NYLS); New York University (NYU)/Tandon School of Engineering (Tandon) and its ICD Innovation Hub; Syracuse University/School of Engineering and its Infrastructure Institute; and, AREA Research, the non-profit research arm of Perkins+Will, are the academic partners for this event.

Day ONE will focus on the service methodologies in Quadrant IV of the MIT model above, which includes design-build and traditional public finance. This is when the event will explore issues related to the newly- authorized projects to use design-build.

Day TWO will focus on Quadrants I and II of the MIT model above—what is often referred to as public-private partnerships or P3s—which need specific legislation in New York to accomplish.

The multi-disciplinary approach in this event is reflected in the mix of academics and practitioners in architecture, engineering and law, which are critical disciplines in the Built Environment interdisciplinary field. In addition to providing basic education on the service delivery methodologies in conjunction with their financing options, the panelists, in the discussion segments, will raise a host of issues relating to risk and its allocation, the relative merits of the service delivery methods with respect to project need, and the feasibility of bringing private equity finance to the public works sector.

- **New York Law School will grant 4 CLE credits for each day to attorneys admitted to practice in New York.**

Learning objectives:

Day ONE

**The Big Picture: From Capital Planning to Project Construction** will cover the State and City laws governing “public works” and the City Charter and other operative provisions governing the process along the capital-planning-to-construction processes

**Issues in Traditional Public Infrastructure/Building Delivery: DBB, DB and O+M** will cover State and City laws and processes underlying the traditional service delivery methods discussed

**New York Case Studies in Design-Build** will discuss several actual projects, with various legal issues highlighted throughout

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<sup>7</sup> *Ibid.*, p. 150.

**Issues in Traditional Public Infrastructure/Building Finance** will discuss the State and local laws governing debt issuance

Day TWO

**The Big Picture: Bringing Forward Concepts from Day One** will discuss the legal impediments from Day One and the need for statutory reform in New York to permit P3s

**Case Studies in Design Build Operate Maintain** will discuss several actual projects, with various legal issues highlighted throughout

**Discussion: Issues with Q and A** will continue the discussions at the previous panels, highlighted the various legal issues in a focused manner aimed at the need for statutory reform in New York to permit P3s.

*New York Law School is certified by the New York State Continuing Legal Education Board as an Accredited Provider of continuing legal education in the State of New York. The school has been serving the legal education needs of the greater New York area for more than 100 years, including the continuing educational needs of its graduates and other area attorneys. Please visit [www.nyls.edu](http://www.nyls.edu) for more information.*

- **The American Institute of Architects will grant 4 CEUs for each day to New York-licensed architects.**

Day ONE Course Number - PW8001. Will focus on design-build and traditional public finance. Attendees will explore issues related to the newly- authorized projects to use design-build.

- Learning Objective 1: Gain a high-level understanding of large scale project financing from capital planning to project construction.
- Learning Objective 2: Learn about challenges in traditional public infrastructure and how it impacts building delivery.
- Learning Objective 3: Review several design-build case studies in New York.
- Learning Objective 4: Discuss project finance and planning efficiency challenges.

Day TWO Course Number - PW8002. Will focus on innovative delivery and finance for public-private partnerships or P3s—which need specific legislation in New York to accomplish.

- Learning Objective 1: Gain a high-level understanding of financing of Public Private Partnerships and the legislation needed to facilitate the process.

- Learning Objective 2: Discuss several large-scale case studies in Design Build Operate Maintain.
- Learning Objective 3: Learn about innovative financing and delivery methodologies for Public Private Partnerships.
- Learning Objective 4: Discuss Public Private Partnership financing and planning challenges.
- **NYU/Tandon will grant 3.5 Professional Development Hours for each Day to New York-licensed engineers.** Engineers seeking PDH credits will have to complete and submit an evaluation at the end of the event.

*Symposium Events in Town+Gown.* Town+Gown develops and hosts Symposium events to advance completed projects within the action research framework and they function as knowledge creation and knowledge transfer type of events—they look and feel like an academic event but have significant practitioner participation. These events are educational, with a mix of academics and practitioners presenting to an audience of academics and practitioners, and are accompanied by a précis document, which in the case of continuing education credits can include professionally-specific educational materials. Since 2011-2012, Town+Gown has hosted (often with academic and practitioner partners) 30 Symposium events in all Built Environment disciplines.

Below are links to the past Town+Gown symposium events, in reverse chronological order, which this event will push forward:

***Approximating Integrated Project Delivery in Design-Bid-Build Environment: Innovations in Design and Construction***, November 17, 2016, at

<https://www1.nyc.gov/assets/ddc/downloads/town-and-gown/111716-precis.pdf>

***Service Delivery Not Procurement—At the State Law Level***, November 12, 2014, at

[https://www1.nyc.gov/assets/ddc/downloads/town-and-gown/11.12.14\\_prcis.pdf](https://www1.nyc.gov/assets/ddc/downloads/town-and-gown/11.12.14_prcis.pdf)

***Service Delivery Not Procurement***, April 18, 2013, at

[https://www1.nyc.gov/assets/ddc/downloads/town-and-gown/SYMPOSIA\\_MAY\\_2013.pdf](https://www1.nyc.gov/assets/ddc/downloads/town-and-gown/SYMPOSIA_MAY_2013.pdf)

***Design: When Does It Begin and End?***, March 14, 2013, at

<https://www1.nyc.gov/assets/ddc/downloads/town-and-gown/DesignBeginEnd.pdf>

***Roadway.2—A Work in Progress, February 12, 2013***, at

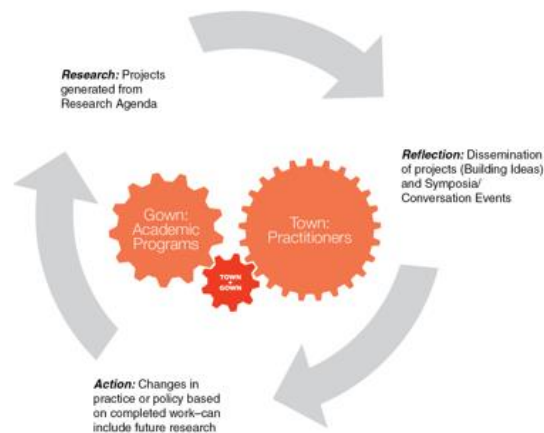
<https://www1.nyc.gov/assets/ddc/downloads/town-and-gown/Roadway.2.pdf>

**What Can Public Built Environment Data Tell Us?**, April 25, 2012, at <https://www1.nyc.gov/assets/ddc/downloads/town-and-gown/04-25-12%20Precis.Final.pdf>

**Life Cycle Costing Data for Roadways: A Precis**, February 22, 2012, at <https://www1.nyc.gov/assets/ddc/downloads/town-and-gown/2-22-12%20Precis.pdf>

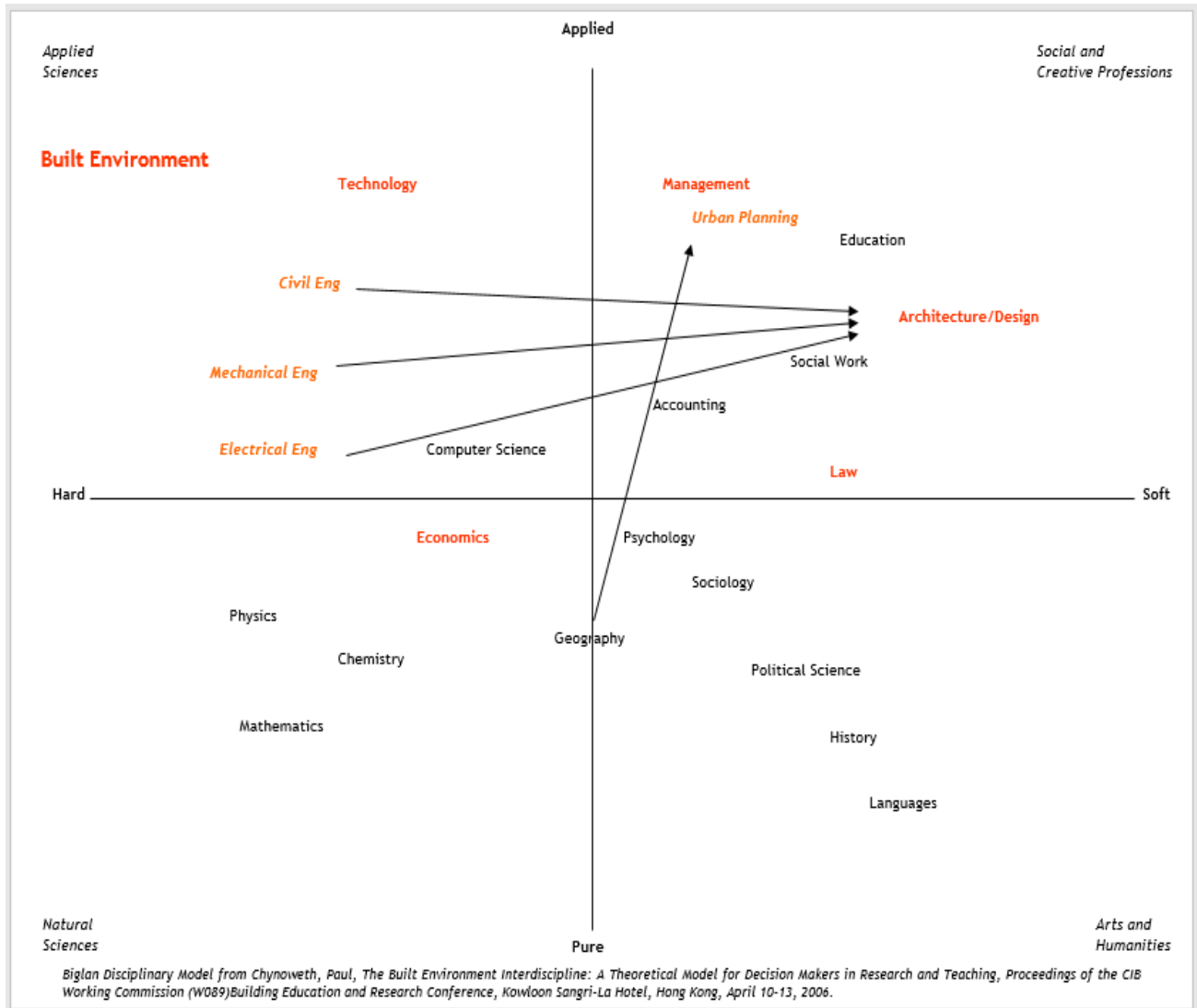
*About Town+Gown.* Town+Gown is a New York City-based university-community partnership with an experiential learning component and a faculty-directed research component. It is resident at the New York City Department of Design and Construction, with a mission to increase applied Built Environment research and analysis to inform and support practice and policy change. See <https://www1.nyc.gov/site/ddc/about/town-gown.page>.

This action research program uses evidence-based research and analysis to focus on “wicked problems” and systemic issues in the Built Environment to support evidence-based policy making and evolving practice improvements.



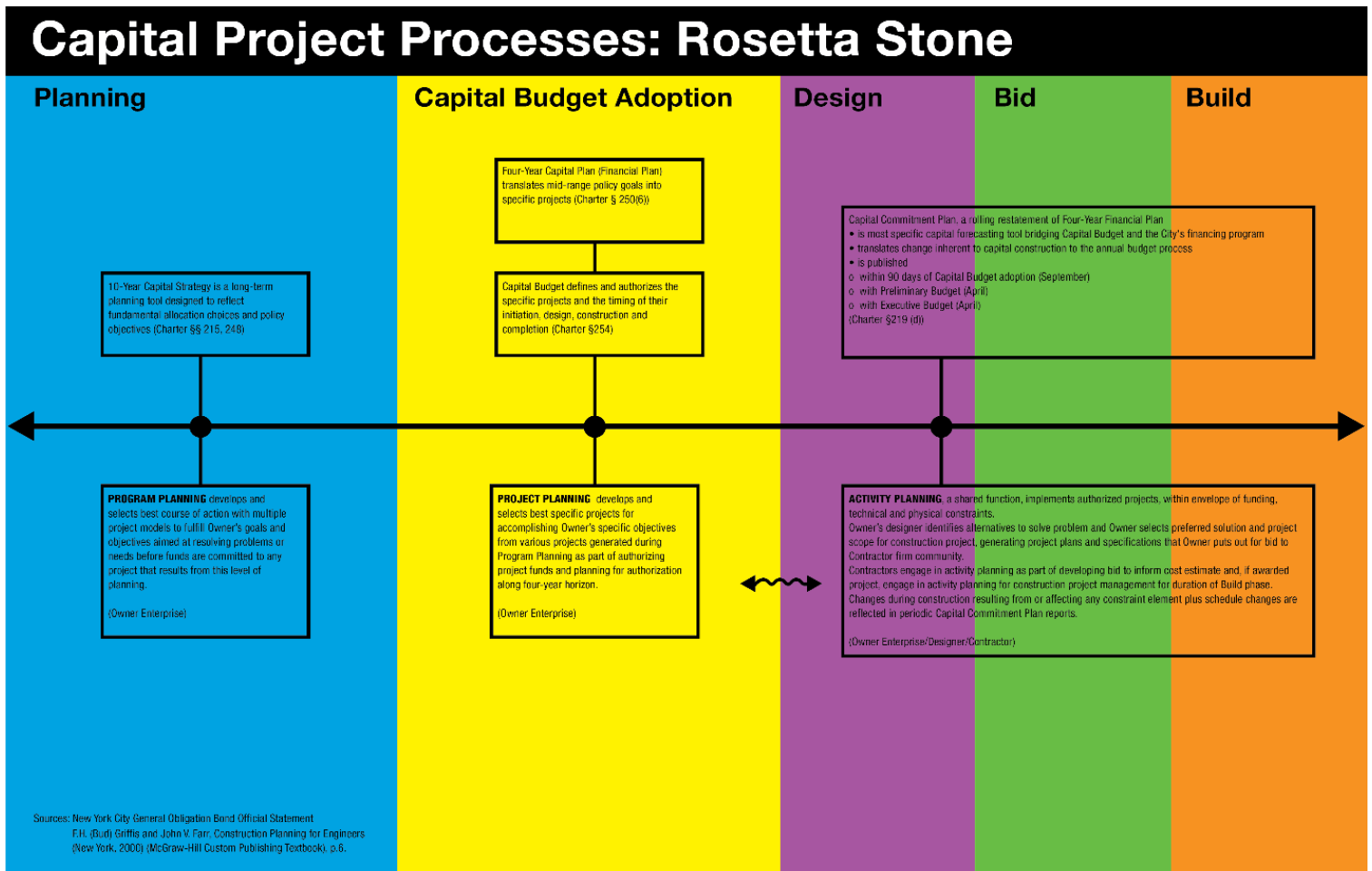
Public and private sector practitioner participants are members of Town, and academic participants are members of Gown. The collaborative inquiry method embedded into Town+Gown’s action research model privileges the practitioner as an equal to the academic in knowledge creation. The practitioner is an active participant in research, not a research subject, so that, from the start, applied research will be of value and use to the practitioner.

The Built Environment is a recognized interdisciplinary field around which Town+Gown has organized its research agenda and work, which includes Symposium events.



**THE BIG PICTURE  
FROM PUBLIC CAPITAL PLANNING TO CONSTRUCTION**

(See TABS 3-A – 3-D in COURSE MATERIALS APPENDIX)



**A. What is a “Public Works” and What Does It Mean?** The term “public works” is used throughout several State statutes, but it is not defined, leaving it to court decisions to give the statutory term meaning. Construction projects are considered to be “public works” under New York State law if (1) a public agency is a party to the contract involving the employment of laborers, workmen or mechanics, (2) the contract concerns a project that primarily involves

construction-like labor and is paid for by public funds, and (3) the primary objective or function of the work product must be the use or other benefit of the general public.<sup>8</sup> When a project is a “public works”, various State laws apply to it, as well as City laws and rules,<sup>9</sup> as summarized below.

1. Prevailing Wage Rules Apply. Construction workers on public works projects in New York must receive “prevailing wages.”<sup>10</sup> During the Great Depression of the 20<sup>th</sup> century, the federal government began to regulate construction worker wages on public construction projects by establishing prevailing labor rates for certain construction trades and mandating public owners subject to federal law to require contractors bidding on public works to pay their employees these established wage rates. The objective of the federal regulation, known as the Davis-Bacon law, was to standardize local market wage rates, “based on prevailing area pay scales,” in order to limit the ability of contractors with a lower wage structure from outside a depressed local construction market from bidding in that market and undercutting the local contractors in that depressed local market. After the adoption of the Davis-Bacon law, many states, including New York, adopted state-wide versions of the federal prevailing wage law.<sup>11</sup>

The original source for the prevailing wage requirements for all public works projects in New York is the New York State Constitution, which provides that “. . . [n]o laborer, worker or mechanic, in the employ of a contractor or sub-contractor engaged in the performance of any public work, shall be permitted to work more than eight hours in any day or more than five days in any week, except in cases of extraordinary emergency; nor shall he or she be paid less than the rate of wages prevailing in the same trade or occupation in the locality within the state where such public work is to be situated, erected or used.”<sup>12</sup> New York Labor Law, Section 220 sets out the prevailing wage requirements for public works, and public construction contracts contain corresponding provisions that contractors must strictly comply in order to receive regular payments and change orders.

The City’s standard construction contract contains several articles focusing on various labor provisions, laying out the prevailing wage law requirements in great detail. The operation of State Labor Law prevailing wage provisions and the construction contract together requires contractors to understand their responsibilities with respect to prevailing wage compliance. State law requires the New York City Comptroller to set and enforce prevailing wage and

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<sup>8</sup> *De La Cruz v. Caddell Dry Dock and Repair*, 2013 N.Y. Slip Op. 04842, p. 7.

<sup>9</sup> City refers to New York City, and State refers to New York State.

<sup>10</sup> New York State Labor Law, Section 220 and New York State Constitution, Article 1, Section 17.

<sup>11</sup> Gerald Finkel, *The Economics of the Construction Industry* (Armonk: M.E. Sharpe, 1997), p. 39.

<sup>12</sup> New York State to Constitution, Article I, Section 17.



benefit rates for workers, laborers and mechanics working on City public works projects and building service employees under City contracts and on certain properties that receive tax exemptions. Generally, the prevailing wage is the wage and benefit rate for each trade or occupation for employees of contractors performing public works projects. Labor Law Section 220 schedules list the prevailing wage rates for covered construction, replacement, maintenance or repair work. The New York City Comptroller determines the prevailing wage rates on these schedules annually on July 1 of each year and they are effective through June 30 of the following year.

The New York City Comptroller’s Directive No. 7, entitled “Audit of Requests for Payment Received under Contracts for Construction, Equipment and Construction-Related Services”, makes each City agency engineering audit officer (EAO) specifically responsible for ensuring the City’s compliance with the State’s Labor Law, and the internal processes at every City construction agency reflect these State law requirements, with the EAO performing audit reviews to ensure such compliance.<sup>13</sup> For example, the EAO must verify that contractors are compliant with New York State Labor Law, Article 8, §220, which includes ensuring that contractors post prevailing wage notices properly at the job site(s), that the posting(s) include all trades associated with the construction contract, and that the posted wages are in conformance with the prevailing wages for the respective trades. In order to comply with sufficient audit tests to verify the contractor’s compliance with the prevailing wage rates, the contractor and subcontractors must provide weekly certified payrolls showing all individual trade employees, daily sign in sheets signed by each worker showing time in and out, construction management labor inventories from the daily construction diaries, and actual wages and benefits paid and/or provided to employees—these are referred to as “certified payrolls”. If an EAO finds that the records described above are inconsistent with each other and/or with the prevailing wage, the EAO must withhold from payment sufficient funds to cover the difference, plus statutorily-defined interest. In addition, the Labor Law provides for penalties for a contractor’s willful and non-willful violation of prevailing wage laws, and the Labor Law’s statute of limitation provisions impose a record retention requirement on contractors with respect to weekly certified payroll reports. A contractor’s failure to comply with prevailing wage law can lead to debarment of the contractor firm under certain circumstances.

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<sup>13</sup> New York City Comptroller’s Office, Directive No. 7 (hereafter “Directive No. 7”), Section 3.8, at [http://comptroller.nyc.gov/wp-content/uploads/documents/Directive-7\\_AuditVoucherContracts.pdf](http://comptroller.nyc.gov/wp-content/uploads/documents/Directive-7_AuditVoucherContracts.pdf) accessed 05-17-19 @ 12:33 p.m.

2. Design-Bid-Build as Default Methodology with Award to Lowest Price Bid by Responsible Bidder. In the absence of specific State law permitting otherwise, public works owners in the State, which includes the City, are limited in how they can deliver their projects due to the required procurement and contracting methods.<sup>14</sup> The manner in which City construction agencies enter into contracts with construction firms to construct public works projects is both a procurement process under the law and a service delivery method, often referred to as the “Design-Bid-Build” methodology, in practice.

Design-Bid-Build not only refers to the separation of the Design phase from the construction—or Build—phase, it also refers to the method of solicitation—open competitive bidding with award to the contractor that proposes a responsive bid at the lowest price, which the construction agency deems to be a responsible vendor under applicable laws and rules.

## Capital Project Processes: Design-Bid-Build

### Mandatory Separation of Designer and Constructor

Public owner must prepare separate specifications for three articulated subdivisions of work, which specifications shall be drawn as to permit bidding (GML § 101 (1) and (2); SFL § 135)

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### Mandated Award to Proposer with Lowest Initial Price

Public owners must award contracts for public work to lowest responsible bidder (GML § 103 ; SFL § 135)

*New York State also mandates multiple prime contracting, unless a project labor agreement is in place with respect to the project.*

### Public Design-Bid-Build Methodology

<sup>14</sup> New York State General Municipal Law, Section 103; New York State Finance Law, Section 163.

In general, the Design-Bid-Build methodology requires any New York public owner, to separate the *Design* process, the *Bid* process and the *Build*—or construction—process, which under other methodologies can be combined in different ways.<sup>15</sup> In general, these rules, as described in greater detail below under *Wicks Law etc.*, require a City construction agency, as project owner, to:

- advertise and procure professional design services first, in order to commence the *Design phase* when the design consultant<sup>16</sup> designs the project and creates design specifications and contract documents for the *Bid* process;
- use the designer’s work product—the project design and related specifications—to create the bid package, which includes the construction contract that will apply to the project, for construction firms to learn more about a noticed public construction project and contemplate making a bid; and
- commence the *Bidding phase* by (a) publishing a public notice of the project containing the rules of the open competitive bidding process for that project and (b) making the bid package available to all interested bidders who may submit the price at which it would perform the work if the owner were to award the contract to that interested bidder, and awarding the project to the interested bidder whose bid represents the lowest responsible price(s) for the project, who then becomes the contractor for the project, commencing the third part of the delivery process known as the construction or *Build phase*.

In 2018, the State authorized the City to use the Design-Build delivery methodology for specifically enumerated capital projects.

3. *Wicks Law Applies unless PLA Applies to Project.* State law also generally requires public Owners to separate project specifications into four component parts—one for general contractor work, one for electrical contractor work, one for mechanical (HVAC) contractor work, one for electrical contractor work, and one for plumbing contractor work. These four types of contractors are often referred to as “prime trade contractors”, and the law requiring such separation of public project work into the four prime trade contracts is referred to as the “Wicks Law”, which is a mandated multiple prime contracting method for public construction in

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<sup>15</sup> Other procurement process/service delivery methods from the MIT Framework require specific State legislation granting authority for a public owner to use.

<sup>16</sup> On some public works projects, agency in-house designers (designers who are public employees) may perform functions during the Design phase, and for those projects there is no separate procurement of design services.

the State.<sup>17</sup> Mechanical (HVAC), electrical and plumbing trades are also referred to collectively as “MEP” trades. Multiple prime contracting is most prevalent on vertical—or building—projects, which involve all MEP trades, and less prevalent on horizontal—or infrastructure projects, such as road reconstruction, which typically do not involve all MEP trades.

In 2008, the State amended the Wicks Law to permit public owners to avoid the requirement of multiple prime contracting when they enter into a project labor agreement—or PLA—for an individual project or a type of project. A PLA is a version of what is known as “pre-hire agreements” entered into by a project owner, construction trade unions and contractor firms before the procurement of any construction services for a public project and it functions as “a comprehensive labor relations agreement — or ‘job site constitution’ — that governs over various area craft agreements, setting uniform terms and conditions, for a particular project.”<sup>18</sup> A PLA binds all bidders on capital projects subject to the PLA to the terms of the PLA. In addition, the 2008 amendments also included a general authorization to enable public owners to pre-qualify bidders for a particular public works project or type of project, which means that the bid packages for such capital project would be made available only to the construction firms on the pre-qualified list (PQL) for them to bid on the project(s), instead of being available to all construction firms that are interested in considering bidding on the work, as described above. Section 3-10 of the City’s Procurement Policy Board (PPB) Rules covers the local requirements for creating PQLs for construction procurements.<sup>19</sup>

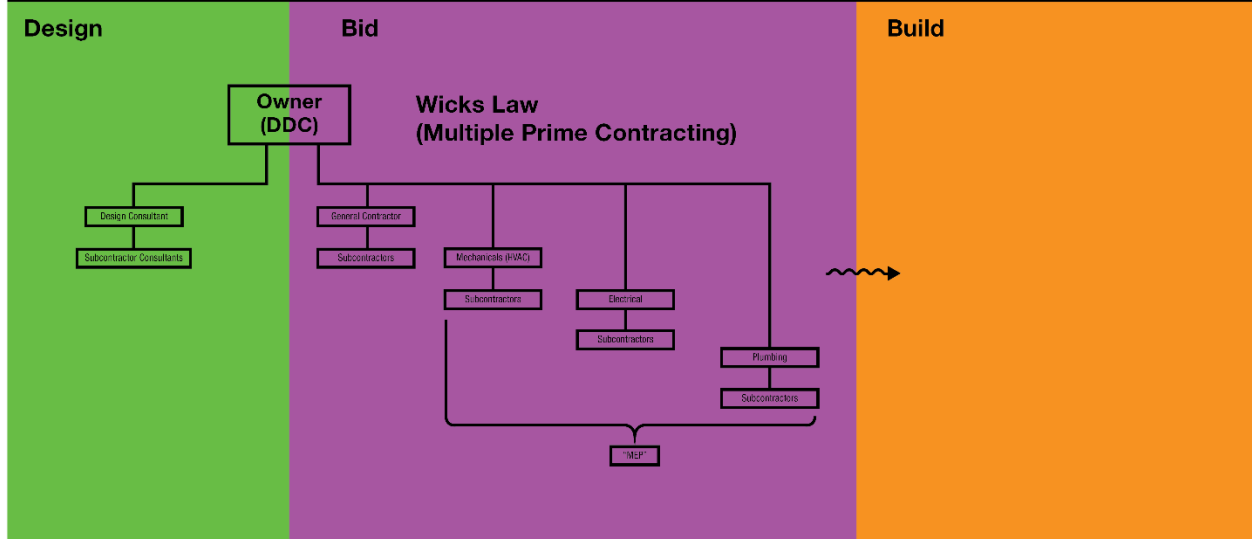
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<sup>17</sup> New York General Municipal Law, Section 101, for municipal government public works. See New York State Finance Law, Section 135, for state public works.

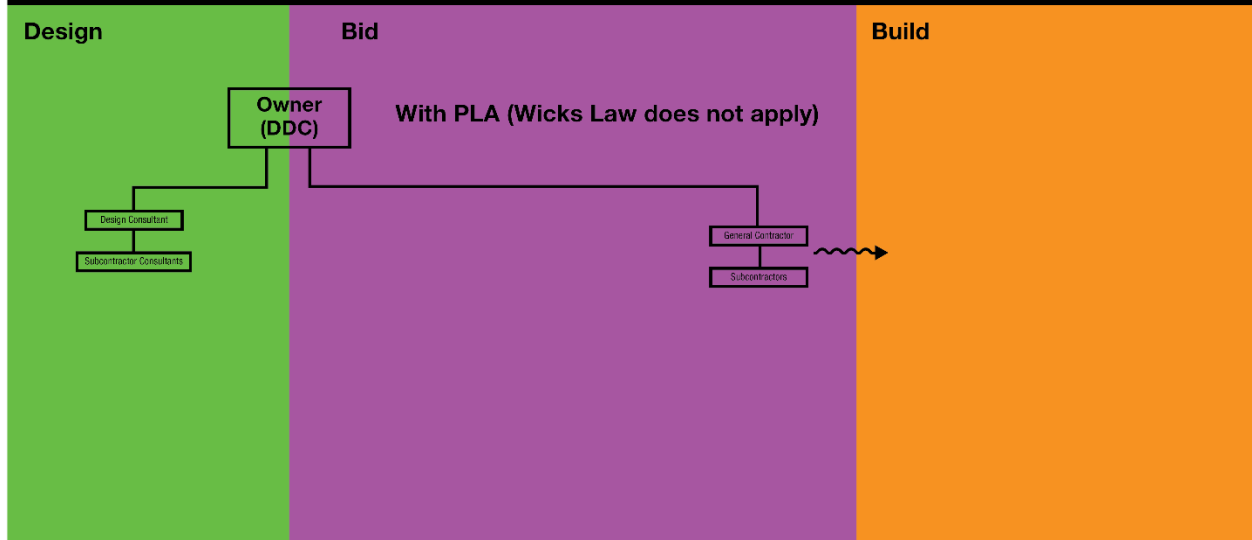
<sup>18</sup> Fred F. Kotler, *Project Labor Agreements in New York State: In the Public Interest*. Ithaca, NY: Cornell University, School of Industrial and Labor Relations — Extension Division, Construction Industry Program (2009), p. 2. [http://digitalcommons.ilr.cornell.edu/cgi/viewcontent.cgi?article=1021&context=reports&sei-redir=1&referer=http%3A%2F%2Fscholar.google.com%2Fscholar%3Fhl%3Den%26q%3Dkotler%2Bf%2Bproject%2Blabor%2Bagreements%2Bin%2Bnew%2Byork%2Bstate%26btnG%3D%26as\\_sdt%3D1%252C33%26as\\_sdt%3D#search=%22kotler%20f%20project%20labor%20agreements%20new%20york%20state%22](http://digitalcommons.ilr.cornell.edu/cgi/viewcontent.cgi?article=1021&context=reports&sei-redir=1&referer=http%3A%2F%2Fscholar.google.com%2Fscholar%3Fhl%3Den%26q%3Dkotler%2Bf%2Bproject%2Blabor%2Bagreements%2Bin%2Bnew%2Byork%2Bstate%26btnG%3D%26as_sdt%3D1%252C33%26as_sdt%3D#search=%22kotler%20f%20project%20labor%20agreements%20new%20york%20state%22) Accessed 09-01-17 @ 12:39 p.m.

<sup>19</sup> Hereafter, the PPB Rules, at <http://www1.nyc.gov/site/mocs/resources/rules.page> and at <https://www1.nyc.gov/assets/mocs/downloads/pdf/PPBRULESFINALEffectiveJuly2016.pdf> accessed 05-07-19 @12:42 p.m.

## Capital Project Processes: Contractual Relationships



## Capital Project Processes: Contractual Relationships



**4. State's Workers' Compensation Scheme Applies.** For public works, the New York State Workers' Compensation Law provides exclusive insurance coverage for workers' job injuries.<sup>20</sup> While generally an exclusive scheme, the State's Labor Laws, under certain circumstances, permit "workers to seek additional compensation from owners, contractors and other parties that are not the worker's employer."<sup>21</sup> In addition, an injury due to an employer's intentional

<sup>20</sup> Sarah Biser, Robert Rubin and Catherine Brown, *New York Construction Law Manual, 2017-2018 ed.*, Section 10:10 (Rochester: Lawyers Cooperative Publishing, 2018).

<sup>21</sup> *Ibid.*, Section 13:2.

tort is excluded from the Workers' Compensation Law's exclusive remedy, though a violation of Section 240 or Section 241 of the State's Labor Law "is not a *per se* intentional tort."<sup>22</sup> The statutory workers' compensation scheme "provide a means by which an injured employee's damages are measured and compensation [with] guidelines for compensation for various injuries, including death."<sup>23</sup>

5. Scaffold Law Applies. Section 240 of the State's Labor Law, known as the Scaffold Law, creates a non-delegable duty for owners of construction (with certain exceptions) and their contractors "to provide safety equipment such as scaffolds and ladders to protect employees from elevation related risks."<sup>24</sup> A strict and absolute liability statutory provision, the Scaffold Law requires only that "(i) a safety device was inadequate, and (ii) this inadequacy was a proximate cause of the elevation-related injury" in order for the claimant to prevail.<sup>25</sup> Injuries must be directly connected to "dangers posed by risks associated with gravity,"<sup>26</sup> and the Scaffold Law only protects employees "engaged in the construction, demolition, repair, alteration, cleaning and other maintenance work" covered by this section.<sup>27</sup> The Scaffold Law stands in contrast, in several respects, to Section 241 of the Labor Law.<sup>28</sup>

6. City's Procurement Policy Board Rules Apply. In addition to provisions of State law, described above, that apply to public works projects, the PPB Rules also apply, and all City agencies must follow them.<sup>29</sup> Created in 1989, the PPB promulgates rules intended to simplify, clarify and modernize the laws that govern how City agencies purchase goods and services, including construction.<sup>30</sup> The PPB Rules intend to provide for increased public confidence in the City's procurement process, to ensure the fair and equitable treatment of all persons who deal with the City's purchasing process, foster effective broad-based competition from all segments of the vendor community, and safeguard the integrity of the process and protect against corruption, waste, fraud and abuse.<sup>31</sup>

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<sup>22</sup> *Idem*

<sup>23</sup> *Idem*

<sup>24</sup> Deborah Kerzhner, Esq., "Introductory Primer", p. 4, from New York City Bar Association, *Constructive Perspectives: Are New York's Construction Safety and Insurance Laws Serving the Public?* at <https://www.nycbar.org/media-listing/media/detail/constructive-perspectives> Accessed 04-19-19 @ 2:40 p.m. See case law cited.

<sup>25</sup> *Ibid.*, pp. 4-5. See case law cited in FN 15 for exceptions.

<sup>26</sup> *Ibid.*, p. 5.

<sup>27</sup> *Ibid.*, p. 6. See also Biser *et al.*, *op. cit.*, Section 13.5.

<sup>28</sup> *Ibid.*, pp. 6-9. See also Biser *et al.*, *op. cit.*, Section 13.6.

<sup>29</sup> PPB Rules, *op. cit.*

<sup>30</sup> New York City Charter (hereafter, the Charter), Chapter 13.

<sup>31</sup> PPB Rules, *op. cit.*, p. 1.

7. New York City Comptroller's Directive No. 7 Applies to Payments and Change Orders.

Directive 7 outlines the audit process for contractor payment requests and change orders. The New York City Comptroller is the City's auditor and creates audit standards for all City agencies to follow during the process of reviewing and submitting vendor invoices for payment under all contracts—contracts for construction, services and goods. Since construction differs significantly from programs that deliver services and the purchase of goods, the New York City Comptroller has promulgated specific audit standards for construction contract payments (regular payments and change orders) in Directive 7. Each City construction agency has an EAO, who performs these audit functions.

Directive 7 requires that each agency's EAO perform enumerated audit functions with respect to construction-related payments, involving a combination of field, desk and contract audits.<sup>32</sup> The function of the EAO "is to perform an independent final review prior to payment," and, thus, the EAO must *audit all construction-related payment requests* before an agency can process payment requests in FMS to ensure the City "has received appropriate value."<sup>33</sup> While an employee of the City construction agency, the EAO is independent and organizationally separate from the agency's design or construction functions cannot have any role with respect to payment requests other than audit activities.<sup>34</sup>

At the end of the audit process, the EAO must be able to make the following unqualified certification with respect to the payment:

*I certify that I or my duly authorized designee have independently examined this payment request, have reviewed adequate supporting documentation certified by appropriate personnel, and have performed site inspection(s), where needed, to verify the approved payment. The payment is just and reasonable under the terms of the contract.*<sup>35</sup>

Directive 7 requires that the EAO "follow appropriate audit procedures to ensure that the payment requests are justified" and establishes guidelines for performing audits under many circumstances experienced in public construction, permitting, however, the EAO "to exercise professional judgment, consistent with the intent of these guidelines, to determine the nature

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<sup>32</sup> Directive 7, *op. cit.*, Section 2.0

<sup>33</sup> *Ibid.*, Introduction and Section 4.2.

<sup>34</sup> *Ibid.*, Section 2.0.

<sup>35</sup> *Ibid.*, Section 4.1. With respect to an audit that cannot fully justify payment, Directive 7 permits the EAO to release funds for payment on any uncontested portion of the request, subject to certain conditions. (Section 4.1) If the EAO cannot justify full or partial payment at all, Directive 7 also establishes a process involving the agency head to resolve the payment request. (Section 4.3).

and extent of the audit procedures necessary for evaluating the payment request under review, [adding to, modifying or omitting] “audit steps as he or she deems appropriate.”<sup>36</sup>

- “For competitively bid and awarded contracts, the EAO must ensure that the contractor or vendor has fulfilled its contractual obligations, and that the City has received appropriate value, under the terms of the contract, for the payment requested.
- For change orders, or contracts which were not competitively awarded, the EAO must also ensure that the change order or contract costs are reasonable, consistent with both the contract and/or the change order terms and adequately documented.”<sup>37</sup>

All payments, including regular payments and payments for change orders, are subject to the retained percentage requirement in the construction contract. City agencies retain a percentage of each progress payment to contractors as specified in the applicable construction contract until satisfactory completion of the project.<sup>38</sup>

**B. Design and Bid Phases and the Capital Budget Process.** The City’s capital budget process refers to a “public work” as a “capital project”. A capital project is a project that provides for construction, reconstruction, acquisition or installation of physical public betterment or improvement which would be classified as capital asset under generally accepted accounting principles for municipalities.<sup>39</sup> In order for a city construction agency to be able to begin work to be reimbursed with capital funds (as opposed to expense funds)<sup>40</sup> on a capital project, the project must first receive legislative appropriation by the New York City Council in the adopted capital budget for the amount of money it would cost to design and build the project.<sup>41</sup> The cost of the project in the adopted capital budget serves as a limit for the project, unless the Council later amends the capital budget to increase the appropriation for the capital project. Since capital projects take several years to design and construct, it is necessary to re-appropriate amounts not expended in each successive year until the project is completed.

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<sup>36</sup> *Ibid.*, Section 3.1.2. Section 3.1.4 permits an agency EAO to consult with the Comptroller’s Chief Engineer and seek advice “when evaluating engineering-related matters in connection with their audits.”

<sup>37</sup> *Ibid.*, Section 3.1.1.

<sup>38</sup> *Idem*

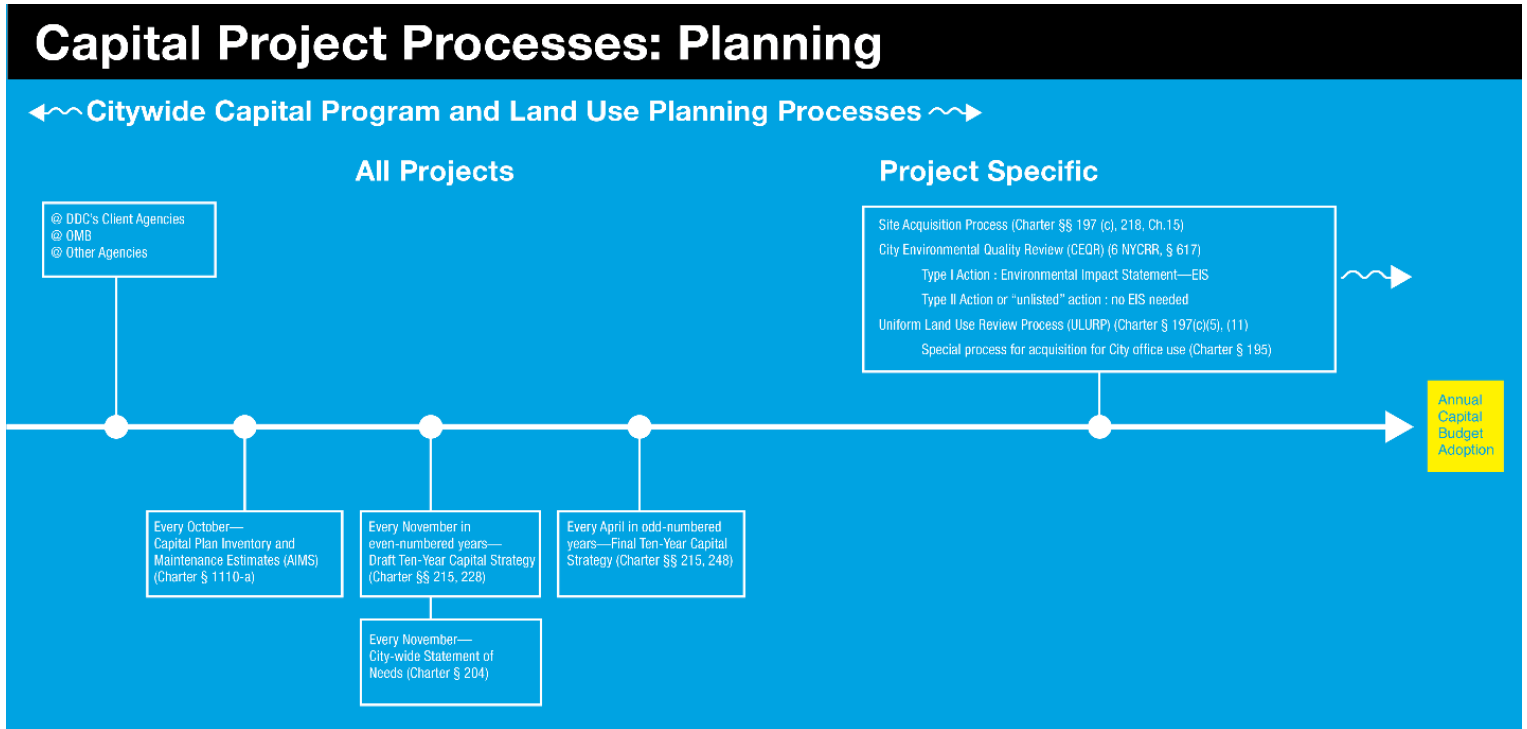
<sup>39</sup> Charter, Section 210(1). The City’s constructions projects can also be funded with expense funds, which come from the annual expense budget and the General Fund from annual tax and other receipts, but this précis document focuses on the capital budget, which imposes more constraints on the construction process than the expense budget does.

<sup>40</sup> Agencies are able to access a pool of expense funds (in addition to their own expense funds) for preliminary project planning and analysis purposes, in collaboration with NYC OMB, that are available in the Capital Scoping Development Fund created in FY 2008-2009.

<sup>41</sup> Charter, Section 217 (a).



While the City’s overall capital budget is large (approximately \$11.4 billion in planned capital expenditures in Fiscal Year 2020),<sup>42</sup> the total amount must be allocated among all City agencies with capital projects. (See **D. Picture of the City’s Capital Program** below.)



Each year, the New York City Council adopts a capital budget,<sup>43</sup> which can be thought of as an annual implementation of the results of city-wide decisions made during the City’s ongoing city-wide capital planning processes that are “ready to go” each year. To see examples of the City’s capital budget documents including those for Fiscal Year 2020, please go to <http://www1.nyc.gov/site/omb/index.page>.

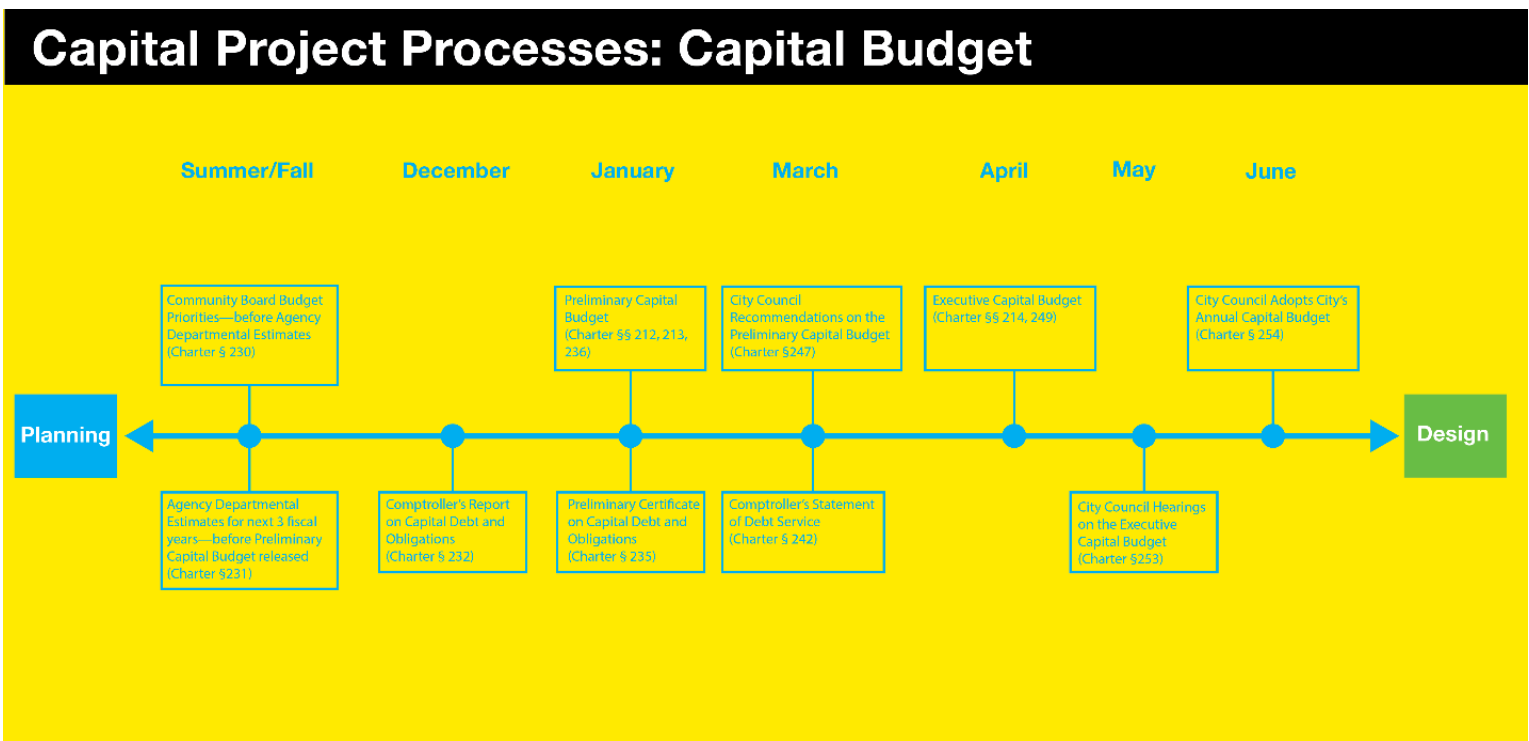
The process before adoption begins each January, when the Mayor submits the preliminary capital budget to the Council. The preliminary capital budget includes a financial plan covering capital expenditure estimates for the next four ensuring fiscal years and a capital program status report, with appropriations for each project and expenditures to date.<sup>44</sup> Each April, after

<sup>42</sup> Budget and Financial Plan Summary from Fiscal Year 2020 Mayor’s Message (hereafter “Mayor’s Message Summary”), p. 58, at <https://www1.nyc.gov/assets/omb/downloads/pdf/mm4-19.pdf>, accessed 5-3-19 @ 4:46 p.m.

<sup>43</sup> Unless otherwise indicated in the material that follows, the term “year” refers to the City’s fiscal year, which begins each July 1 and ends each June 30.

<sup>44</sup> Charter, Section 213.

the Council holds its hearings on the preliminary capital budget, the Mayor submits executive capital budget to the Council.<sup>45</sup> The executive capital budget sets forth, for each capital project, a brief description and location, estimated cost and estimated dates of completion of final scope, final design and final construction. Capital projects are paid with the proceeds of bonds or indebtedness that the City issues in the capital markets—in other words, proceeds from (mostly) tax-exempt municipal debt are the source of funds that pay for work completed by construction firms under contract with City agencies. Annual principal and interest amounts on these bonds—or debt service—are an annual operating expense each fiscal year and are paid from current revenues in the City’s General Fund. (See **C. The City’s Financing Program** below.)

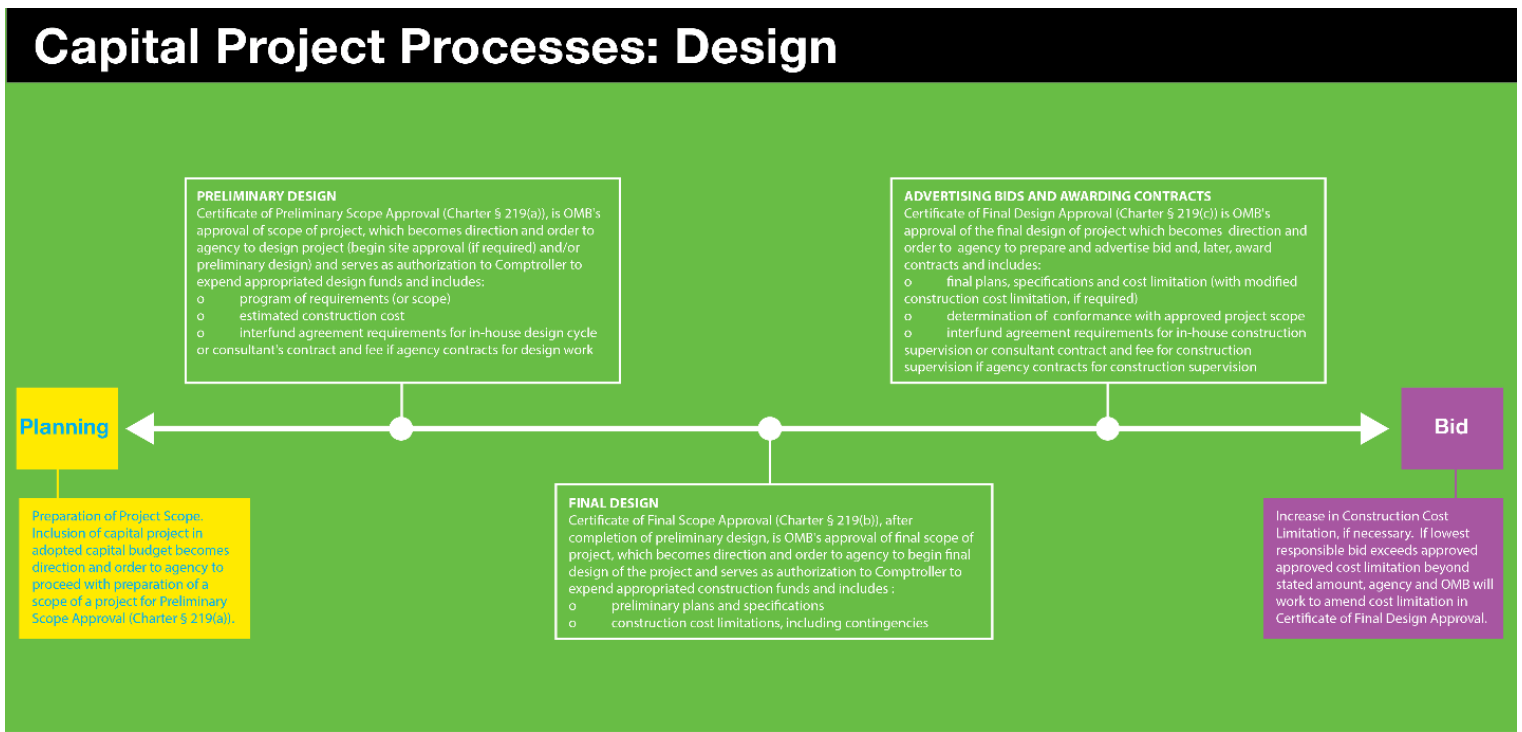


**1. Design Phase.** The New York City Charter creates a capital project "road map" along which the Mayor’s Office of Management and Budget (OMB) and the City construction agencies advance authorized capital projects *via* a controlled approval process to enable the agencies to be able to commit the City’s legal obligation to pay for work on a capital project.<sup>46</sup> The first

<sup>45</sup> Charter, Sections 249 and 214.

<sup>46</sup> Official Statement of the City of New York with respect to \$1,050,000,000 The City of New York General Obligation Bonds, Fiscal 2019 Series D \$700,000,000 Tax-Exempt Bonds, Subseries D-1 \$223,255,000 Taxable Bonds, Subseries D-2 and \$126,745,000 Taxable Bonds, Subseries D-3 Official Statement, dated November 30,

stop on the road map is the inclusion of a capital project in the adopted capital budget, which OMB must approve. This roadmap follows the Design-Bid-Build methodology up to the Bid phase, which is the first interaction of the construction community with a City construction agency on the capital project. This Charter process is intended to be able to accommodate changes to the project as the Design phase process increases understanding of the project among is stakeholders.



Inclusion of a capital project in the adopted capital budget begins a process leading to OMB's *preliminary scope approval*, which requires agencies to submit a preliminary scope (program of requirements) in accordance with applicable approved standards to OMB for approval.<sup>47</sup> If OMB approves preliminary scope, it will issue a certificate of preliminary scope approval which includes: a program of requirements (or scope), an estimated construction cost and bond proceeds requirements for in-house design (if a City agency uses its personnel for design work) or a design consultant's contract and fee if (if a City agency contracts with a professional design

2018 (hereafter "Official Statement"), p. 50, at <https://emma.msrb.org/ER1171366-ER915714-ER1316231.pdf> accessed 05-06-19 @ 2:06 p.m.

<sup>47</sup> Charter, Section 219 (a)-(f).

consultant for design work).<sup>48</sup> With respect to project designs for which an owner procures design services, “[a] civil engineering firm usually designs earthmoving and heavy construction projects—or horizontal infrastructure projects—and the “design of general buildings is usually under the purview of an architectural firm.”<sup>49</sup>

This preliminary scope approval becomes a direction and order to the agency to proceed with the preparation of the scope of the project<sup>50</sup> and also functions as a directive to begin site approval, if required, and preliminary design. OMB’s approval documents described above and below are called "Certificates to Proceed" or "CPs".<sup>51</sup>

After preliminary scope approval, OMB and the construction agencies continue to collaborate to provide for orderly project advancement from scope through final design and initiation of construction. The next step on the roadmap is OMB’s *final scope approval*, which is OMB’s approval of the scope of project for a capital project pursuant to OMB’s relevant construction standards and becomes a direction and order to the agency to *design* the project.<sup>52</sup> Upon completion of preliminary design, agencies submit preliminary plans, specifications and cost estimate to OMB for review and approval. If OMB deems documentation acceptable, it issues a certificate of *final scope approval*, which includes approval of the construction agency’s preliminary plans and specifications and is considered a directive to the agency to begin final design of the capital project.

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<sup>48</sup> Charter, Section 219 (a)-(f). This also creates the authorization for an agreement, called an Inter-Fund Agreement or an IFA, which permits bond proceeds—or capital funds—pay project (1) costs attributed to City agency personnel working on a project and certain costs paid to consultants, such as architects and engineers who work during the design phase of the project and possibly during the construction phase, and (2) hard costs, which are all the costs that are paid under the Contracts for a project.

<sup>49</sup> F.H. (Bud) Griffis and John V. Farr, *Construction Planning for Engineers*, (New York, 2000) (McGraw-Hill Custom Publishing Textbook), p. 172. “A mechanical, electrical, process, or industrial engineering firm usually leads the design of process-type facilities.” *Idem*

<sup>50</sup> Charter, Section 219(a). This direction to proceed is conditioned upon sufficient planning funds for proceeding with the preparation of a scope of the project being appropriated and is reflected as a Unit of Appropriation (U/A) and a Budget Line for the capital project in the capital budget to be adopted.

<sup>51</sup> The Certificates to Proceed (CPs) feed into the City’s financing program *via* a Proceeds Directive, consisting of various projects approved in various CPs, that functions as a bond resolution. Internally at OMB, after an agency has made a CP request, finance staff within OMB reviews the CP request for capital financing eligibility under State Finance Law. It is at the CP stage, that funds move from the U/A budget line to budget codes and then, via object modification to schedules in the object code making it available to agencies to encumber in FMS. All of this must occur before the Comptroller will register the related contract.

<sup>52</sup> Charter, Section 219(b). This direction to proceed is conditioned upon sufficient funds for project design being appropriated in capital budget and otherwise available; it also becomes a notification to the comptroller of comptroller’s authorization to expend appropriated design funds.

The last stop on the roadmap is OMB's *final design approval* for a capital project pursuant to OMB's relevant construction standards, which becomes a direction and order to the agency to prepare bid and award documents and to proceed to bid.<sup>53</sup> Upon completion of final design, construction agencies submit their final plans, specifications and cost estimate to OMB for review and approval. If OMB deems the plans acceptable, it will issue a certificate of *final design approval*, which includes approval of final plans and specifications, a modified construction cost limitation, if required, and in-house construction supervision or consultant contract and fee for construction supervision if the agency contracts for construction supervision. This final design approval is considered to be authorization for the construction agencies to advertise for bids and award contracts, according to all applicable laws.<sup>54</sup> An eventual award of contracts is, however, subject to the requirement that the amount of the awarded bid plus a certain percentage amount (awarded bid amount) does not exceed the issued cost limitation in the final design approval.<sup>55</sup> In the event the awarded bid amount exceeds the issued cost limitation, construction agencies need to submit a request for an increased cost limitation for OMB approval.

2. Construction Procurement: Bid as the Link between Design and Build Phases in Design-Bid-Build. A public “procurement” consists of a function and a series of related activities. A City agency engages in the function of “procurement” when it purchases, rents, leases or otherwise acquires goods, services or construction in exchange for payment from public moneys. There are many related activities that a City agency performs to effect such a purchase, rent, lease or other acquisition include planning, description of requirements, solicitation and selection of sources and preparation and award of contract. There are also procurement-related activities performed during the construction phase, which relate to all phases of contract administration, including project acceptance, evaluation of performance and final payment.

3. Bid Phase: The Public Procurement Process. As described above, the State laws that characterize City capital projects as “public works” mandate a procurement process, which is also the service delivery method known as “Design-Bid-Build” unless specific authority for another process, such as design-build, is granted by the State. The Charter authorizes “competitive sealed bidding”, which is the local procurement analog to the State law design-bid-build requirement, and Section 3-03 of the PPB Rules provide detailed guidance and requirements for City construction agencies to follow when procuring construction-related

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<sup>53</sup> Charter, Section 219(c).

<sup>54</sup> For all approved projects, agencies must submit a monthly expenditure plan (warrant basis) to OMB, and OMB will issue a certificate to the Comptroller reflecting this plan and authorizing encumbrance of these funds.

<sup>55</sup> The issued cost limitation and related contract award does not explicitly include funds for contingency.

services as that term is defined in Section 1-01 of the PPB Rules.<sup>56</sup> The bid package made available to interested bidders will include project design documents and related specifications, the construction contract and an “Information for Bidders” document that contains all the procurement-related information interested bidders will need to know in order to prepare bid documents to be considered by the construction agency for evaluation and eventual award.

4. Competitive Sealed Bid (CSB) Process Lifecycle. City agencies can procure construction using one of two methods—competitive sealed bidding, through the release of a Bid Package, the PQL process, or through the release of a Request for Qualifications, which are both generally authorized by State law and PPB Rules. For certain projects, however, City agencies can procure construction through a Design-Build procurement, which has recently been specifically authorized by State law and which the City recently received to use on specific projects.<sup>57</sup> The materials below focus only on the CSB process, which is open to all interested bidders and initiates the *Bid phase* of the construction process that follows a standard series of steps that city agencies must follow as required by State law and PPB Rules. The CSB lifecycle process includes:

- Release of Notice of Invitation to Bid on agencies’ websites and The City Record, which interested bidders can download electronically or pick up a physical copy.
- “Bid Walk Through” meeting at agencies, when indicated in the Invitation to Bid, can provide interested bidders with greater understanding of the project, elements of the bid package, which includes the construction contract that becomes binding on the bidder upon agency’s acceptance of its bid and compliance with the requirements of a valid bid.
- Interested bidders submit their bids, as indicated in the bid package, along with a bid bond and other required documents, by the due date, which includes a specific time.
- Immediately after the time for bid submission has occurred, the agency holds a public bid-opening meeting, at which time the agency initially reviews the bids it receives for responsiveness to elements of the bid package and identifies the bidder/proposer who submits the lowest price for constructing the project, as required by State law, ranking the proposals of all bidding/submitting firms in order of price, from lowest to highest.
- The apparent winning bidder and the agency work together to complete the vendor integrity compliance process, which requires the vendor to complete information in PASSPort. Other City agencies (such as New York City Department of Investigation, New York City Department of Small Business Services, and OMB, if required under State law with respect to the Financial Control Board for the City) must make determinations to permit

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<sup>56</sup> Charter, Section 313; PPB Rules, *op. cit.*

<sup>57</sup> In 2018, the City received state legislative approval to use Design-Build for specific capital projects.

agencies to advance the vendor compliance process to completion and to permit the Comptroller to register the construction contract.

- Agency and the vendor conduct a pre-award meeting to confirm understanding of project scope in the bid package.
- Agency makes a formal award of the construction contract to the vendor, after it receives all required approvals by other City agencies by sending a Notice of Award letter to the construction firm.
- After the vendor submits, and the agency accepts, required documents necessary for registration, the vendor and agency execute the construction contract, at which time the vendor becomes the contractor for the project.
- Agency submits the executed construction contract to the New York City Comptroller for registration as required by the Charter. Section 328 of the Charter requires all City agencies file all City contracts with the Comptroller for registration within 30 days, unless there exist grounds for the Comptroller not to register a contract.<sup>58</sup> Agencies prepare an Advice of Award document for submission with the executed contract to the Comptroller. Upon its receipt, the Comptroller has 30 days to approve or reject the Contract for registration. If, during this period, the Comptroller approves and registers the contract, the Comptroller will enter the contract via the City's Financial Management System (FMS), which means that contract work can commence and be paid for with City funds. No work under any City contract can commence until registration.
- After the agency receives notice of contract registration, typically no later than 30 days after submission, unless the Comptroller rejects the contract as permitted by the Charter, the agency begins the *Build* phase by sending the contractor a Notice to Proceed letter

6. Relation of Contract and Bid. Each construction agency includes the City's standard construction contract, which is modified to apply to the particular capital project, and a document entitled "Information for Bidders" in the bidding package that all interested bidders can access. The Information for Bidders expressly makes the provisions of the Information for Bidders document, along with several other enumerated documents, to be the entire construction contract. Thus, the standard construction contract, modified for the project, becomes part of each interested bidder's bid, and the winning contractor is deemed to agree to all contract provisions and be subject to all contract provisions should it win the bid for the project, which is the reason interested bidders must examine the all contract documents carefully. With the construction agency's acceptance of the interested bidder's submitted bid, the contractor firm is bound by the terms of the construction contract, which is where all the

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<sup>58</sup> Charter Sections 93(p) and 328 (a) and (b).

requirements for payment for work the contractor completes and change orders with respect to the project are expressed. The contract contains a wide variety of local law requirements, such as locally based enterprise (LBE) requirements, the City's safety requirements, the applicability of the PBB Rules, international boycotts, the Macbride Principles, prohibition of tropical hardwoods, and participation by minority-owned and women-owned enterprises in City procurement. The construction contract also sets out requirements for, and limitations on, the contracts the contractor may execute with its subcontractors.

**C. The City's Financing Program.** As noted earlier, City construction projects are considered to be "public works" because, among other things, they are paid for with public funds. These public funds are typically in the form of proceeds of bonds—or indebtedness—issued by the City and its related issuers that are repaid over time with City taxes and other revenues paid by City property owners or people who work and purchase goods and services in the City.<sup>59</sup> Bond proceeds are referred to as "capital funds" because they are different from operational revenues (which the City refers to as "General Fund" revenues), from an accounting perspective.

The City's capital program is a plan for investment in the City's infrastructure and building assets, and the annual capital budget appropriates funds to implement the program *via* a wide variety of public building and infrastructure projects—both new/expansion projects and renovation/improvement projects—land acquisition and major equipment purchases. For a general sense of magnitude and scope of the City's capital program, the City plans to commit \$69.8 billion from Fiscal Year 2020 to Fiscal Year 2023 for a variety of capital project types.<sup>60</sup> The largest categories of project types are education, environmental protection projects and transportation projects, followed by general services projects, housing and economic development projects, public safety projects, parks, libraries and cultural institution projects, sanitation projects, and health and social services projects.<sup>61</sup>

The Charter outlines the possible categories for a capital project to be paid for with bond proceeds. A capital project can consist of:

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<sup>59</sup> The costs of a capital project, initially financed with bonds, eventually find their way into the annual expense budget in the forms of debt service (annual principal and interest payments) on the bonds, incrementally increased personal service costs for expanded program(s) in a new or expansion project, and post-construction operation and maintenance costs.

<sup>60</sup> Mayor's Message Summary, p. 58.

<sup>61</sup> New York City Independent Budget Office, "Understanding New York City's Budget: A Guide", pp. 5-6, at <https://ibo.nyc.ny.us/iboreports/IBOCBG.pdf> accessed 05-07-19 @ 1:05 p.m.



- a project that provides for construction, reconstruction, acquisition or installation of physical public betterment or improvement which would be classified as capital asset under generally accepted accounting principles for municipalities or any preliminary studies or surveys relative thereto or any underwriting or other costs incurred in connection in connection with financing
- acquisition of property or permanent nature
- acquisition of furnishings, machinery apparatus or equipment when the project is first constructed or acquired
- a physical improvement or acquisition of real property for physical improvement consisting of certain enumerated items
- any other project permitted under the State's Local Finance Law, with mayor and comptroller approval
- any combination of the above<sup>62</sup>

The City's capital projects are governed by many State laws and City laws and rules.<sup>63</sup> Among the Charter's restrictions on capital projects that are related to the eventual issuance of indebtedness to pay for such projects is the restriction that the City cannot issue or authorize debt related to any capital project not previously authorized in the capital budget, among other restrictions,<sup>64</sup> which has meant that City construction agencies cannot spend capital funds until a project is authorized in the capital budget. The State Local Finance Law, which authorizes the City to issue general obligation bonds,<sup>65</sup> also lists the "periods of probable usefulness"—or PPU—for each authorized type of item for which bonds may be issued, which authorizes the maximum maturity of the debt component attributable to such item.<sup>66</sup> OMB, which is responsible for the City's financing program, determines the periods of probable usefulness for project elements, which is also known as determining "capital eligibility" of a capital project. Pursuant to the Local Finance Law, the New York City Comptroller has established accounting policies that all City agencies must follow in order to use capital funds to pay for their capital projects. Elements of capital projects must meet the defined term of a capital asset in

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<sup>62</sup> Charter, Section 210(1). Charter, Section 217 (a), provides "“No obligations of the city shall be issued or authorized for or on account of any capital project not included in a capital budget, . . .”". As a further limitation, the City may not issue capital debt only to finance expense items properly includable in expense budget per the State Comptroller's accounting principles set forth in uniform system of accounts for municipalities.

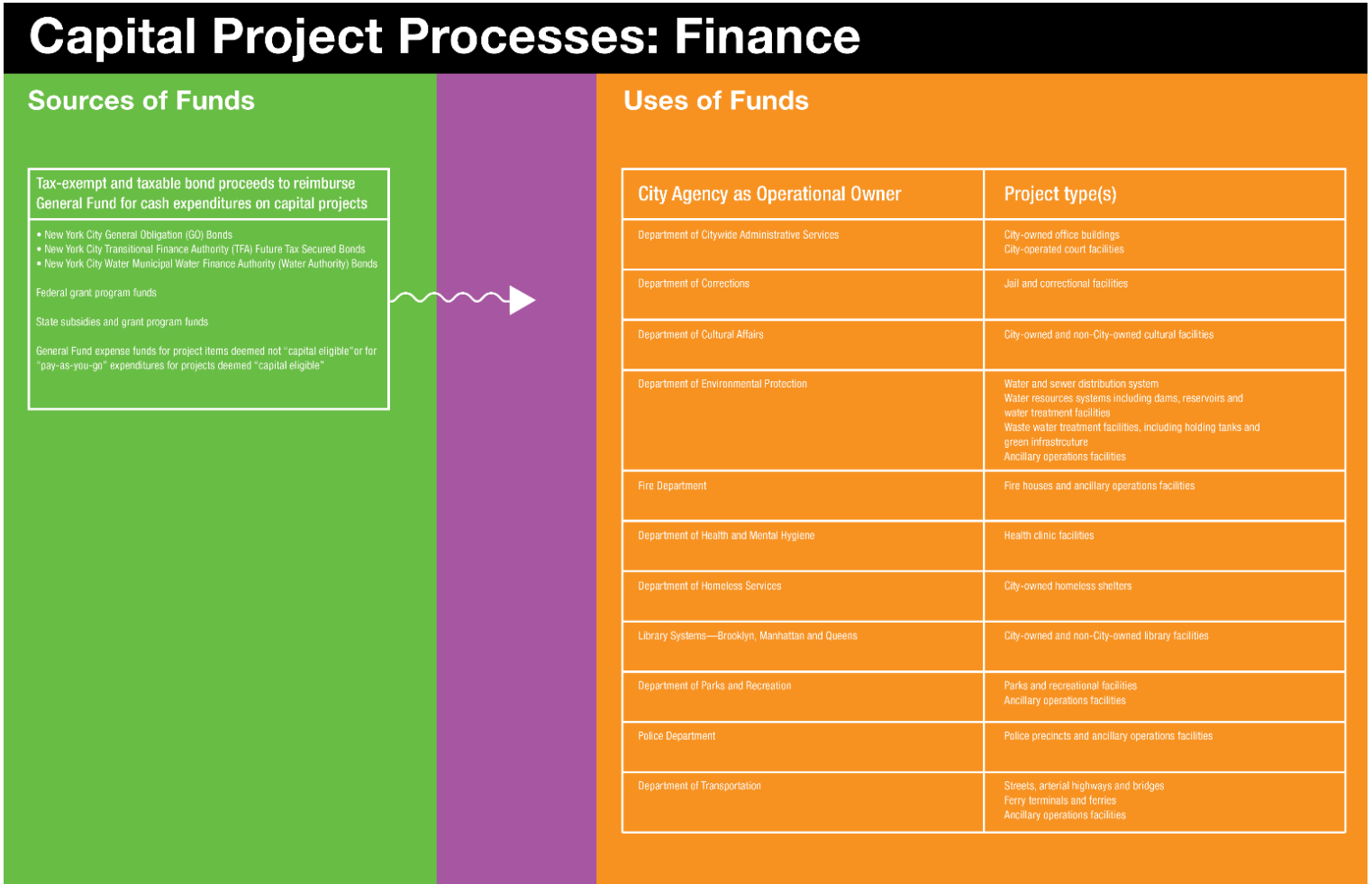
<sup>63</sup> Federal tax law applies as well, primarily for those bonds deemed to be tax-exempt. Further, the capital project process includes the interposition of other governmental processes with associated laws, such as land use processes—the City's Environmental Quality Review process and the Uniform Land Use Review process—and public finance processes.

<sup>64</sup> Charter, Section 217 (a).

<sup>65</sup> Local Finance Law, Sections 10.00, 24.00, 25.00, 25.10 and 29.00

<sup>66</sup> Local Finance Law, Section 11.00.

accordance with generally accepted accounting principles in order to be paid with capital funds. In addition to complying with the Charter provisions, the Comptroller’s Directive 10 establishes, as base line eligibility criteria for City capital projects, a minimum total project cost of \$35,000 and a minimum useful life of five years, in order to keep current expenses and minor purchases from being financed with long-term debt.<sup>67</sup> (See also TAB 5 Issues in Traditional Public Infrastructure/Building Finance).



**D. Picture of the City’s Capital Program.** The City’s Ten-Year Capital Strategy for Fiscal Years 2020-2029, totaling \$116.9 billion, includes several planned priority investments including \$13.1 billion to make repairs and safety improvements to the City’s roads and bridges and \$6.5

<sup>67</sup> New York City Comptroller’s Directive 10, Section 3.0, at [https://comptroller.nyc.gov/wp-content/uploads/documents/Directive-10\\_CapitalProjectsFund.pdf](https://comptroller.nyc.gov/wp-content/uploads/documents/Directive-10_CapitalProjectsFund.pdf) accessed 05-07-19 @ 1:09 p.m.

billion to repair and expand the City’s sewer and water infrastructure, and a combined total of \$34.8 billion are focused on school facilities, affordable housing and borough-based jails.<sup>68</sup> Infrastructure and government operations each have a 34 percent share of the Ten-Year Capital strategy—planned infrastructure investments include environmental protection projects (\$20.1 billion), transportation and mass transit projects (\$16.6 billion), and sanitation projects (\$3.2 billion); and, planned government operations investments include resiliency and energy efficiency (\$5.2 billion), parks (\$4.6 billion), public buildings (\$1.9 billion), and fire (\$1.4 billion), in addition to justice-related investments (\$13.7 billion) and education (\$24.1 billion).<sup>69</sup> Debt service attributable to the Ten-Year Capital Strategy as a percentage of *tax* revenues (which includes property taxes) increases approximately to 11 percent from its 2018 level slightly above 10 percent, rising steeply over seven fiscal years to a peak in 2026 to less than 14 percent.<sup>70</sup> The total debt burden (total debt service as a percentage of total taxes for the Fiscal Year 2020-2023 Plan period), is 11.5 percent in Fiscal Year 2020, 11.7 percent in Fiscal Year 2021, 12.4 percent in Fiscal Year 2022 and 13.1 percent in Fiscal Year 2023 and, total outstanding debt as a percentage of total City personal income is projected at 12.1 percent in Fiscal Year 2020, 12.5 percent in Fiscal Year 2021, 13.0 percent in Fiscal Year 2022 and 13.5 percent in Fiscal Year 2023.<sup>71</sup>

The Four-Year Capital Plan, which includes capital projects in the Fiscal Year 2020 capital budget to be adopted and authorized projects in the next following three fiscal years (2020-2023), totals \$69.8 billion and represents highlighted planned investments in educational facilities (\$14.9 billion), bridge state of good repair reconstruction and rehabilitation (\$4.6 billion), affordable housing (\$4.5 billion), the City’s water and wastewater systems (approximately \$3.6 billion).<sup>72</sup> A mix of city funds, non-city funding and the Water Authority funds (which supports the City’s water and wastewater systems) will support these planned investments, with projected city funding in Fiscal Year 2019 dipping slightly below actual for Fiscal Year 2018 and rising over the Plan period.<sup>73</sup> Non-city capital funds, which come from state and federal programs, support facilities for the City’s Health+Hospitals system, education, transportation, resiliency measures, and parks.<sup>74</sup> Capital commitments for Fiscal Year 2020 to be authorized in the Fiscal Year 2020 Capital Budget total approximately \$18.5 billion—highlights include investments in Environmental Protection and Sanitation, Transportation, Administration of

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<sup>68</sup> Fiscal Year 2020 Budget Summary (hereafter “Budget Summary”), p. 17, at <https://www1.nyc.gov/assets/omb/downloads/pdf/sum4-19.pdf> accessed 5-3-19 @ 4:45 p.m.

<sup>69</sup> Budget Summary, p. 23; see also Mayor’s Message Summary, pp. 63-67.

<sup>70</sup> Budget Summary, p. 24.

<sup>71</sup> Mayor’s Message Summary, p. 77.

<sup>72</sup> *Ibid.*, p. 58.

<sup>73</sup> *Ibid.*, p. 60.

<sup>74</sup> *Idem*

Justice and Public Safety, Recreation and Cultural and the City's public buildings.<sup>75</sup> Among those areas of investment are the sewer build outs in Southeast Queens and Staten Island bluebelt (\$271.5 million and \$56.9 million), in-City water main projects including state of good repair and accelerated replacement (\$329.7 million) and wastewater treatment projects, totaling \$1.1 billion, and including the wastewater system itself, green infrastructure instalments, addressing combined sewer overflows and construction of various water supply tunnels.<sup>76</sup> Transportation projects include rehabilitation of City bridges (\$730.3 million), reconstruction and resurfacing of City streets and highways, reconstruction of sidewalks and pedestrian ramps (\$965.4 million) and the City's capital contribution to the MTA's capital program for subways and buses ((\$135.5 million).<sup>77</sup> Human-service capital commitments include investments in K-12 education facilities (\$4.1 billion) and higher education facilities (\$141.5 million) and investments in the City's Health+Hospitals system (\$302.2 million), senior centers (\$7.5 million), children-related services (\$150.5 million), and homeless services (\$100.2 million). Parks-related commitments total \$169.5 million and among government operations commitments are the rehabilitation of the City's public buildings and renovation of City-leased space and other City-owned facilities (\$140.6 million, \$89.4 million and \$65.5 million, respectively).<sup>78</sup>

The City's management initiatives "to enhance the administration and enhancement of the capital program" include consolidation of design and construction for certain transportation, environmental protection and general services projects within a single design and construction agency to avoid duplication of efforts and increase coordination among City agencies; use of the Capital Project Scope Development Fund to get better project scoping and cost estimates before budget adoption; the Charter-mandated Capital Asset Inventory and Maintenance Program; and, application of Value Engineering during the Design phase.<sup>79</sup>

**E. Design-Build, Generally.** Deficiencies noted above in the Design-Bid-Build methodology—namely the mandated separation of designer from constructor, which directly relate to costs that could have been avoided in the absence of such separation—are intended to be resolved in the Design-Build methodology. In 2018, the State authorized the City to use the Design-Build delivery methodology for specific capital projects. For a more detailed description of the Design-Build methodology see TAB 4.

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<sup>75</sup> *Ibid.*, pp. 68-71.

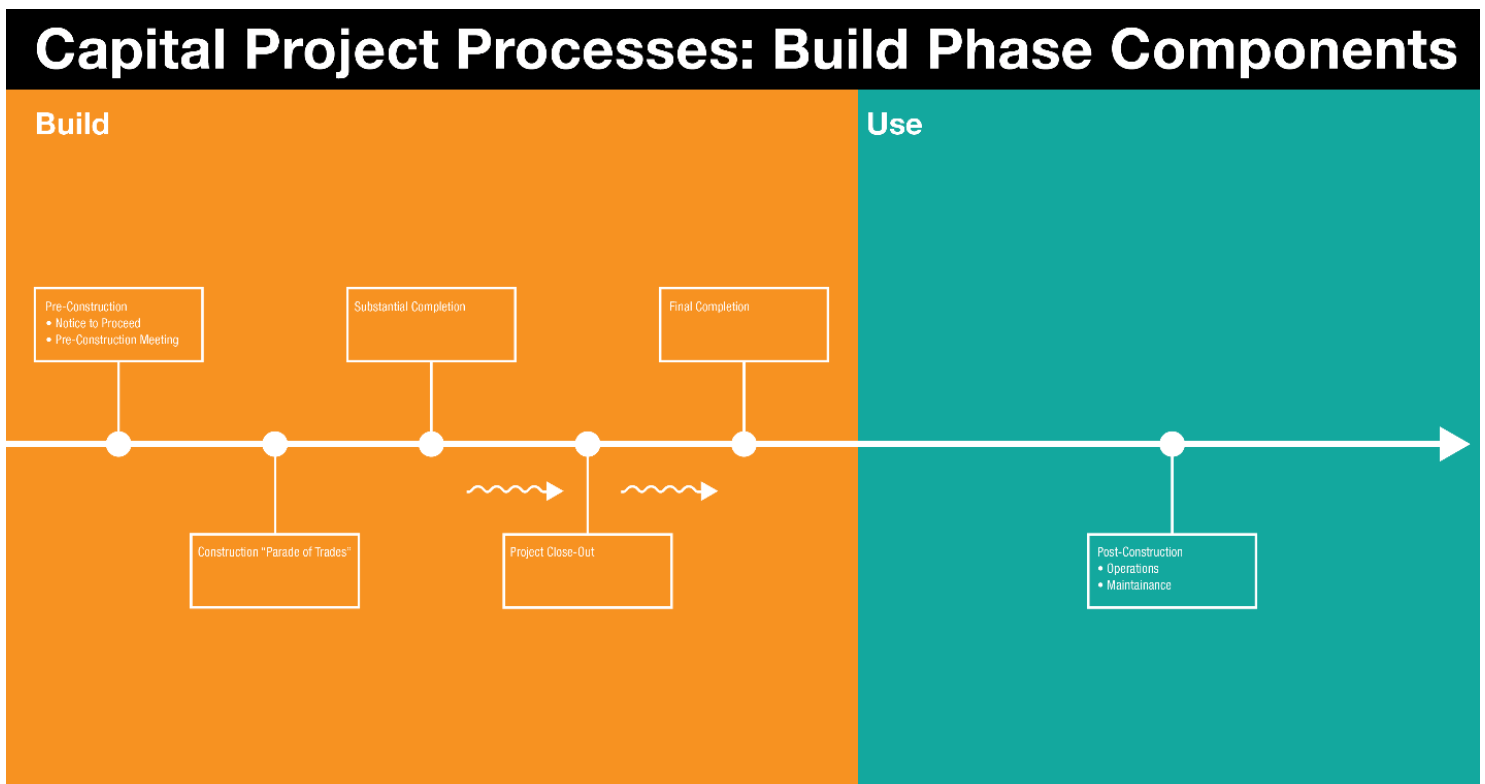
<sup>76</sup> *Ibid.*, p. 68-69.

<sup>77</sup> *Ibid.*, p. 69.

<sup>78</sup> *Ibid.*, p. 71.

<sup>79</sup> *Ibid.*, pp. 74-75.

**F. The Build Phase: Project Management.** Technically, the *Build* phase begins after the contractor has been awarded the contract, but the project management work supporting the *Build* phase begins earlier, for the owner during the *Design* phase, and for the contractor during the *Bid* phase, with the estimation function as the common denominator. The owner and the contractor share the project management function. Both owner and contractor perform control cost estimates for monitoring the project for financing purposes and during the *Build* phase to estimate the cost to completion.<sup>80</sup> Both owner and contractor engage in *project management*, which is a major administrative activity associated with all construction projects and relates to the general conditions of a particular project and varies with the size and complexity of a project.”<sup>81</sup>



<sup>80</sup> Chris Hendrickson and Tung Au, *Project Management for Construction: Fundamental Concepts for Owners, Engineers, Architects and Builders* (New Jersey: Prentice Hall 1989), p. 4/31, at <http://pmbook.ce.cmu.edu/> accessed 08/28/17 @ 3:13 p.m.

<sup>81</sup> Griffis and Farr, *op. cit.*, p. 180.

1. Project Planning and Management. There are three types of planning functions for construction projects that require management to implement.<sup>82</sup> The management of any public project has at least two aspects—the owner’s and the contractor’s. Though they relate to each other, they are different in important respects and they may overlap at certain times during a project’s lifecycle. But project planning functions, which consist of the “systematic identification of program and project tasks, task schedules and resources required for task accomplishment”, are embedded into all phases of a capital project.<sup>83</sup>

The relationships among the owner of construction and the firms within the *constructor network of firms*, is a contractual one. The constructor is actually a network of firms—typically referred to as a prime contractor and its subcontractors—that all relate to each other by a series of contracts, much like the contract between the owner and the prime contractor.<sup>84</sup> These related contracts for a project are closely connected to each other throughout the construction process, and while the owner and the constructor are not in opposition to each other, they have different perspectives on the many functions they share, such as project management.

Economic analysis can evaluate the efficiency of the *build* phase conducted *via* contractual relationships, which, in Design-Bid-Build, is a “linked set of contracts—owner-design professional, owner-contractor, contractor-subcontractors—” with the owner-contractor contract and the contractor-subcontractor contracts creating, on an *ad hoc* basis, the constructor quasi-firm network, on the basis of how well the “asset-and-relationship-specific investment” resolves information asymmetries on the project “before the deal is struck, or *ex ante*, and after the deal is struck, or *ex post*” within a shared environment of uncertainty.<sup>85</sup> See TAB 4 **B. Service Delivery and the Procurement Function**, 6. Economic Efficiency of Construction Contracts. below.

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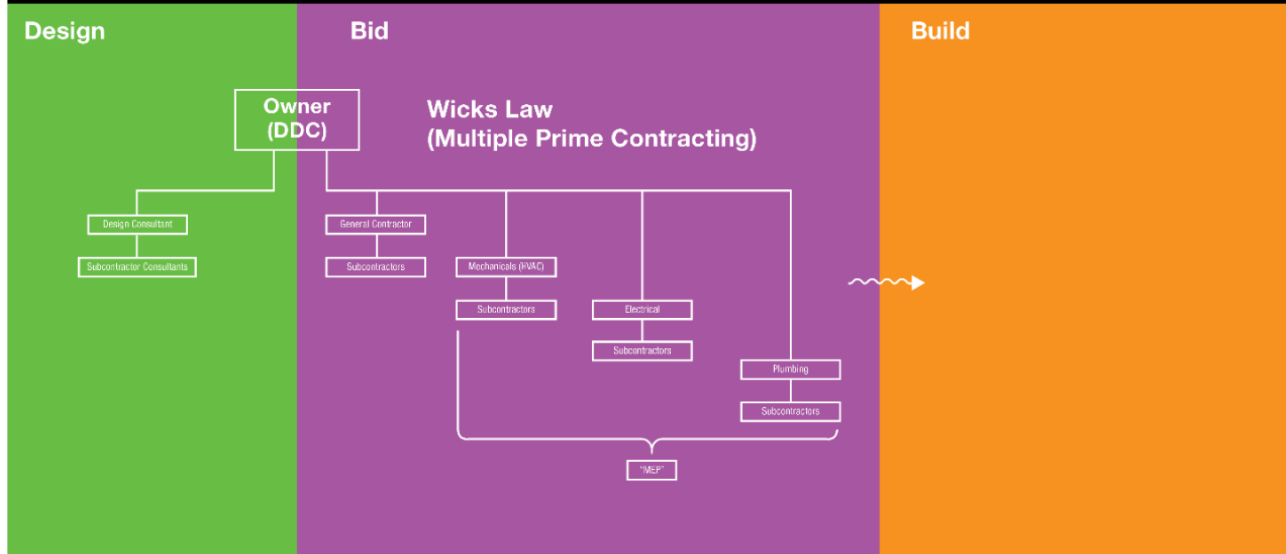
<sup>82</sup> Griffis and Farr, *op. cit.*, p. 4.

<sup>83</sup> *Ibid.*, p. 5.

<sup>84</sup> See Robert R. Eccles, “The Quasifirm in the Construction Industry, *Journal of Economic Behavior and Organization*, Vol. 2 (1981), pp. 335-357. See also Contract, Chapter IV (Article 17).

<sup>85</sup> Justin Sweet and Marc M. Schneier, *Legal Aspects of Architecture, Engineering and the Construction Process*, 9<sup>th</sup> ed. (Stamford CT: Centage, 2009), p. 386; Matthews, *op. cit.*, p. 162, citing de Bettignies and Ross, *op. cit.*, p. 137; and Patrick Bajari and Steven Tadelis, “Incentives versus Transaction Costs: A Theory of Procurement Contracts”, *RAND Journal of Economics*, Vol. 32, No. 3, Autumn 2001, pp. 387-407, p. 388.

## Capital Project Processes: Contractual Relationships



## Capital Project Processes: Contractual Relationships



The three types of planning functions consist of:

- **Program planning**, the “process to develop and select the best course of action for fulfilling goals and objectives defined to resolve problems or needs,” is performed by

the owner enterprise, typically before funds are committed to any project the results from this level of planning.<sup>86</sup>

- **Project planning**, the “process to develop and select the best model for accomplishing a specific project’s objective,” is shared by both owner and contractor, each with a different perspective, with the owner performing it during the Design phase and the contractor performing it during the Bid phase.<sup>87</sup>
- **Activity planning**, the function of the contractor, monitored and overseen by the owner.

All planning and management processes and activities proceed within an envelope of constraints. One constraint common to all aspects of planning is costs, and “it has been generally accepted that costs should be minimized or profits (or benefits) should be maximized in the search for an optimal alternative to solve a physical problem.”<sup>88</sup> In addition to financial constraints, however, there are also “technical and physical constraints, [and] economic, social, ecological and political considerations that always come into play.”<sup>89</sup>

2. Project Planning as Program Plan Implementation. Many stakeholders are involved in the program planning process, which involves the identification of alternatives to solve the problem that initially set the planning process in motion and the selection of the preferred solution(s) that become construction projects to be bid out and awarded to contractor firms.<sup>90</sup> The program planning process, a multi-disciplinary effort, “usually will end with a series of construction projects, which [ideally] will be fairly well defined at the end of the program planning phase.”<sup>91</sup> Legal authorization of construction projects “begin[s] early in the process [and] may be the most time-consuming activity associated with the accomplishment of the program.”<sup>92</sup> Initial implementation of the selected construction projects will “require some sort of permitting action” at the federal, State and/or City level, depending on the nature of the construction project.<sup>93</sup> In addition, the project owner must receive funding authorization for the project—public projects “will require legislative action of one kind or another,” which, for City public works projects, is described in **B. Design and Bid Phases and the Capital Budget Process** and **D. Picture of the City’s Capital Program** above.<sup>94</sup> In the case of the City, this step

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<sup>86</sup> Griffis and Farr, *op. cit.*, p. 6.

<sup>87</sup> *Idem*

<sup>88</sup> *Ibid.*, p. 16.

<sup>89</sup> *Idem*

<sup>90</sup> *Ibid.*, pp. 21, 73.

<sup>91</sup> *Ibid.*, p. 73.

<sup>92</sup> *Ibid.*, p. 21.

<sup>93</sup> *Idem*

<sup>94</sup> *Idem*



is the capital budget adoption process that authorizes the spending of capital funds to implement the construction projects it contains.

“Once the project (or at least the need for the project) has been defined,” the owner, a consultant to the owner, or the eventual designer” must develop the project scope.<sup>95</sup> While the timing of the scope definition phase can vary by project, “the level of definition of the project scope can dictate the project delivery method, if the owner has flexibility in using a variety of project delivery methods.”<sup>96</sup> There are many modern service delivery methodologies in use in both public and private sectors, but, as noted above, City construction agencies are generally limited by State law to using Design-Bid-Build.<sup>97</sup>

The project planning principles described below “apply to both the *Design* phase and the *Build* phase of a project,” though, in practice, schedule and budget take on different considerations during the different phases. In public construction, the budget and costs receive the most focus during the *Design* phase, and the schedule, which has a direct relation to costs and the budget, receives the most focus during the *Build* phase.<sup>98</sup>

The four planning principles listed below form the basis of all project planning and management functions:

- What are the project objectives?
- Who will be charged with the various responsibilities for accomplishing project objectives?
- What organization of resources is available or required?
- What are the likely information requirements of the various levels of management involved in the project?<sup>99</sup>

Project planning and management, for both owner and contractor, emerge from the program planning stage, with the preliminary activities planning exercises initially performed during the cost estimating functions during *Design* and *Bid* phases.

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<sup>95</sup> *Idem*

<sup>96</sup> *Idem*

<sup>97</sup> *Ibid.*, pp. 73-76.

<sup>98</sup> *Ibid.*, p. 77, see also pp. 78-81.

<sup>99</sup> *Ibid.*, pp. 81-82 (listed material directly quoted).

# Capital Project Processes: Build

## Parade of Trades



### Earthmoving and heavy infrastructure construction

- Earthmoving and trenching operations
- Excavation and lifting
- Loading and hauling
- Compacting and finishing
- Production of aggregates
- Production and pouring of portland cement concrete
- Production and laying of asphaltic concrete
- Paving and surface treatments
- Rock excavation
- Compressed air and water supplies

### Building construction

- Foundations
- Concrete construction
- Wood construction
- Steel construction
- Piping
- HVAC
- Electrical
- Telecommunications
- Exterior finish construction
- Interior finish construction

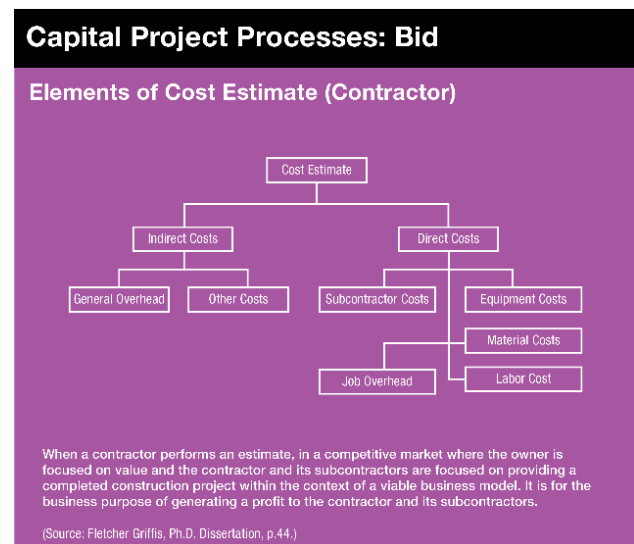
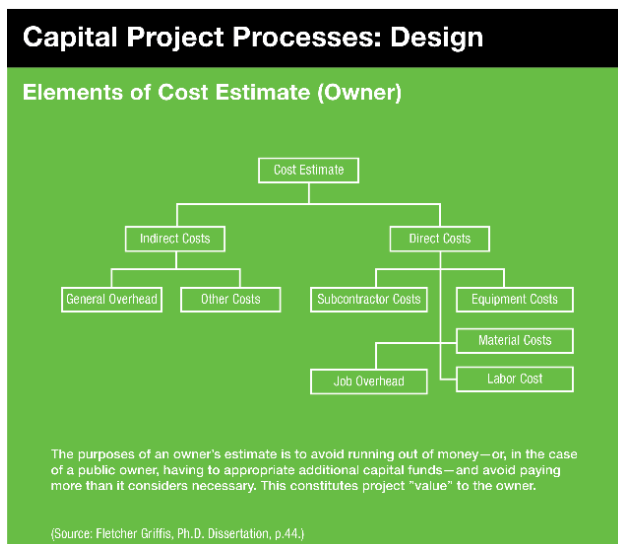
Source: F.H. (Bud) Griffis and John v. Farr, *Construction Planning for Engineers*, (New York, 2000) (McGraw-Hill Custom Publishing Textbook), p. 172.

**3. About Cost Estimates.** Underlying all aspects of program and project planning and management is the “cost estimate [that] establishes the base line of the project cost at different stages of development of the project [and] represents a prediction provided by the cost engineer or estimator on the basis of available data.”<sup>100</sup> While construction costs do not represent all of total project costs, it is one type of cost that can be managed and, to some extent, controlled, and the cost estimate “serves three basic functions: design, bid and control.”<sup>101</sup> The owner or its designer conducts cost estimates during the planning and design phases to generate order of magnitude cost estimates; conceptual cost estimates; more definitive estimates as design details become available; and, designer’s or engineer’s estimates

<sup>100</sup> Hendrickson and Au, *op. cit.*, Chapter 5, p. 3/31.

<sup>101</sup> *Idem.*

based on plans and specifications.<sup>102</sup> The detailed estimate, becomes the owner’s budget estimate, but as the *Design* phase progresses, the owner must revise it “periodically to reflect the estimated cost to completion.”<sup>103</sup> Contractors conduct cost estimates during the *Bid* phase to submit to owners for competitive bids, which estimates generally include “direct construction cost including field supervision, plus a markup to cover general overhead and profits” with direct costs “derived from a combination of . . . subcontractor quotations, quantity takeoffs and construction procedures.”<sup>104</sup> The winning contractor’s bid estimate becomes its budget estimate, which it will use for its control purposes and update “periodically to reflect the estimated cost to completion as well as to insure adequate cash flows for the completion of the project.”<sup>105</sup> Both owner and contractor perform control cost estimates for monitoring the project for financing purposes and during the *Build* phase to estimate the cost to completion.<sup>106</sup>



Understanding the process of developing an estimate of the cost of a construction project depends first on understanding the context and purpose of the estimate. The estimation function for a public owner serves two purposes in the context of the public budgeting and the public procurement processes. Estimations for budgetary purposes focus on “the objective of providing sufficient funds to achieve project goals under conditions of uncertainty. Estimations

<sup>102</sup> *Ibid.*, pp. 3-4/31.

<sup>103</sup> *Ibid.*, p. 5/31.

<sup>104</sup> *Ibid.*, p. 4/31. Construction procedures are often subsumed within the term “means and methods”. Chapter II, Article 4 of DDC’s standard general conditions to the City’s standard construction contract contain provisions with respect to the Means and Methods of Construction, which is defined to be “the labor, materials, temporary structures, tools, plant, and construction equipment, and the manner and time of their use, necessary to accomplish the result intended by this Contract.” (Section 2.1.22)

<sup>105</sup> *Ibid.*, p. 5/31.

<sup>106</sup> *Ibid.*, p. 4/31.

for procurement purposes focus on the objective of spending no more than necessary to accomplish project goals.”<sup>107</sup> The estimation function for a contractor firm on a public construction project is performed in the context of bidding for a public construction project where “bidding” can be defined as “a competition for the right to perform services or acquire property” and can take many forms including “the submission of sealed [bids] to a public organization for the right to perform services or delivery products at a specified consideration.”<sup>108</sup> There may be several purposes for a contractor in bidding on a public construction project, but the most commonly stated objective “is that of maximizing the contractor’s expected profit for each contract.”<sup>109</sup>

The economic concept of *auctions* applies to the public Design-Bid-Build process with the award going to the bidder tendering the lowest initial construction price. Thus, the estimation functions are performed in a competitive market where the owner is focused on project value, which includes assuring sufficient funds for the project and not paying more than is considered necessary,<sup>110</sup> and the contractor and its subcontractors are focused on providing a completed construction project within the context of a viable business model that includes a profit to the participating firms. The owner prepares/hires a consultant to prepare an estimate of the final project design and specifications, which are called the “engineer’s or designer’s estimate.” This estimate should be no more than the amount authorized in the budget and it informs the owner in its evaluation of the prices bid for the job in a public open competitive bidding environment in which the lowest bid from a responsible and responsive bidder wins the contest. The interested bidders evaluate the design drawings and specifications in the bid package, which the law requires to be complete and final, and the construction contract they will sign should they win the bid and are awarded the project.<sup>111</sup> In this environment,

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<sup>107</sup> Glenn Ballard, *Should Project Budgets Be Based on Worth or Cost?*, Proceedings for the 20<sup>th</sup> Annual Conference of the International Group for Lean Construction, p. 1.

[https://s3.amazonaws.com/academia.edu.documents/30757782/77\\_P\\_011.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1503339075&Signature=LOUULa0UNgxbTZIRJe2cMjoqtY%3D&response-content-disposition=inline%3B%20filename%3DSHOULD\\_PROJECT\\_BUDGETS\\_BE\\_BASED\\_ON\\_WORTH.pdf](https://s3.amazonaws.com/academia.edu.documents/30757782/77_P_011.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1503339075&Signature=LOUULa0UNgxbTZIRJe2cMjoqtY%3D&response-content-disposition=inline%3B%20filename%3DSHOULD_PROJECT_BUDGETS_BE_BASED_ON_WORTH.pdf)

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<sup>108</sup> Griffis, F.H. (Bud), "A Stochastic Analysis of the Competitive Bidding Problem", Oklahoma State University, PhD Dissertation in partial fulfillment of Doctor of Philosophy Degree, May 1971, p. 1.

<sup>109</sup> *Ibid.*, p. 2. See pp. 68-72 for a detailed exposition on several possible objectives in addition to maximizing profit.

<sup>110</sup> The statutory public bidding process assumes the lowest tendered price is the lowest construction cost.

<sup>111</sup> The bid package may have a cost range within which the engineer’s or designer’s estimate is located.

contractor firms “must maintain a sufficient volume to cover [their] direct costs, ‘other costs’ and “their” general overhead” in order to remain a viable business enterprise.<sup>112</sup>

Both the owner and the contractor perform their estimates in a shared environment of “uncertainty about many important design changes that occur *after* the contract is signed and production begins, such as design failures, unanticipated site and environmental conditions and changes in regulatory requirements.”<sup>113</sup> Within the shared environment of uncertainty, the actual cost of construction can be broken into component elements of cost, which the estimation function attempts to quantify.<sup>114</sup>

4. Construction Project Management from Public Owner Perspective. The Notice to Proceed (NTP) letter commences City agency construction project management functions with a pre-construction meeting. The NTP letter indicates the start date of the construction phase and invites the contractor to attend a pre-construction meeting, which is to occur in advance of any work permits issued to the contractor. The contractor is expected to provide information and documents required by the construction contract to the agency project manager at this meeting, including proof of insurance required under the contract; the baseline construction schedule; the submittal schedule; a detailed estimate (schedule of values for approval); proof of required insurance and payment bonds; project-specific site safety plan; and, request for approval of subcontractors.

The baseline construction schedule, once approved by the agency, becomes the basis for project management activities by both the agency and the contractor, for the contract work, including all issues with respect to potential delays. In order to create its baseline construction schedule submission, the contractor must buy durations in all subcontracts, know the project’s critical path, identify key construction milestones, issue a long lead items log, and integrate submittals.

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<sup>112</sup> Griffis, *op. cit.*, p. 61. “Estimating the costs and labor time that will be incurred on a project can determine the contractor’s financial success on a given undertaking. Small-sized projects have little margin for error while larger ones rely on repetitive installations to lower building costs. Large-scale operations usually include procedures for dealing with unforeseen occurrences (extra work orders, overtime etc.) Even so, an unexpected physical barrier or delivery delay can prove disastrous to a firm’s profit margin. \*\*\* The issue of labor intensity and control of the pace of production is framed by the physical requirements of the installation regardless of the particular market.” Finkel, *op. cit.*, p. 84.

<sup>113</sup> Bajari and Tadelis, *op. cit.*, p. 388.

<sup>114</sup> Griffis, *op. cit.*, pp. 43-44. “The majority of these seven costs are extremely sensitive to random influences of nature and human beings. Thus, these cost elements can be termed random variables. \*\*\* The fact that they behave randomly implies that each will follow a specific probability distribution. This fact can assist the contractor in more accurately predicting his cost . . .”. *Idem*

Due to the inherent risk present in all construction projects, which also “involve a significant commitment of money and resources” by both owners and contractors, within a constrained context, a “retained percentage” practice has evolved among owners in the U.S. construction industry to manage risks associated with construction.<sup>115</sup> Retained percentage practice applies to the practice of “providing partial payment for a ‘product’ prior to completion and final acceptance” because it is not possible for contractor to wait for payment until final acceptance by owners. “Extending payment for a project during production has inherent risks including overpayment for the work installed, payment for defective work, and the continued solvency of the parties until the work is complete.”<sup>116</sup> From the owner’s perspective, the “retained percentage” practice involves owners retaining “a percentage of each progress payment to their contractors, and contractors in turn typically [withholding] a similar amount from their subcontractors until satisfactory completion of the project.”<sup>117</sup> The City permits different types of retainage percentages in Contracts for projects, and Schedule A of the General Conditions to the Contract indicates the applicable retainage percentage for the project.

“The last major phase of a project’s life cycle is the closeout.”<sup>118</sup> The last two milestones related to *project closeout* are defined in the construction contract—*substantial completion* and *final acceptance*—for a project. The construction contract details provisions for payments for substantial completion of the project and final payment after final acceptance of the work. The payment processes for these milestones, described below, are substantially different than the regular partial payments and change order payments and relate directly to the terms and conditions of the construction contract and the general conditions for the project.

An owner considers a project “closed out” when it “receives and approves all reports as required by the terms and conditions of the award and notifies the contractor of its acceptance and closure of the project.” This process involves administrative closure procedures and contract closure procedures and “includes (1) finalizing all activities completed and transferring

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<sup>115</sup> Dennis C. Bausman, *Retainage Practice in the Construction Industry* (Alexandria 2004), p. 1 (citing Office of Program Policy Analysis and Government Accountability – OPPAGA (2000), *Inflexibility in Contracting and Retainage Practices Could Hurt Construction Industry*, Report No. 00-26, December 2000). <https://www.asaonline.com/eweb/upload/Retainage%20Report%20for%20CKD.pdf> accessed 05/02/17 at 4:13 p.m.

<sup>116</sup> *Idem*

<sup>117</sup> *Idem*

<sup>118</sup> A. A. E. Othman and K. A. Zaid, “Delivering Successful Construction Projects through Achieving Professional Projects Closeouts”, *The Second Built Environment Conference* (2007), p. 244, at [https://www.researchgate.net/profile/Ayman\\_Othman/publication/271269648\\_Delivering\\_Successful\\_Construction\\_on\\_Projects\\_through\\_Achieving\\_Professional\\_Projects\\_Closeout/links/54c384310cf219bbe4eb92d5/Delivering-Successful-Construction-Projects-through-Achieving-Professional-Projects-Closeout.pdf?origin=publication\\_detail](https://www.researchgate.net/profile/Ayman_Othman/publication/271269648_Delivering_Successful_Construction_on_Projects_through_Achieving_Professional_Projects_Closeout/links/54c384310cf219bbe4eb92d5/Delivering-Successful-Construction-Projects-through-Achieving-Professional-Projects-Closeout.pdf?origin=publication_detail), accessed 05-15-19 @ 3:26 p.m.

them to the responsible entity managing and operating [the project], (2) establishing the procedures to coordinate the activities needed to verify and document the project deliverables, [and] (3) coordinating and interacting for formalize acceptance of those deliverables by the [owner] . . .”<sup>119</sup>

A general road map for the final project milestones, encompassing the term “capital project close-out process,” is described below:

- Required items and documentation for project closeout
- Regulatory closeout documentation
- Establishing a punch list
- Final inspections and requirements for sign-offs
- Punch list completion
- Required guaranties, warrantees, affidavits, certifications and manuals for closing out a project
- Project transfer to owner

The City’s standard construction contract defines Substantial Completion as “the written determination by the Engineer for the Work required under [a] contract is substantially, but not entirely, complete and the approval of the Final Approved Punch List, which the Contract defines as “a list, approved pursuant to [the Contract] specifying those items of Work to be completed by the Contractor after Substantial Completion and dates for the completion of each item of Work” (Final Approved Punch List).<sup>120</sup> This contract defines Final Acceptance as “final written approval of all the Work by the [City agency commissioner], a copy of which shall be sent to the Contractor.”<sup>121</sup> At that time, the contractor’s obligation under the contract to provide bonding and insurance ends.

Upon Substantial Completion, the City agency EAO must first “perform a comprehensive review of payments and conduct a field visit to verify that all work has been satisfactorily and substantially completed under the terms of the contract.”<sup>122</sup> The EAO must further verify that incomplete work, which includes all Final Approved Punch List items, including “as-built” records and drawings, “has been identified, evaluated on a cost-to-complete basis, and certified by the resident engineer” and “must ensure that for incomplete work, twice the amount of the

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<sup>119</sup> *Idem*

<sup>120</sup> City Standard Construction Contract (hereafter, City Contract), Article 2 Definitions.

<sup>121</sup> *Idem*

<sup>122</sup> Directive 7, *op. cit.*, Section 3.6.

cost-to-complete has been withheld in accordance with the contract,” after applying all applicable deductions.<sup>123</sup> The Substantial Completion payment releases a major portion of the Retained Percentage Amounts previously retained in each partial payment.

The contractor may, after Substantial Completion if the City accepts the work for occupation or use before Final Acceptance or after the guarantee period specified in the Contract, request the release of retained funds held by the City, as security. If the appropriate City agency personnel approves such contractor’s request, the EAO “must review the project, including a site visit where needed, to verify that all work is in compliance with contract terms” before approving such requested release.<sup>124</sup>

The City agency determines the date of Final Acceptance and will accept the work as final and complete as of the date of the project engineer's inspection if, upon such inspection, the project engineer finds that all items on the Final Approved Punch List are complete and no further work remains to be done. The City agency commissioner will then issue a written determination of Final Acceptance. The City agency EAO may, however, need to conduct field visits subsequent to the field visit for Substantial Compliance discussed above through final payment “to identify necessary adjustments before final payment is approved.”<sup>125</sup> Sections 44 and 46 of the City’s standard construction contract govern the process by which remaining retained percentage amounts can be returned to the contractor at Substantial Completion, Final Acceptance and release of guarantees.

5. Construction Project Management from Contractor Perspective. While the owner’s focus on the four planning principles during the earlier program planning phase “can provide much insight into a planning and scheduling”, the contractor, when preparing a cost estimate as part of the bid for which it may receive an award, and later if it receives the award, must understand the project, the construction sequence and quantities required in order to prepare a network plan and schedule, which means it is first necessary to study the drawings and specifications before developing a detailed list of activities to accomplish the project.<sup>126</sup>

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<sup>123</sup> *Idem*; applicable deductions include liquidated damages, established disincentive assessments or appropriate temporary or permanent withholdings.

<sup>124</sup> *Ibid.*, Section 3.7.

<sup>125</sup> *Ibid.*, Section 3.6.

<sup>126</sup> Griffis and Farr, *op. cit.*, pp. 82-83. For example, if “[one considers] the total worker-hours required to complete a project to be the effort required for the project on a macro level, and the time to completion is dictated, then [one] can calculate the total workforce.”



Basic understanding of the construction process is necessary for the project planning process, and “factors that govern the sequencing of activities with regard to construction, some of which permit flexibility and others of which do not”, are listed below:

- Physical relationships between components
- Trade interaction caused by
  - Space limitations
  - Resource limitations
  - Unsafe environmental effects
  - Damage of installed building parts
  - Requirements for service
- Path interference
- Code requirements
- Flexibility of sequencing constraints
- Time-dependence scheduling logic<sup>127</sup>

As a project moves from planning for the project to planning for its related activities, the definition of an activity is useful:

“An *activity* can be best defined as a time-consuming element of a project. *Tasks* and *jobs* are the words often used in lieu of the word *activity*. Activities can be categorized as engineering, procurement, construction and management activities.”<sup>128</sup>

Project planning, as it relates to activity planning, “leads to the concept of *levels* of networks” for major project activities, with network details evolving from the early planning stages as “the planning process proceeds and more information becomes available.”<sup>129</sup> While programs give rise to projects, projects consist of activities, which are the building blocks of the Build phase process.<sup>130</sup> Project activities are “the basic building blocks used to manage construction . . . projects”, and planners create networks “as a way of visualizing the interrelationships of activities.”<sup>131</sup> The use of networks to manage projects is helpful because they can:

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<sup>127</sup> *Ibid.*, pp. 83-84 (listed material directly quoted).

<sup>128</sup> *Ibid.*, p. 85.

<sup>129</sup> *Ibid.*, pp. 85-86. “In addition, different management levels in the organization require different levels of detail in reporting. \*\*\* Some contracts specify that the contractor provide a network that includes all activities with durations longer than two weeks.”

<sup>130</sup> *Ibid.*, p. 87.

<sup>131</sup> *Ibid.*, p. 87.

- determine the overall duration of a project,
- provide insight into the precedence relationships of the activities, and
- balance workloads<sup>132</sup>

Once the contractor firm develops a network model of a project, the contractor firm can develop a resource plan that further “determines the durations and the costs of the activities in the network,” with modifications to the model and plan as more information, particularly constraints, become known.<sup>133</sup> Resources “include labor, equipment, material, subcontractors, money, workspace, and anything else needed to perform a project [and] determine the duration and cost of a project.”<sup>134</sup>

Focusing specifically on the nature of an activity for project planning and management purposes, an activity “is a single work step that has a recognizable beginning and end and that requires time for its accomplishment [and] should be large enough to identify meaningful quantities of work, yet small enough to be sorted by assigned trade or by project position,” with the activity duration “consistent with the level of detail planning.”<sup>135</sup> Standard practice guidelines for use in identifying activities suggest dividing a project:

- by area of responsibility, with Work performed by general contractor and subcontractors separated
- by category of work, as distinguished by craft or crew requirements
- by category of work, as distinguished by equipment requirements
- by category of work, as distinguished by materials
- by distinct structural elements such as footings, walls, beams, columns, or slabs
- by place on the project
- with regard to owner’s breakdown of the work for bidding or payment purposes
- with regard to contractor’s breakdown for estimating and cost accounting purposes<sup>136</sup>

Another method for categorizing activities is to determine the activity duration and activity costs by first determining the drivers of duration and cost, which requires a focus on:

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<sup>132</sup> *Ibid.*, p. 88 (listed material directly quoted); see also pp. 92-110.

<sup>133</sup> *Ibid.*, p. 152.

<sup>134</sup> *Ibid.*, pp. 160-161.

<sup>135</sup> *Ibid.*, p. 172.

<sup>136</sup> *Ibid.*, p. 173 (listed material directly quoted).

- Production related activities, which have two components: “those whose production is determined by equipment and those whose production is determined by labor”
- Procurement related activities are “related to material takeoff and bills of materials” and “only those unusual or long-lead-time procurements are considered”
- Administrative activities do not depend on production rates and “may involve special activities such as dealing with regulatory affairs, housekeeping requirements, security arrangements and supervisory activities” as well as quality assurance inspections and site cleanup<sup>137</sup>

In order to establish activity durations, it is necessary to predict production rates, which is easier to calculate “when production is equipment-dependent”, as is the case with horizontal infrastructure projects, than it is for vertical building structures.<sup>138</sup> Intangible factors, such as changed conditions, equipment breakdown and weather, however, “are often the factors driving productivity.”<sup>139</sup> In addition, difficulties in calculating labor productivity and predicting weather complicate this exercise.<sup>140</sup>

Once the project scope has been defined for the contractor’s project management purposes, costs, schedule and quality are the “three aspects of a project that require management” and all three variables are interrelated.<sup>141</sup> The most effective use of management concepts is when “they are implemented early in the planning and design stages of a project [because] “most of the control of project cost and duration is exerted in its early planning stages”<sup>142</sup> When a contractor is awarded a public works project and thus accepts the contract, however, “there is little leeway left on the cost or schedule” and the contractor “is left to influence only the cost and scheduling aspects of the project” with “management of labor and equipment productivity, smart buying, and the use of good management practices “ as the tools available to the contractor.<sup>143</sup>

The management tools during the *Build* phase focus on managing resources, which “are typically divided into labor, equipment, material and subcontractors. However, money,

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<sup>137</sup> *Ibid.*, pp. 175-179.

<sup>138</sup> *Ibid.*, p. 86.

<sup>139</sup> *Ibid.*, pp. 86-87.

<sup>140</sup> *Ibid.*, pp. 86-87.

<sup>141</sup> *Ibid.*, pp. 90-91.

<sup>142</sup> *Ibid.*, p. 91.

<sup>143</sup> *Idem*; “Stochastic networks are used in the industry, usually not to schedule a project, but to analyze the risk associated with it.” *Ibid.*, p 117.

workspace, and anything needed to perform a project can also be classified as ancillary physical resources.”<sup>144</sup> Available resources for project management during the Build phase can be categorized into labor, equipment, material and subcontractors.<sup>145</sup>

- Labor resources control the execution of many projects, so a source of activity delays can be from “less labor . . . being used on that activity than was needed to accomplish the planned production rate.”<sup>146</sup>
- Equipment resources, which is a significant driver on horizontal infrastructure projects, can be managed to improve production by adding equipment or using larger equipment.<sup>147</sup>
- Material, which “will be installed and become a permanent part of the constructed facility”, is affected by “its availability or its lead time in procurement” so that early identification of special materials enables project management to factor procurement lead times into the schedule.<sup>148</sup>
- Subcontractors as resources also have labor, equipment and material components, and managing subcontractors involves evaluating and managing their production rates during the *Build* phase.<sup>149</sup>

The construction contract *generally imposes on the contractor several continuing obligations after final project acceptance such as certain obligations with respect to defective materials and workmanship, obligations with respect to warranties and guarantees and obligations to retain project books and records.*

**G. Change during Build Phase.** In construction, as in life, change happens. Since on construction projects, change usually has cost implications, rarely positive, it is imperative for the owner to understand and manage change at all times during the construction process. Government as client, like all owners, should be open to innovative ways to increase the chances of aligning its interests in budget, schedule, safety and quality with the interests of its agents in construction, especially since the construction milieu is the very definition of asymmetric information, which is "a situation where two parties to a transaction involving a

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<sup>144</sup> *Ibid.*, p. 146. “Resources are the independent variables of a project,” and “the assignment and management of resources determine a project’s duration, cost and even quality.”

<sup>145</sup> *Idem*

<sup>146</sup> *Ibid.*, p. 147.

<sup>147</sup> *Idem*

<sup>148</sup> *Idem*

<sup>149</sup> *Ibid.*, p. 148.

good or service have unequal knowledge of the properties or risks involved in making that transaction."<sup>150</sup>

1. Change from Public Owner Perspective. As discussed above, the capital budget administration process anticipates changes in the understanding of a capital project as it progresses from budget adoption through design to the bid phase, which, at the end of the bid process, leads to the price at which the contractor firm commits to construct the project when its bid is accepted and the City agency awards it the construction contract for the project. The nature of the construction process, however, is one of continual change after the contract with the contractor's stated price has been awarded. As a general matter in construction, the risk of potential changes to assumptions made during the Design and Bid phases that can occur during the Build phase is shared by both the Owner and the Contractor. The formal allocation of that risk is set forth in the construction contract, typically in the provisions that cover change orders, which, in the city standard construction contract, are Articles 25 and 26. Managing the potential for change is part of project management, and the cost estimate, which becomes the base line against which to determine revisions to the cost of completion, is one tool for managing costs.<sup>151</sup> Cost estimates during the Design and Bid phases, including the contractor's bid estimate, will never be identical to the actual cost of construction "because of imperfect information", but in Design-Bid-Build contracts, the contractor's bid estimate generally becomes the contract price of the work.<sup>152</sup>

Since the potential for change exists throughout the process, it is necessary for the construction contract to anticipate the kinds of changes during construction due to information that was not possible to know during the Design phase and provide for a process to amend the contract for certain types of changes during the Build phase, after the contract is executed.<sup>153</sup> Most, though not all, changes during the *Build* phase will have cost implications,<sup>154</sup> so the contract includes an important process by which both the owner and contractor understand and manage change during the construction process, including those with cost implications. Change orders are

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<sup>150</sup> Myers, *op. cit.*, pp. 149-150, 251. See also Joseph Stiglitz, "Principal and Agent, *The New Palgrave: A Dictionary of Economics*, Vol. 3 (London: Macmillan, 1987), pp. 966-71.

<sup>151</sup> Hendrickson and Au, *op. cit.*, p. 5/31.

<sup>152</sup> *Ibid.*, Ch. 8, pp. 5-6/28.

<sup>153</sup> While the State's statutory Design-Bid-Build methodology, with its mandatory separation of the Design phase and its participants and the Build phase and its participants, can exacerbate the process of increasing information about a capital project as the various project participants learn more about the project over time during the Build phase, the Contract's change order provisions and its risk allocations govern this aspect of Design-Bid-Build.

<sup>154</sup> Some contracts, notably those for infrastructure projects, can contain provisions to incentivize the contractor firms to make changes during the construction process that reduce the overall cost of the project. For example, if the contract permits, contractors may initiate value engineering to reduce costs during construction or accelerate the execution of the work.

amendments to the contract to accommodate changes during construction that are permitted, for City projects, under the terms of the standard construction contract and the PPB Rules.<sup>155</sup> The materials that follow describe the change order process as set forth in the standard construction contract.

The City's standard construction contract defines *Extra Work* as *Work* permitted by the contract and authorized by the City agency commissioner, in writing, as changes to the contract, which become part of contract, and which *Work* the contractor must perform as *so ordered*.<sup>156</sup> Extra work consists of all labor, materials, and equipment necessary for completion of the project, which is incidental to, but not provided for, in the contract. These kinds of changes to the contract can be made only for (1) *Work* that is necessary to complete *Work* in the original scope of the contract or (2) non-material changes to the contract scope.<sup>157</sup> The contractor is entitled to price adjustment for such *Extra Work* performed pursuant to **written change order** (Change Order). The contract outlines how the City agency and contractor can calculate the price adjustment for Extra Work performed pursuant to a written Change Order, and the various methods of payment for overruns and Extra Work, which will involve the EAO, and Change Orders must be registered, like the original contract, with the New York City Comptroller for the change order to be legally effective.

Conditions giving rise to a Change Order on a City capital project can be categorized under one of the following:

- *Non-Material Scope Changes* are changes to the work at the owner's request that add or delete items or specification requirements to the work as originally designed in the contract documents at the time of bid. These changes do not materially or significantly alter the original scope of the contract and usually consist of minor revisions and/or substitutions that do not affect operational functions or maintenance.

City agencies can only permit *non-material* scope changes on a City project under a City construction contract. A scope change that is deemed to be a material scope change because it materially and significantly alters the scope of the contract work as originally designed in the contract documents at the time of bid is not permitted on any project under any contract, and the City agency would need to procure such work separately.<sup>158</sup>

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<sup>155</sup> PPB Rules, *op. cit.*, Sections 1-01, 4-02.

<sup>156</sup> City Contract, *op. cit.*, Section 25.1.

<sup>157</sup> *Ibid.*, Section 25.2.

<sup>158</sup> PPB Rules, *op. cit.*, Section 4-02(b)(2). Examples of material scope changes include increases or decreases in gross area or size of a project; significant changes in the location, layout, or use of rooms or facilities; significant

- *Administrative Changes* consist of any contract revisions or changes due to revised or pending changes in the requirements of regulatory agencies that were not in effect at the time of the bid. These could include the upgrading of materials, equipment, standards, etc. to conform the new regulatory agency requirements.
- *Changes Due to Field Conditions* consist of unforeseen, previously existing situations encountered in the field during the progress of a contract that prevent the contractor from proceeding with the required work.
- *Changes Due to Design Error* consist of changes resulting from inadequate contract documents requiring the alteration of bid contract work prior to installation or revisions to contract work already installed. The owner seeks recoupment without limitation from the design consultant for any additional costs due to the design error, as specified in the change order, including the cost of demolition or removal (in the case of work already installed), delay damages and additional insurance costs.
- *Changes Due to Design Omission* consist of changes related to items omitted from the contract documents, but required to fulfill the intent of the contract. A change order arising out of a design omission can be issued before or after the construction of the work as originally designed. Like changes due to design error, the design consultant is responsible for the actual cost of installing these omitted items, which is the difference between the cost of the additional work as indicated in the change order and the cost of the work had it been included in the original competitive bid.
- *Overruns/Underruns* consist of changes due to the cost of unit price bid items to be in excess or less than the quantity estimated in the contract. A special category of overruns consists of items that do not routinely fit into the other classifications.
- *Comptroller's Dispute Determination* can result in a change order when the New York city Comptroller has made a decision that is final and binding on the City agency that directs the City agency to pay the contractor a stated amount.

The Change Order or cost overrun payment process at city agencies has six component elements:

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changes in materials, equipment, or type of construction; changes in geographical boundaries or types of construction for streets or highways; and changes that materially impact operating costs.

- Discovery of condition giving rise to Change Order or overrun
- Initiation
- Negotiation
- Package completed at agency
- Package sent out to Comptroller
- Comptroller's registration within 30 days of receipt

In addition to change orders, the PPB Rules and the City's standard construction contract permit another type of contract amendment, which is a reasonable extension of time to perform the work under the Contract for delays as stated expressly in the Contract.<sup>159</sup>

Section 4-06 of the PPB Rules establishes a policy "to process contract payments efficiently and expeditiously so as to assure payment in a timely manner to firms and organizations that do business with the City." With respect to construction projects, the City's obligation to pay for services invoiced begins on the Invoice Received or Acceptance Date (IRA Date), which is "the date when the field engineer certifies on the payment requisition that the work has been accepted" and is conditioned on receipt by the City agency of a Proper Invoice, which is "a written request for a contract payment that is submitted by a vendor in good faith setting forth the description, price, and quantity of goods or services delivered or rendered, in such form and supported by such documentation as an agency may require, and any other documents required by contract." For change orders that require a change to a construction contract, when a City agency "receives a Proper Invoice and the IRA Date has been established," the City agency has 60 days to make such timely payment.<sup>160</sup>

All payments, including regular payments and payments for Change Orders, are subject to the City's retained percentage requirement in the construction contract. City agencies retain a percentage of each progress payment to contractors as specified in the applicable contract until satisfactory completion of the project. The City's retainage percentage requirement in a schedule to the General Conditions to the contract indicates the applicable retainage percentage for the project.

For all change orders that result in a change to the Contract, "the EAO must ensure that all appropriate approvals are in place" must conform to applicable PPB Rules, Mayor's Office of

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<sup>159</sup> PPB Rules, *op. cit.*, Section 4-03.

<sup>160</sup> PPB Rules, *op. cit.*



Contract Services (MOCS) directives,<sup>161</sup> and OMB Construction Standards, and EAO cannot authorize any payments for Change Order work until it is registered with the Comptroller, unless the contract provides otherwise.<sup>162</sup> The EAO must confirm that the Change Order category is appropriate, that the contract does not already require the Change Order work, that the completed work conforms to the contract plans and specifications and “is sufficiently advanced to warrant the requested payment,” and that the “costs are reasonable based on appropriate price and costs analysis.”<sup>163</sup>

With respect to the cost analysis, there are several types of Change Orders:

- negotiated Change Orders based on documented cost history,
- time and materials Change Orders
- Change Orders without documented cost history, and
- unit price Contract Change Orders

Negotiated Change Orders based on prior established cost history require “documented experience on similar work for which a cost history is available and/or documented bid unit price experience which supports the cost and/or documented industry estimating publications supporting costs reasonableness.”<sup>164</sup> For Change Orders without a prior established cost history, support for negotiated Change Orders includes “labor rates and mark-up; crew sizes, compositions and production rates for the respective work activities; equipment description and estimated times of utilization; and material volumes and cost.”<sup>165</sup> The EAO must apply certain cost principles found in the contract, MOCS and Comptroller’s directives, State Labor Law to time and materials Change Orders and Change Orders without prior established cost history.<sup>166</sup> The EAO must confirm, with respect to unit price contracts, that the Change Order prices are the same as the prices in the unit price contracts.<sup>167</sup> With respect to Change Orders due to field conditions, in particular, unforeseen subsurface conditions, the resolution of which “will often eliminate the physical evidence of the condition, the EAO should schedule a site visit to confirm project management’s documented evidence of the conditions.”<sup>168</sup>

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<sup>161</sup> Such directives include all effective directives from the prior Office of the Director of Construction, which was merged with MOCS in the Bloomberg Administration.

<sup>162</sup> Directive 7, *op. cit.*, Section 3.5.

<sup>163</sup> *Ibid.*, Section 3.5.1.

<sup>164</sup> *Ibid.*, Section 3.5.1(d)(1)-(3).

<sup>165</sup> *Ibid.*, Section 3.5.1(d)(4).

<sup>166</sup> *Ibid.*, Section 3.5.1 (d)(1)-(3) *sic.*

<sup>167</sup> *Ibid.*, Section 3.5.1 e).

<sup>168</sup> *Ibid.*, Section 3.5.1(h). There are additional requirements for unforeseen subsurface conditions as well as for design errors and omissions in Directive 7.

Upon the happening of condition(s) giving rise to a Change Order under a contract, which is often referred as “discovery”, the City agency performs its own estimate of costs to accomplish the Extra Work, which becomes a basis for negotiations with the contractor for the Change Order. Directive 7 outlines the process within a City agency when there are internal disputes as well as when issues arise during post-audits of negotiated Change Orders.<sup>169</sup>

## 2. Change from Contractor’s Perspective.

*Before Build Phase.* Since the contract’s allocation of risk with respect to Change Orders defines this part of the Build process, a step a contractor should perform, ideally as part of preparing its bid, is to review the contract to identify how the contract assigns responsibilities between the owner and the contractor with respect to Change Orders and overruns, including those with respect to discovery of conditions that give rise to Change Orders and overruns.

*During the Build Phase.* After the *discovery* of a condition that could lead to a Change Order or overrun, the contractor meets with the agency to discuss the scope of work (Extra Work) involved and identify all documents and information required for the contractor to prepare a detailed cost proposal for the Change Order or overrun. The agency *initiates* the Change Order or overrun process at the agency by, among other things, sending to the contractor all documents and information necessary for the contractor to prepare the contractor’s cost proposal.<sup>170</sup> The agency will schedule a *negotiation* meeting after receiving a complete contractor’s cost proposal with all required information from the contractor.

3. Change Orders and the Budget. While some Change Orders do not result in increased costs under the contract, when they do increase costs under the construction contract, there are additional requirements necessitated by the capital budget administration process that happens after the original budget administration process discussed above. Changes to a project that occur after the last approval of a CP may require an amended CP and, depending on the amount of added cost, may involve review and approval of oversight agencies such as OMB (and possibly the Financial Control Board) and MOCS. In some instances, the magnitude of the cost increase may necessitate a *mini* capital budget exercise in the context of the applicable Commitment Plan and capital budget authorization, with elements similar in

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<sup>169</sup> *Ibid.*, Section 3.5.1(d)(5) and (f).

<sup>170</sup> The agency will not consider a Change Order or cost overrun resulting from a change initiated by a client agency until the Resident Engineer and other staff at DDC receive a letter requesting such change from the client agency.

function to that of the exercise that preceded the initial capital budget appropriation, thus involving an added element of time to accomplish the processes described above.

4. Change from Systems Analysis Perspective. In 1988, RAND published "Understanding the Outcomes of Megaprojects: A Quantitative Analysis of Very Large Civilian Projects", which studied 52 civilian projects, including government-owned and industry-owned projects, as well as jointly-owned projects.<sup>171</sup> One of the primary findings of this report was that "[c]ost growth and schedule slippage for projects in the megaproject database are driven primarily by conflicts between the projects and the host governments, i.e., institutional problems relating to "environmental regulations and opposition, health and safety rules and regulations, and labor practices and procurement controls."<sup>172</sup>

This study's primary conclusion is that government process is the most significant driver of costs for mega projects, but it also noted that *the "host government makes the rules; the host government can change the rules"*.<sup>173</sup> For public owners, this is the essence of "We have met the enemy and he is us". The study made three simple recommendations:

Significantly broaden the scope of project definition phase to rigorously and systematically include cultural, linguistic, legal and above all political factors.

\*\*\* It means, for example, that research on local labor practices and rules should be at least as thorough as the soils and hydrology work done at the site.

Train project managers to be geared at least as much to the project's institutional environment as to the internal project organization. \*\*\*

Question whether the introduction of proposed new technology, construction techniques or design approaches is absolutely essential to the mission of the project. \*\*\*<sup>174</sup>

A 2006 consultant analysis prepared for the City noted that construction cost increases are driven by the combination of market conditions and historical cost drivers, among which are agency and oversight practices, both conscious and inadvertent, and essentially unexamined since the City's fiscal crisis in the 1970s, that embed delay into the construction process, unnecessarily adding costs to projects in the City's capital program. Fixing these processes

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<sup>171</sup> Edward W. Merrow with Lorraine McDonnell and R. Yilmaz Arguden, "Understanding the Outcomes of Megaprojects: A Quantitative Analysis of Very Large Civilian Projects" (R-3560-PSSP) (Santa Monica: The RAND Corporation, 1988).

<sup>172</sup> *Ibid.*, pp. 61

<sup>173</sup> *Ibid.*, pp. vi, 34, 62.

<sup>174</sup> *Ibid.*, pp. vi-vii.

would enable the City to avoid out-year costs, thus freeing up scarce expense and capital resources for future capital needs, reducing the pressure on cash flow to advance expenditures and reducing future debt service attributable to costs that could have been avoided. These historical cost drivers are part of a multi-disciplinary systemic problem requiring a multi-disciplinary systemic solution.

“Cost and schedule are closely linked by common causal factors, both directly and when delays force costs up.”<sup>175</sup> As part of selecting the base estimate to perform this analysis, the study noted that “[m]ore than one cost estimate is made for virtually all capital projects over the life of the project; at least three estimates are usually made, and frequently there are five or more.”<sup>176</sup> The study further noted that “[f]or a variety of reasons, estimates made later in a project will be generally more accurate than those made earlier.”<sup>177</sup> “The study selected the “cost estimate made closest to the commencement of detailed engineering” . . . [which] . . . is usually the critical cost estimate for the ‘go/no-go’ decision on a project, and it typically results in the authorization for expenditure (AFE).”<sup>178</sup> Due to the City Charter requirement that prohibits applying capital funds to projects during the planning phase before budget adoption, the City’s “go/no-go” AFE decision is typically made before even the estimate selected by the study, which is important because “[w]hen detailed engineering begins, expenditures begin to mount rapidly.”<sup>179</sup> Inadequate estimates have several root causes including “*poor project definition* at the time an estimate is made, . . . [*p*]roject *complexity* . . . [and errors in the] set of *economic assumptions*, the most important of which concerns the amount of inflation to expect for the facility being estimated.”<sup>180</sup>

The City’s formal public budget process discourages meaningful project scope development before adoption, since agencies cannot spend capital funds on projects for project planning activities, such as detailed estimates, before appropriation in the capital budget.<sup>181</sup> While “[t]he very word ‘estimate’ connotes uncertainty . . . [and e]stimates of cost can either be too

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<sup>175</sup> *Ibid.*, p. 12; “. . . cost, schedule, and facility performance are also affected by technological innovation.” *Idem*

<sup>176</sup> *Ibid.*, p. 18; citing to Edward W. Merrow, Stephen Chapel and Christopher Worthing, “A Review of Cost Estimation in New Technologies: Implications for Energy Process Plants” (R-2481-DOE), (Santa Monica: The RAND Corporation, 1979).

<sup>177</sup> *Idem*; citing to Edward W. Merrow, Kenneth E. Phillips and Christopher W. Myers, “Understanding Cost Growth and Performance Shortfalls in Pioneer Process Plants” (R-2569-DOE), (Santa Monica: The RAND Corporation, 1981).

<sup>178</sup> *Idem*; the analog to detailed engineering estimates on vertical building projects would be detailed design estimates performed by architects.

<sup>179</sup> *Idem*; Charter, Section 217 (a).

<sup>180</sup> *Ibid.*, p. 22

<sup>181</sup> Charter, Section 217 (a). The expense-funded Capital Project Scope Development Fund has helped to mitigate this.

high or too low, . . . for a variety of reasons, they are usually too low.”<sup>182</sup> After dismissing deliberate cost underestimation for political reasons for the study dataset,<sup>183</sup> the study noted that “[c]ost estimates tend to be optimistic primarily because it is difficult to estimate aspects that are not apparent when using the ‘bottom-up’ cost and schedule estimating approach usually practiced in the engineering and construction industry. In the absence of specific information, such estimating methods usually fix at zero the costs and time requirements for things that are not readily apparent . . . [and c]ontingency allowances are not designed to adjust for the major sources of bias and therefore rarely do.”<sup>184</sup>

Translating the close link between cost and schedule and persistent underestimation during the project planning—or project definition<sup>185</sup>—phase to the public budgeting process suggests that when the adopted budget project estimate and scope are wrong, everything, beginning with budget through design and construction phases, runs the risk of being wrong. “The project estimated early in project development is often not the project actually built . . . [because s]cope changes, technological innovation and such extraneous factors such as unusually bad weather can lead to either changes in the configuration of a project or increases in the cost of its execution.”<sup>186</sup> Scope changes are “any *discretionary* change in the size or configuration of a project . . . [and] include both additions to and subtractions from a project, as well as discretionary changes in the elements that make up a project.”<sup>187</sup> “Most changes in scope result from changing market conditions or a better understanding of the need for the project”<sup>188</sup> or a better understanding of the project itself as the *Design* phase activities detailed in the Charter (see 1 Design Phase above) are intended to produce. Innovation is “simply and broadly . . . the inclusion of anything novel or commercially untired in the design, materials, or construction of a project . . . [and can include] things done in the same manner as before but at a larger-than-ever scale \*\*\* [or] modest and subtle changes from current practice, even *retrogression* in the state of the art, can cause problems that lead to cost growth and schedule

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<sup>182</sup> *Ibid.*, p. 21.

<sup>183</sup> *Ibid.*, Footnote 1; but see Bent Flyvbjerg, Mette Skamris Holm and Soren Buhl, “Underestimating Costs in Public Works Projects: Error or Lie?” *APA Journal*, Summer 2002, Vol. 68, No. 3, pp. 279-295.

<sup>184</sup> *Idem*; citing J.J. Milanese, “Process Industry Contingency Estimation: A Study of the Ability to Account for Unforeseen Costs” (N-2386-PSSP), (Santa Monica: The RAND Corporation, 1987). “Bottom-up cost estimation techniques usually work well only for standard (i.e., non-innovative) projects that are not perturbed by other problems, such as changing regulations. Even then, such techniques tend to underestimate cost and time in the early stages of project development.” *Ibid.*, pp. 21-22, citing to Merrow, Philips and Myers, *op. cit.*, and J.W. Hackney, *Control and Management of Capital Projects* (New York: John Wiley and Sons, 1965).

<sup>185</sup> *Ibid.*, p. 30.

<sup>186</sup> *Ibid.*, p. 24.

<sup>187</sup> *Idem*

<sup>188</sup> *Idem*

slippage.”<sup>189</sup> “A variety of other factors can also affect cost and schedule . . . [such as [u]nusually bad weather, strikes, labor shortages, equipment shortages, and failed delivery of equipment [which] can all increase the costs of a project, sometimes significantly.”<sup>190</sup> Finally, “[t]he legal system, labor practices, attitudes toward worker health and safety, environmental concerns and constraints, and basic economic facts such as the relative price of key inputs and products are manifestations of the ‘macroenvironment’ of capital projects” . . . can affect cost growth and schedule in two ways: (1) by being unknown to some degree by project planners, estimators, and managers, and (2) by changing.”<sup>191</sup> The combination of construction contract provisions that define and allocate various risks and the standard 10 percent rule of thumb contingency for expected changes are intended to establish institutional and legal boundaries of expected cost growth and schedule change.

Initial underestimated estimates exert pressure on a capital project’s budget and schedule and can dog the project to end, generating a tranche of changes outside the expected range of change orders, within the standard change order process. Thus, inadequate estimation and scoping before AFE, which the public budgeting process does not explicitly acknowledge and makes almost certain, is a root cause of systemic capital project budget uncertainty and schedule delays that find expression in the change order process. A construction program working group during the Bloomberg Administration commissioned a value analysis of the change order process facilitated by OMB. Most of the recommendations, except those involving scope creep and no damages for delay, could only marginally reduce process through-time. The other recommendations involved systemic process improvements to address systemic issues due to inadequate scoping during the planning process, which includes the inadequate charter-mandated asset evaluation process that does not adequately operations and maintenance needs for all existing assets, that inflated the total amount of change orders as percent of original contract cost more than the standard 10 percent rule of thumb and feeding back into the CP approval process in a dysfunctional way, crowding out traditional and anticipated change orders and slowing overall change order system through-time.

Instead of focusing on the details of the change order process itself, focusing on elements of the overall processes that *lead* to change orders beyond the standard 10 percent contingency amount require aligning capital planning and budgeting practices to meet project needs in addition to the needs of various organizational stakeholders and include:

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<sup>189</sup> *Ibid.*, p. 25.

<sup>190</sup> *Idem*

<sup>191</sup> *Ibid.*, p. 26.

- Better scope analysis and definition during the planning phase before adoption; the City's creation of a capital project scope development fund, funded with expense funds, encourages agencies to develop more accurate project scope and cost estimates of certain large, complex and often high-profile projects before the project goes into budget
- Meaningful existing condition surveys beyond those required by the Charter's AIMS process (see TAB 4 D. **Operations+Management** below) would require making strategic investments in the Charter-mandated AIMS process so that AIMS reports regularly produce better needs assessments/scope information for operations and maintenance to keep assets in a state of good repair, and provide meaningful scoping information when the aggregation of those activities lead to a capital project
- Budget approval for construction that includes adequate contingency for standard change orders that is registered with contract funds to speed up the change order process for the expected types of change orders and cost overruns
- Expanding blanket budget approvals to correspond with expanded risk-based program space and quality standards
- Moving the value engineering process to earlier in the design process and integrating it with agencies' project management processes
- Supporting agencies' engagement in rigorous risk analysis-based program management throughout the process but explicitly beginning as soon as projects begin to move from the Ten-Year Capital Strategy toward inclusion in a particular capital budget
- Exploiting existing procurement processes to reduce risk and pressing for State legislative changes for fuller service delivery flexibility

**H. Construction as a Production Function.** Construction categories differ broadly for horizontal infrastructure projects and vertical building projects. Horizontal infrastructure projects involve significant amounts of earthmoving and heavy construction and include activity categories such as earthmoving and trenching operations, excavation and lifting, loading and hauling, compacting and finishing, production of aggregates, production and pouring of portland cement concrete, production and laying of asphaltic concrete, paving and surface treatments, rock excavation and compressed air and water supplies.<sup>192</sup> Activity categories for vertical building structure construction consist of foundations, concrete construction, wood construction, steel construction, piping, HVAC, electrical, telecommunications, exterior finish construction and interior finish construction.<sup>193</sup>

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<sup>192</sup> Griffis and Farr, *op. cit.*, p. 171 (listed material directly quoted).

<sup>193</sup> *Ibid*, p. 172 (listed material directly quoted).

While horizontal infrastructure construction differs from building structure construction in many ways, lean construction principles, the construction industry's adaptation of Toyota's total quality management, make it possible to see commonalities when looking at construction as a production function.<sup>194</sup> The construction industry stands out among all other industries across a number of areas, in part because construction is less like factory production and more like product development conducted at a specific site requiring on site assembly against a dynamic and complex "parade of trades" montage.<sup>195</sup> A construction project is a complex setting where multiple levels of "skill differentiation and hand-tool operations . . . converge at a unique site" and the "myriad of special-trades employers then direct these operations."<sup>196</sup>

In the "parade of trades" montage—or the construction production function—the project is an assembled object, fixed-in-place where "the stations—or work crews—move through the emerging whole [building or infrastructure in the process of becoming]".<sup>197</sup> This "parade of trades" process on a vertical building project (and to a lesser extent on a horizontal infrastructure project) also "involves a large number of specialty trades that generally work in a continuing and repeating sequence as they move from one floor to another, from the structural parade, the overhead work parade, the perimeter work parade, the enclosure work parade to the interior finishes work parade, which can impact access and create congestion."<sup>198</sup> The concentration of work at the site will vary by trade and "the different parades [will] move through a building in different directions."<sup>199</sup> In this setting, "[e]very project is somebody else's subproject" in an atmosphere of "fast completion in a dynamic setting where frequent changes are not the exception but the rule."<sup>200</sup>

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<sup>194</sup> Sweet and Schnier, *op. cit.*, pp. 381-382.

<sup>195</sup> Glenn Ballard and Greg Howell, "What Kind of Production Is Construction?", *Proceedings IGLC '98 Guarujá, Brazil*, pp. 2, 4, 6. See also, Ophir Rozenfeld, Rafael Sacks, Yeheil Rosenfeld and Hadassa Baum, "Construction Job Safety Analysis", *Safety Science*, 48 (2010), p. 491.

<sup>196</sup> Finkel, *op. cit.*, p. 83.

<sup>197</sup> Ballard and Howell, *op. cit.*, pp. 2, 4.

<sup>198</sup> Iris Tommelein, David Riley, Greg Howell, "Parade Game: Impact of Workforce Variability on Trade Performance", *Journal of Construction Engineering and Management*, Sept/Oct 1999, p. 304.

<sup>199</sup> *Ibid.*, p. 305.

<sup>200</sup> Sven Bertelsen, "Lean Construction: Where Are We and How to Proceed?", *Lean Construction Journal*, Vol. 1 October 2004, p. 56.



# Capital Project Processes: Build

## Parade of Trades



### Earthmoving and heavy infrastructure construction

- Earthmoving and trenching operations
- Excavation and lifting
- Loading and hauling
- Compacting and finishing
- Production of aggregates
- Production and pouring of portland cement concrete
- Production and laying of asphaltic concrete
- Paving and surface treatments
- Rock excavation
- Compressed air and water supplies

### Building construction

- Foundations
- Concrete construction
- Wood construction
- Steel construction
- Piping
- HVAC
- Electrical
- Telecommunications
- Exterior finish construction
- Interior finish construction

Source: F.H. (Bud) Griffis and John v. Farr, *Construction Planning for Engineers*, (New York, 2000) (McGraw-Hill Custom Publishing Textbook), p. 172.

Finally, to make matters more complicated, the construction process is an “undocumented process that takes place as an interplay between a complex and dynamic customer and a complex and dynamic production system at a temporary production facility.”<sup>201</sup> It may help to understand the construction process by looking at it as “essentially a design process” or more like product development and less like factory production, at a specific site that requires on site assembly.<sup>202</sup> The construction projection function for buildings and infrastructure thus conceived is “a flow of information and materials (flow process) and as the generation of value for customers” in the context of “converting inputs to outputs (conversion process).”<sup>203</sup> Viewed in this manner, it becomes possible to identify and manage “previous work, space, crew,

<sup>201</sup> *Ibid.*, p. 52.

<sup>202</sup> Ballard and Howell, *op. cit.*, p. 5.

<sup>203</sup> *Idem*

equipment, information, materials and external conditions such as the weather” as “flows toward . . . execution of a work package.”<sup>204</sup> The techniques of managing the “turbulence” in space, crew, equipment, information, materials and external conditions and using buffers to “facilitate reliable workflow by ensuring that there is always work packages ready”<sup>205</sup> can shed light on the root causes of many issues in construction ranging from schedule delays (and resulting increases in cost) to accidents. Managing “the handing over of space from one trade to another”<sup>206</sup> and “flows of crew [shared with other construction projects] and equipment in a highly dynamic system”<sup>207</sup> requires both “managing bottom up and not top down only . . . while focusing the middle management’s own resources on managing the logistics . . . and establish the overall strategy . . .”.<sup>208</sup> Thus the management process, which “take[s] place by a series of conversations” can become a “learning process, where the crews and the organization as a whole are learning . . . about the object, the process and the objectives and also learning about each other.”<sup>209</sup> Thus, despite “frequent work team rotations, exposure to weather conditions, high proportions of unskilled and temporary workers . . .” and “. . . changes in topography, topology and work conditions . . . that make managing construction . . . more difficult than managing . . . in manufacturing plants,” it is, however, possible to assess and model conditions for construction to predict and thus manage risks to project schedule and safety.<sup>210</sup>

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<sup>204</sup> Bertelsen, *op. cit.*, p. 58.

<sup>205</sup> *Idem*

<sup>206</sup> Bertelsen, *op. cit.*, p. 59.

<sup>207</sup> *Ibid.*, p. 60

<sup>208</sup> *Idem*

<sup>209</sup> *Ibid.*, pp. 61, 63; *see also* Martin Marosszeky, Khalid Karim, Steven Davis, Nitin Naik, “Lessons Learnt in Developing Effective Performance Measures for Construction Safety Management,” from proceedings of 12<sup>th</sup> Annual Conference of the International Group for Lean Construction, 2004.

<sup>210</sup> Rozenfeld, *op. cit.*, pp. 492, 497.

**ISSUES IN TRADITIONAL PUBLIC PROJECT DELIVERY: DBB, DB AND O+M**  
and  
**NEW YORK CASE STUDIES IN DESIGN-BUILD**

(See TABS 4-A – 4-F in COURSE MATERIALS APPENDIX)

**A. Analytical Paradigms for Public Built Environment Systems.** In all built environment systems, especially publicly-funded systems, finance issues—the capital budget and debt financings for construction<sup>211</sup> and the expense budget for post-construction operations and maintenance<sup>212</sup>—have a direct impact on system performance. The Built Environment disciplines, like the built environment practitioners, are often fragmented and rarely make the necessary connections between finance and infrastructure to permit multi-disciplinary systemic analyses aimed at resolving “wicked problem” structural issues.

Public built environment (PBE) systems at the local government level reflect the police powers of local governments and mandates from the state level of government.<sup>213</sup> In the City, as the municipal corporation,<sup>214</sup> they include:

- Local roads and bridges (local tax supported with federal and state grants)
- Water resource facilities, waste water treatment facilities and related transmission facilities (New York City Water Authority/Board with federal and state grants)
- Facilities where local services, such as police, fire, health and mental health, sanitation, cultural and library,<sup>215</sup> and social services, are delivered (local tax supported with federal and state funding and grants)

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<sup>211</sup> Construction activities consist of new construction, major rehabilitation of existing facilities and capital-eligible renovations that fall short of major rehabilitation, which are associated with “state of good repair” or “SOGR”.

<sup>212</sup> Maintenance includes activities associated with “state of good repair” or “SOGR”.

<sup>213</sup> “The public works or capital programs of all levels of government are, in essence, work orders for facilities relating to “social” or “public” goods and to “mixed goods” that correct for negative and positive externalities.” New York City Bar Association, Construction Law Committee, *21st Century Construction 20th Century Construction Law: February 2008* (hereafter, the 2008 Report), p. 9; citing to Richard A. Musgrave and Peggy B. Musgrave. *Public Finance in Theory and Practice, 5/e* (New York: McGraw-Hill Book Company, 1989), pp. 5-9, 41-58, 446-453; and to Danny Myers, *Construction Economics: A New Approach* (London: Spon Press 2004), pp. 39-40, 147-159, 184-186, 191.

<sup>214</sup> In New York City, these are local government responsibilities; elsewhere they can be regional responsibilities

<sup>215</sup> New York City owns a number of cultural facilities, such as the Metropolitan Museum of Art, the Natural History Museum, which are operated by private entities. New York City, unlike other cities, does not own or

- Public housing (New York City Housing Authority with federal, state and local funding; initial historical City origin)
- Public hospital system (New York City Health+Hospitals with federal, state and local funding)

PBE systems at the New York metropolitan area level include:

- Public transit system
  - Buses and subways subsystems (MTA/NYCTA)
  - Commuter railroads (MTA/LIRR/MNCR)
  - Bridges and tunnels (TBTA and PANYNJ)
- Air travel system (PANYNJ)

State governments, for themselves and on behalf of local governments, often create off-budget entities (also known as authorities) to finance and/or operate a PBE system. Creation of authorities to operate and finance a PBE system is consistent with public economic theory when the assets and related user fees follow the utility finance model. In jurisdictions with antiquated constitutional debt limits, such as New York State, authorities are often a tool to effect and “end run” around such limits.<sup>216</sup>

Government performs several roles, often simultaneously and often at cross purposes, in the built environment.<sup>217</sup>

- As an owner of construction and client of construction-related services (design and constructor), the interests of the government owner in budget, schedule, quality and safety are similar to and shared with those of all owners of construction, including private owners. Issues that arise from the owner role are of an enterprise management nature, with specific construction project management issues as part of the larger enterprise perspective. Public owners that are units of government with debt issuing

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operate the public libraries, which are three separate privately owned systems with a long standing public funding agreement.

<sup>216</sup> This analytical paradigm applies to all levels of government; when authorities have been created to finance and operate city PBE systems, these authorities are city controlled. “[State c]reation of [public] authorities to finance and/or construct their respective public works was the result of a ‘strategy of circumvention that has tempered the need to attach anachronistic state restrictions directly.’” Matthews, *op. cit.*, p. 155; citing Alberta Sbragia, *Debt Wish: Entrepreneurial Cities, U.S. Federalism, and Economic Development*, (Pittsburg: Pittsburg University Press, 1996), pp. 22-23.

<sup>217</sup> 2008 Report, pp. 9-12; Myers, *op. cit.*, pp. 15, 39-40, 60, 70-71, 147-159, 184-86, 191.

authority to finance their project also perform the role of financier (which is performed by construction lending institutions for private project), which along with the public budgeting function, is also an enterprise management issue.

- Government owners that are units of government act in the role of economic policy maker and regulator. Public owners with large capital spends can function as market makers and economic catalysts.<sup>218</sup> Public spend is thought to have countercyclical power within the economy, providing public works for the construction industry going in the downside of the economic cycle when private construction tapers down.
- Government owners that are units of government at various levels also regulate built environment artifacts and market participants under the police powers (e.g., various safety codes, licensing schemes and public procurement). The multiplicity of several layers of regulation that often apply to all projects creates regulatory complexity and related inefficiencies, and these institutional frameworks at all levels are rarely reviewed and revised to reflect current conditions and needs and/or reduce inefficiency.

The following analytical concepts, with Built Environment disciplines noted, explicitly link finance and infrastructure to permit multi-disciplinary systemic analyses aimed at resolving “wicked problem” structural issues.

1. Construction Efficiency (Management, Technology, Design/Engineering). The efficiency paradigm is associated with the needs of the infrastructure and the construction activities necessary to effect them. Construction-related activities leading to projects and the projects themselves are notoriously inefficient due to a number of factors, so that focusing on ways to make the construction process more efficient has a direct impact on the finance issues associated with construction and post-construction operations and maintenance. Technological construction innovation and design and engineering innovation can help increase efficiency.

Debt is not free, and non-discretionary debt service payments can operate, in periods of declining revenues, to crowd out discretionary expense-funded program service, holding taxes at constant level. Increasing capital planning/budget process efficiency and design/construction process efficiency, creates future “savings” for expense budget and/or permits more capital projects to come to the start line. But it is critical to start with a focus on

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<sup>218</sup> This is different than the use of specific economic development projects, which are a form of economic catalyst as well.

the ‘stuff’—construction policy that cuts across all project types—not with the policy of the stuff (e.g., roads and bridges and transit infrastructure vs. transportation policy; water resource systems, waste water treatment facilities, distribution networks vs. environmental policy; energy generation and transmission facilities vs. energy policy; residential housing assets at all income levels vs. homeless and affordable housing policy).

2. Transaction Cost Economics and Risk Management (Economics, Law). The laws that govern construction are complex, and regulatory complexity alone creates inefficiency. These laws at all levels of government serve various public purposes that do not explicitly include efficiency and, in fact, are often at odds with efficiency. They are rarely updated to reflect current reality and they often work together to increase inefficiency.<sup>219</sup> The statutory ensemble requiring Design-Bid-Build, which was initially “enacted, or were perceived to have been enacted, in response to earlier instances of corruption in public works . . . ‘reflects a strong bias against negotiation as a way to obtain the best value for construction services and products,’ in spite of evidence to the contrary of a relationship between lowest initial price and quality or lowest life-cycle costs.”<sup>220</sup> A mismatched service delivery methodology and project not only keeps a project team from avoiding costs due to the mismatch, but the network of contracts supporting such a mismatched project will be economically inefficient on an “asset-and-relationship-specific investment” basis because they will not be able to resolve information asymmetries on the project “before the deal is struck, or *ex ante*, and after the deal is struck, or *ex post*” within a shared environment of uncertainty.<sup>221</sup> See **B. Service Delivery and the Procurement Function**, 6. Economic Efficiency of Construction Contracts. below.

3. Public Finance qua Public Finance (Management, Economics, Law). Spatial incidence of infrastructure systems and the revenues to support them impact efficiency of various systems, and legal jurisdictional issues are directly related to spatial incidence of revenues and the authorization to build systems.<sup>222</sup> Constitutional home rule provisions and application of the municipal corporation law “Dillon’s Rule” clearly identify the actual actor(s) for various PBE systems. Finance law ends up determining what level of government is the authorized actor and can help with the efficiency perspective. Constitutional debt limits, resulting creation of

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<sup>219</sup> 2008 Report, pp. 5-7.

<sup>220</sup> Matthews, *op. cit.*, p. 157; citing New York City Bar Association, Construction Law Committee, *20<sup>th</sup> Century Construction, 21<sup>st</sup> Century Construction Law: Update*, March 2011 (hereafter, 2011 Update), p. 6, (<http://www.nycbar.org/pdf/report/uploads/20072050-21stCentConstruction20thCentConstructionLawUpdated.pdf>).

<sup>221</sup> Sweet and Schnier, *op. cit.*, p. 386; Matthews, *op. cit.*, p. 162, citing de Bettignies and Ross, *op. cit.*, p. 137; and Patrick Bajari and Steven Tadelis, “Incentives versus Transaction Costs: A Theory of Procurement Contracts”, *RAND Journal of Economics*, Vol. 32, No. 3, Autumn 2001, pp. 387-407, p. 388.

<sup>222</sup> 2008 Report, p. 7; citing Musgrave and Musgrave, *op. cit.*, pp. 7-9, 54, 446.

authorities and development of public-private financing vehicles can all highlight areas of inefficiency. State public finance laws and federal tax laws also provide additional contexts for identifying increased efficiencies in delivery of projects and state of good repair activities.

**B. Service Delivery Methodologies and the Procurement Function.** "In the built environment and, in particular, public capital construction, words like *procurement* and *contracting* can obscure relations to other large system processes and, in particular, to the underlying functions they facilitate. At public owner organizations, by obscuring the project service delivery function, words with roots in the larger enterprise system can create conceptual impediments that inhibit management innovation. The tendency of referring to project delivery as *procurement* and/or *contracting*, as those at public owners are accustomed to do, can obscure thinking of ways to improve service delivery. It is as if the words themselves inhibit innovative thinking."<sup>223</sup> Moreover, New York State laws authorizing how *contracting* for public works must occur conflate contracting, which is a procurement term, with the single service delivery methodology it authorizes— traditional design-bid-build service delivery methodology. Thus, it is common for proposed reforms or innovations to be expressed as reforms to procurement or contracting, instead of focusing on aspects of the service delivery methodology at the project level that are bound up in the laws. In addition, dissonances—or disconnects—between enterprise-wide management systems and policies (e.g., public capital planning and budgeting) and project-specific management systems and activities also can obscure systemic impediments to innovation, if not actually discourage them.<sup>224</sup>

1. Enterprise-Wide Processes as Sources of Dissonance on Project Management—From Service Delivery Not Procurement.<sup>225</sup> An enterprise's operating systems and controls can, over time, lose the direct connection to the imperatives that animated them. The measures of the larger system, often publicly reported at public owner entities, develop a life of their own, obscuring their underlying animating purposes, sometimes at odds with the imperatives of the actual activities and results. After the City began to operate under a less strict fiscal monitoring environment in 1986, [the New York City Financial Control Board] identified a structural disconnect between the work of line agencies and the enterprise-wide budget planning and

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<sup>223</sup> From précis document from Town+Gown *Service Delivery Not Procurement* symposium event, on April 18, 2013 (hereafter, *Service Delivery Not Procurement*), p. 1, at [https://www1.nyc.gov/assets/ddc/downloads/town-and-gown/SYMPOSIA\\_MAY\\_2013.pdf](https://www1.nyc.gov/assets/ddc/downloads/town-and-gown/SYMPOSIA_MAY_2013.pdf).

<sup>224</sup> Matthews, *op. cit.*, pp. 168-171.

<sup>225</sup> *Op. cit.*

implementation processes.<sup>226</sup> This disconnect, expressed in the context of the expense budget, arises from differences in planning functions and budgeting functions.

'The terms 'financial plan' and 'budget' . . . are often used interchangeably. In fact, they are different products with different purposes even though they are developed at essentially the same time and are often presented together [but are] . . . the result of separate sets of decisions and analytical investigations . . . ' .<sup>227</sup>

This disconnect, still to be resolved on the expense side of the budget, is exacerbated on the capital budget side by the temporal realities of capital programs as well as the several, but inextricably related, roles the enterprise government plays in the built environment, often simultaneously, as it performs the related functions.<sup>228</sup> The City's budget process has a four-to-five-year horizon, depending on the time of year, consisting of the current year (adopted budget) and estimates for up to the following four fiscal years (financial plan period). This horizon, which is considered the gold standard in public budgeting, is not long enough to account for the temporal realities of construction, and a focus on the budget alone—including the capital budget component—will distort analysis. Making matters worse, the time from design to construction completion for an individual project, excluding the earlier time for related capital planning phase, can span across executive administrations and legislatures, 'further attenuating the connection between the decision to invest and the budget consequences of such decision.' The investment decision methodology, the analytical tool for analyzing capital projects, which accounts for related debt service costs and post-completion life cycle operation and maintenance expenses, would far outstrip any budget horizon. This temporal reality establishes an illusion, during the planning and construction phases, especially at the line agency level, that capital projects are without cost or impact on their agency operating budgets, which illusion the budget convention of reporting debt service, on an aggregate enterprise-wide basis, aids and abets. These divides and dissonances impede the ability of both enterprise-wide oversight entities and line agencies to understand and plan for the impact of capital decisions on annual operating budgets.<sup>229</sup>

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<sup>226</sup> See New York State Financial Control Board, *Financial Planning in the Nineties: Building on New York's Pioneering Efforts in the Seventies*, June 1992 (hereafter, *Financial Planning in the Nineties*), for the difference between planning and budgeting, see pp. 15-18; for related operational elements, see pp. 24-28.

<sup>227</sup> *Ibid.*, p. 15.

<sup>228</sup> See above under **A. Analytical Paradigms for Public Built Environment Systems**.

<sup>229</sup> Service Delivery Not Procurement, p. 3; Matthews, *op. cit.*, p. 170; citing to 2011 Update, p. 15. "The weak connection between capital program decisions at the agency level and their impact on the operating budget is made more tenuous by the length of time from the planning of a project, scoping a project, awarding the contracts, constructing and commissioning the project and, finally, debt service payments." 2011 Update, p. 15. Debt service costs and operation and maintenance costs accruing from capital planning/budgeting decisions



2. Lack of Statutory Service Delivery Flexibility as Source of Avoidable Costs.<sup>230</sup> Complicating matters, the City enterprise is subject to various laws from higher levels of government. While the City has its own Charter chapter for procurement and an extensive set of rules,<sup>231</sup> State law effectively pre-empts local law to such an extent that New York State law defines and constrains the public construction process for the City as one of the State’s many subordinate municipal governments. The essential elements of New York’s public construction procurement statutory ensemble were established by the end of the first half of the last century, and despite “tinkering on the margins, [this ensemble] remains essentially the same reflection of theory and practice, today as when it was enacted.”<sup>232</sup> While the statute itself does not explicitly use the functional service delivery term “design-bid-build”, various provisions under the rubric of contracting for public works, result in the design-bid-build methodology as the single authorized service delivery for the vast majority of the State’s public owner entities, several decades after alternative delivery service methodologies developed to meet changing project needs.<sup>233</sup> After years of lobbying efforts, in 2018, the City received specific authority to use and alternate to design-bid-build—design-build—for two specific capital projects.

Two defining elements of the design-bid-build methodology, which remains appropriate for some projects, consist of a temporal and legal separation of the designer and the constructor entities and the requirement that the lowest initial cost determines who the constructor entities can be. The temporal separation of designer from constructor reduces the opportunities to avoid changes and related costs during the construction phase. The mandated use of a single delivery methodology, with such separation, further reduces opportunities to avoid costs arising from the mismatch from the service delivery methodology and projects needs and project team capacities. The requirement that selection of constructor entities be based on the lowest initial cost may have been an effective criterion when buildings were simpler, aligning more closely with the concept of commodity pricing, and when it was realistic to expect that final plans and specifications were indeed final, which is often no longer the case.

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appear much later in the expense budget. Debt service becomes a non-discretionary cost that can crowd out other expense budget needs when revenues are tight. Expense budget-funded operations and maintenance cost, in practice, are often deferred until they become larger and thus eligible for debt finance (e.g., “capital” eligible). See also précis document from Town+Gown symposium event *When Does Design Begin and End?*, on March 14, 2014, pp. 2-3, at <https://www1.nyc.gov/assets/ddc/downloads/town-and-gown/DesignBeginEnd.pdf>, accessed 05-13-19 @ 6:44 p.m.

<sup>230</sup> Service Delivery Not Procurement, pp. 3-4.

<sup>231</sup> See Charter Chapter 13 and PPB Rules, *op. cit.*

<sup>232</sup> Matthews, *op. cit.*, p. 155; citing 2011 Update, p. 6.

<sup>233</sup> *Idem* and 2011 Update, pp. 6-7.

Moreover, the lowest initial cost requirement may tend, in a public and political budget environment where what is required to be measured tends to drive attention, to become an impediment for the owner to maintain (assuming it had one) a focus on the total life cycle costs of the project, especially on more complex projects for which incrementally increased initial costs can reduce life cycle costs as compared to the lowest initial cost version.

It is generally accepted now that there is no single optimal project delivery methodology for all types of construction projects. "The objective of an owner and project team is to match the service delivery methodology to specific project circumstances, such as the extent of scope definition, the need for schedule speed as well as certainty, the need for flexibility to make changes to the project during construction, the capacity of the owner to participate in the process and general market conditions. In addition, the integration of the owner, designer and constructor on a collaborative team from project conception until commissioning at project completion can lead to increases in efficiency and cost effectiveness by increasing shared knowledge about the project as early as possible."<sup>234</sup> "The inability to (1) match project delivery methodology to project needs and owner capacity and/or (2) bring the benefits of contractor experience, judgment and skill to the project as soon as possible during the design phase generates avoidable costs," with the second restriction guaranteeing changes later in the construction process due to the progressive increase in project knowledge that are more costly than similar changes incorporated earlier in the design phase.<sup>235</sup> "Analysis that captured "the interactions among changes, disruptions, productivity losses" demonstrated the capacity of techniques to manage change, whether owner- or contractor-directed, and their related costs. But the ability to manage change requires access to the full menu of service delivery methodologies, with their attendant management techniques."<sup>236</sup> "When[, as in New York,] the law constrains a public owner's ability to use all modern project delivery methodologies and the management techniques associated with them, the public owner will be less likely to be to deliver a project within its estimated budget, schedule and quality parameters."<sup>237</sup>

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<sup>234</sup> 2011 Update, p. 12.

<sup>235</sup> 2011 Update, pp. 12-13.

<sup>236</sup> *Ibid.*, p. 12; citing William Ibbs; Long D. Nyguyen; and Seulkee Lee, Quantified Impacts of Project Change, *Journal of Professional Issues in Engineering Education and Practice*, American Society of [Civil] Engineers, January 2007, p. 46. See also Love, Peter E. D., Irani, Zahir and Edwards, David J., "A Rework Reduction Model for Construction Projects," *IBEE Transactions on Engineering Management*, Vol., 51, No. 4, November 2004, pp. 435-37. "Specific project attributes that can increase or decrease the utility of a particular methodology include 'the extent of scope definition, the need for schedule speed as well as certainty, the need for flexibility to make changes to the project during construction, the [institutional] capacity of the owner to participate in the process, and general market conditions.'" Matthews, *op. cit.*, p. 163; citing 2011 Update, p. 12.

<sup>237</sup> 2011 Update, p. 10.

"Thus, a public owner's ability to choose the optimal project delivery methodology, some of which permit earlier collaboration between the designer and contractor, would facilitate the ability to avoid costs due to changes. Avoided costs translate into marginally lower construction costs that are financed with long term debt and marginally lower related debt service costs over the life of the debt."<sup>238</sup> Two defining elements of the design-bid-build methodology, which remains appropriate for some projects, consist of a temporal and legal separation of the designer and the constructor entities<sup>239</sup> and the requirement that the lowest initial cost determines who the constructor entities can be. The temporal separation of designer from constructor reduces the opportunities to avoid changes and related costs during the construction phase. The mandated use of a single delivery methodology, with such separation, further reduces opportunities to avoid costs arising from the mismatch from the service delivery methodology and projects needs and project team capacities. The requirement that selection of constructor entities be based on the lowest initial cost may have been an effective single criterion when buildings were simpler, aligning more closely with the concept of commodity pricing, and when it was realistic to expect that final plans and specifications were indeed final, but it is no longer true.<sup>240</sup> Moreover, the lowest initial cost requirement may tend, in a public and political budget environment where what is required to be measured tends to drive attention, to become an impediment for the owner to maintain a focus on the total life cycle costs of the project, especially on more complex projects for which incrementally increased initial costs can reduce life cycle operations and maintenance costs as compared to the lowest initial cost version.<sup>241</sup>

In addition, the award to the bidder with the lowest initial cost, in contrast to an award based on best value criteria, exacerbates the public sector's lack of focus on operation and maintenance costs after initial construction, which contributes to problems with state of good repair of capital assets.<sup>242</sup> Among the factors that conspire against the explicit and early assumption and planning for such life cycle costs as part of the initial public investment decision processes, the current procurement law's single-minded focus on initial costs is a significant contributor.<sup>243</sup> "The impact of inadequate budgeting for state of good repair activities or

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<sup>238</sup> 2011 Update, p. 13.

<sup>239</sup> Service Delivery Not Procurement, p. 3. The constructor is a term that contains, and obscures, a highly complex set of contractual arrangements that creates a corresponding highly complex set of management issues within the constructor actor and among the three archetypal participants. See Bajari and Tadelis, *op. cit.*, 389–90; see also Iris D. Tommelein, David R. Riley & Greg A. Howell, "Parade Game: Impact of Work Flow Variability on Trade Performance, 125 *Journal of Construction Engineering and Management* 304 (1999), pp. 304-05.

<sup>240</sup> 2008 Report, endnote 4.

<sup>241</sup> Service Delivery Not Procurement, p. 3 and 2011 Update, pp. 9-10.

<sup>242</sup> Matthews, *op. cit.*, p. 168; citing 2011 Update, pp. 9-10.

<sup>243</sup> Matthews, *op. cit.*, p. 173; citing Miller *op. cit.*, p. 22.

necessary operation and maintenance in the expense budget, while periodically surfacing in the press, is 'largely invisible, encouraging the continuing cycle of deferred maintenance, until much higher than necessary capital replacement costs become necessary.' The costs of failing to budget 'to properly perform operations and maintenance services throughout the life cycle results in substantial additional overall expense, lower levels of service, damage to existing equipment, additional energy consumption and shortened useful life of existing facilities.' Life cycle costs that could have been avoided by the analysis of such costs as part of the investment decision or, at the latest, the decision to award the construction contract, appear in the expense budget as marginally higher operation and maintenance costs and eventually as capital expenses for major repair or replacement."<sup>244</sup>

The State has expanded service delivery options to include design-build for certain State agencies responsible for horizontal infrastructure, and in 2018, legislation authorized the City's use of design-build for specific projects. As the State was among the few remaining design-bid-build-only jurisdictions, this recent movement toward increasingly authorizing design-build is an encouraging development. The focus on design-build only, however, does not acknowledge other modern service delivery methodologies that, with design-build, would permit public owners with the ability to match service delivery method strengths with project need and owner capacities, such as construction-manager-at-risk or construction-manager-as-constructor, which are thought to more suitable for vertical structures. Moreover, the State continues to focus on traditional segmented alternative delivery methodologies,<sup>245</sup> ignoring integrated delivery methodologies that explicitly unite project finance with construction and permit a life-cycle focus from the beginning of new construction planning and permit contracts to contain some or all of integrated project delivery principles and techniques.<sup>246</sup>

3. MIT Framework and the MCPIP. Since there is no single optimal project delivery methodology for all types of construction projects, the MIT Framework integrates all necessary aspects of project delivery, regardless of artificial distinctions that may be present in any applicable law. It specifically brings, into the conventional view of project delivery, the related financing of the project and the project's post-completion operation and maintenance activities. The MIT Framework (on which the 2007 Model Code for Public Infrastructure Procurement (MCPIP) is based) distills the alphabet soup of delivery methodologies into

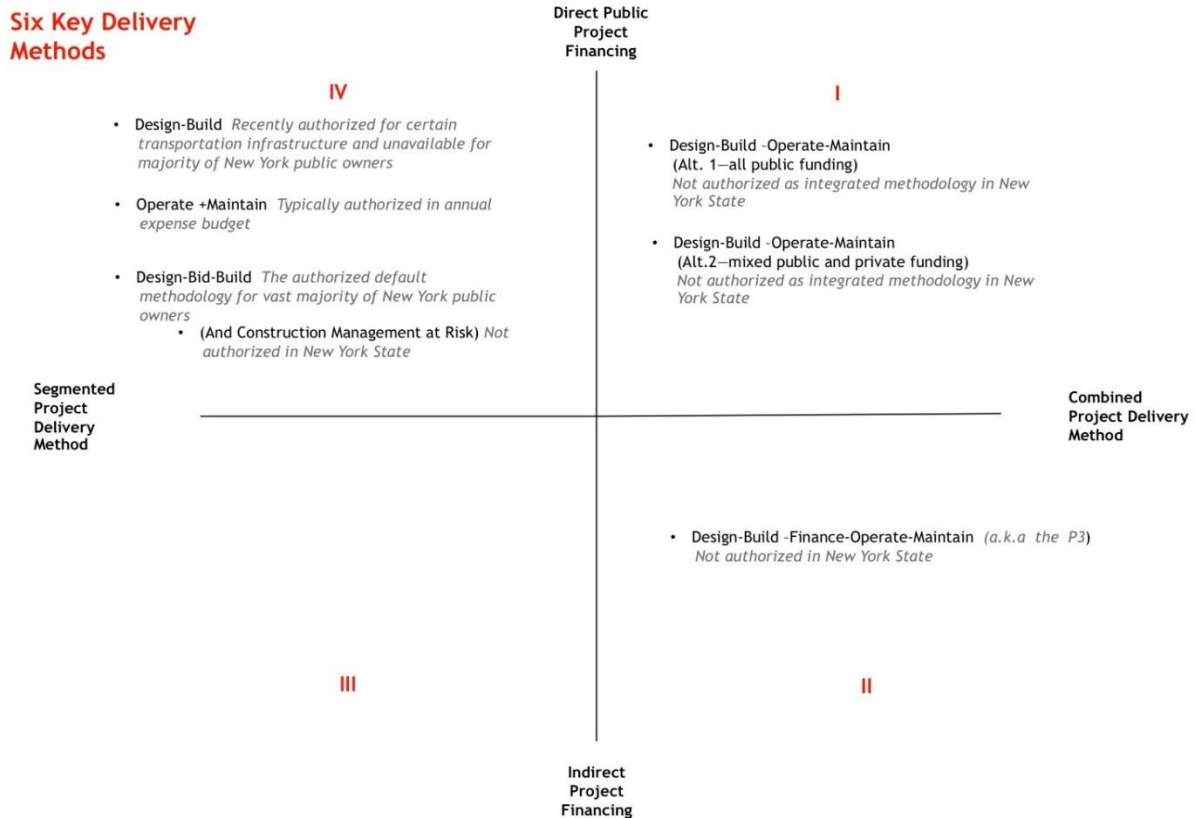
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<sup>244</sup> *Ibid.*, pp. 173-174; citing Miller, *op. cit.*, pp. 22-23. For a conceptual methodology to quantify budget savings for statutory modernization, see Matthews, *op. cit.*, pp. 162-167 and 171-177.

<sup>245</sup> Miller, *op. cit.*, p. 5.

<sup>246</sup> *Ibid.*, pp. 5, 22.

functional typologies and is a touchstone for analyzing service delivery methodologies linked with financing elements:



Dr. John B. Miller, "Life Cycle Delivery of Public Infrastructure: Precedents and Opportunities for the Commonwealth", Pioneer Institute White Paper, No. 44, December 2008, p. 6 (emphases added).

“To authorize methodologies beyond design-bid-build that include selection criteria that can permit a focus on life cycle costing requires a statutory “sea change” away from the public design-bid-build methodology. In stark contrast to features such as the public solicitation based on purported final design and specifications and a selection methodology based on the lowest initial cost, modern procurement methodologies use a competitive request for proposal process ending with a negotiated award to the respondent proposing the best value to the public owner, with price as one consideration among others which include qualifications and life cycle costs. The MCPIP specifically provides for authorizing all categories of service delivery methodologies, while setting conditions for the use of each methodology, for public owners across a spectrum of institutional capacities.”<sup>247</sup> When a public owner enterprise shifts from a total design-bid-build environment to one using design-build or other service delivery

<sup>247</sup> 2011 Update, p. 10.

methodologies, this sea change includes, with the first project, the need for new skill sets among the owner enterprise employees to initiate and oversee projects and a different enterprise risk management approach expressed in the capital planning and budgeting process, the procurement process and construction-related contract forms.

“The MCPIP, based upon the experiences of state and local governments across the country that enacted provisions from the earlier 1979 Model Code as well as upon academic research, provides model statutory language to authorize all modern service delivery methods as options for public owners to match service delivery with project needs and owner capacity. It expresses these options in general functional terms that can accommodate changes in practice over time and it specifically authorizes public owners to use competitive sealed proposals awarded based on best value criteria. All MCPIP methods depend upon the public owner first establishing the functional requirements of a project, which are to be part of any solicitation document. The MCPIP authorizes the traditional design-bid-build methodology, which will continue to remain an appropriate option for a significant proportion of any public capital program, but it also permits authorization of construction manager at risk, as a variation of design-bid-build. It authorizes design-build, which permits an earlier collaboration among the designer, contractor and owner, permitting changes to the project during the early design phase when change is effectively cost-free.”<sup>248</sup>

“The MCPIP also authorizes design-build-finance-operate-and-maintain and design-build-operate-and-maintain, which are types of public private partnerships that highlight the finance aspect. The design-build-finance-operate-and-maintain methodology specifically [excludes] any public funding, while the design-build-operate-maintain methodology can be financed exclusively on a public funds basis or on a mixed public and private funds basis. All methodologies except design-bid-build require a competitive sealed proposal solicitation process with an award based on best value criteria, permitting an integrated focus on a project’s initial construction cost and its life cycle costs.”<sup>249</sup>

4. Past City-wide Innovations within Design-Bid-Build Environment.<sup>250</sup> Even with expanded service delivery methodology flexibility, however, it is likely that public owners will continue to use the traditional design-bid-build methodology for a significant portion of their capital

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<sup>248</sup> 2011 Update, p. 11.

<sup>249</sup> *Idem*

<sup>250</sup> This material comes from The following material comes from précis document from Town+Gown *Approximating Integrated Project Delivery in Design-Bid-Build Environment: Innovations in Design and Construction symposium* event, on November 11, 2016 (hereafter "Approximating IPD"), pp. 2-4, at <https://www1.nyc.gov/assets/ddc/downloads/town-and-gown/111716-precis.pdf>, accessed 05-14-19 @ 1:27 p.m.

programs.<sup>251</sup> Thus, continuing to focus on project management innovations on projects using the design-bid-build service delivery methodology, in particular those that approximate the benefits of integrated project delivery, remains relevant.

City agencies involved in the City's capital program embarked on a cooperative working group initiative in 2003 to prioritize excellence in construction design. Leveraging major features of the General Services Administration's methodology to address impediments to design and construction excellence, the working group identified impediments in City processes and developed solutions, which became the City's Design+Construction Initiative. In 2004, the Mayor tasked the New York Department of Design and Construction (DDC) to lead the implementation of this initiative. As one example, the absence in the PPB Rules of express authorization for agencies to make evaluations based on subjective design criteria was an impediment to design excellence. Since the City Charter permits an evaluation of proposers *not* based primarily on price, the City was able to make necessary changes to the PPB Rules to expressly authorize quality-based selection models.

In 2008, the City announced a suite of related strategic initiatives that were intended to increase the number of bidders on City construction projects based on analyses that began in 2006, to study and address the drivers of cost increases. One pilot initiative consisted of adding a contractual provision in 25 percent of construction contracts greater than \$1 million over a three-year test period that allows contractors to collect damages for certain delays that they can prove resulted from the City's actions. The underlying theory for this initiative was that provisions that do not allow compensation to contractors for construction delays due to the City's actions increase the initial bid prices to cover this risk and also blunt incentives to prevent delays. This innovation was made permanent before the three-year test period concluded. Another initiative created a fund to support professional preliminary project scoping and cost estimating for projects during the capital planning phase, before budget adoption. The fund provides expense budget resources<sup>252</sup> for professional scope development and cost estimating exercises on proposed projects with unclear scopes, new or unusual technical challenges, or complex regulatory issues. These analyses enable funding agencies and OMB to identify realistic costs and options *before* budget adoption to reduce the likelihood and magnitude of

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<sup>251</sup> A study hypothesized the future of service delivery methodology use over the next 30 years and noted that "[t]he vast majority of public infrastructure projects (75%) will continue to use design-bid-build (and Construction Management at Risk)", "while [t]he use of design-build will continue to expand (to 10% of all projects and approximately 5% of all expenditures)." Miller, *op. cit.*, p. 10.

<sup>252</sup> The Charter prohibits applying capital funds to projects during the planning phase before budget adoption. Allocating expense funds to a central account available to agencies before budget adoption solved a structural problem that impeded earlier scoping to support budget estimates. Charter, Section 217 (a).

schedule delays and change order cost increases during construction that are due to initially inadequate project scopes and budgeted amounts. Management techniques, applied during the design phase after budget adoption, are still available to align project costs and scope. Value engineering is perhaps the best known technique,<sup>253</sup> and OMB uses value engineering reviews to provide an opportunity for all stakeholders to get a "reality check" on a project's functionality, cost and schedule for projects that meet certain criteria.<sup>254</sup>

Also as part of the 2008 initiatives, the City announced a task force to evaluate the City's bonding requirements, which earlier investigations had suggested inhibited the ability of contractors, especially small construction firms and Minority and Women's Business Enterprise (MWBE) firms, to bid on City construction projects. Elements of the City's performance bond form did not comply with the requirements of the federal Small Business Administration's Surety Bond Guarantee Program that assists small construction businesses obtain bonding required by municipal contracts. The City, in October 2009, announced a reform of its bonding policy on projects valued up to \$5 million that permits small construction businesses to participate in the Surety Bond Guarantee Program. The revised bond form and ability to participate in the federal program eliminated one impediment to small firms bidding as prime contractors or subcontractors on City projects.

The City has also been able to take advantage of targeted State law reforms from 2008, which include an ability to avoid the mandatory prime contracting requirement, known as the Wicks Law,<sup>255</sup> if it enters into a project labor agreement<sup>256</sup> for an individual project or project type.

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<sup>253</sup> Other design management methodologies that help bridge the mandated divide between designer and constructor in a design-bid-build environment *earlier in the design phase* than when value engineering is typically used include: Functional Analysis System Technique/Functional Analysis Conceptual Design; Target Cost Modeling and Target Value Design; Multi-disciplinary Design Optimization; and Total Quality Management. Techniques to align scope, schedule and authorized funding *during the earliest part of the design phase* are available for public capital projects that are managed by the funding agency—they are especially critical for those projects funded by public agencies but managed by a separate design and construction management agency.

<sup>254</sup> The criteria include projects that: are valued at \$30 million; involve complexity, new technology; are repetitive or prototype projects or reflect standards; are of high visibility; are subject to constrained schedules; or involve processes or operational procedures in need of improvement or streamlining.

<sup>255</sup> In New York, multiple prime contracts are required for projects above threshold amount. Public owners must break up construction drawings and specifications and separately bid contracts for general construction, HVAC, electrical and plumbing. These contracts have direct contract privity with the public owner, not with the general contractor as is the case for most private projects and the majority of public projects outside New York.

<sup>256</sup> Project labor agreements are a version of what is known as "pre-hire agreements" entered into by a public owner, construction unions and contractor firms before the procurement of any construction services for a public project. A project labor agreement functions as "a comprehensive labor relations agreement — the 'job site constitution' — that governs over various area craft agreements, setting uniform terms and conditions, for a particular project." Kotler, F. [2009]. *Project Labor Agreements in New York State: In the Public Interest*. Ithaca, NY:



The City has also been able to take advantage of general authorization for public owners to pre-qualify bidders for particular public works in order to focus on those contracting firms with the experience, skills and compliance track records that would ensure such projects, typically complex projects, come in on-time and on-budget.

The statutory environment mandating the design-bid-build service delivery methodology with vendor selection on the basis of lowest initial price alone, with a strong owner construction contract on a “take it or leave it basis” is a statutory regime conceptually based on economic and legal principles of perfect information and price as the single operative variable instead of a long-term mutually dependent relationship with *ex post* revelation of information. Nonetheless, City agencies have, however, attempted several piloted design and construction management innovations within this statutory environment to approximate the benefits of integrated project delivery, which were discussed at a Town+Gown event in November 2016.<sup>257</sup> Aimed at assisting in the delivering of high-quality public building projects within public sector budget and schedule parameters, these innovations included co-location of designer/contractor/owner team during the design phase; the use of pre-construction design-assist (with pre-qualification); the use of lean construction techniques including the “last planner” scheduling technique; and application of building information modeling.

In December 2013, the City posted the NYC Capital Projects Dashboard,<sup>258</sup> which provides the both oversight agencies and the public with a snapshot view of the City’s public building, infrastructure and information technology (IT) projects with budgets of \$25 million or more. This centralized reporting of capital projects permits comparison of projects across agencies, using standardized metrics, and facilitates project management transparency and accountability. While it tracks project information over time to inform citywide monitoring, it also permits data analyses of a large database to inform policy on the planning, budgeting and management of capital projects as well.

5. BIM to Avoid Some Avoidable Costs = Savings.<sup>259</sup> As discussed above, when public owners lack the full menu of service delivery methodologies, such as with the mandated use of a single

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Cornell University, School of Industrial and Labor Relations — Extension Division, Construction Industry Program, p. 2.

<sup>257</sup> This material comes from precis document from 11/17/16 *Approximating Integrated Project Delivery in Design-Bid-Build Environment: Innovations in Design and Construction* event at <https://www1.nyc.gov/assets/ddc/downloads/town-and-gown/111716-precis.pdf>

<sup>258</sup> At <https://www1.nyc.gov/site/operations/performance/capital-projects-dashboard.page> and <https://www1.nyc.gov/site/capitalprojects/dashboard/dashboard.page> accessed 05-07-19 @ 1:53 p.m.

<sup>259</sup> This material comes from Service Delivery Not Procurement, pp. 4-5.

delivery methodology, the project team is constrained in avoiding costs arising from the mismatch from the service delivery methodology and projects needs and project team capacities. As between design-bid-build and design-build, design-bid build, due to its separation of the designer from the constructor, depriving the designer of construction-related information during the design phase, almost certainly guarantees, as a functional matter, a certain level of change orders to deal with the delayed revelation of construction-related information, which is an avoidable cost if design-build had been used instead. Actual costs of change during the construction phase are not simply derived from the incremental increased costs of extra labor and materials of the rework, but include disruptions from the rework that impair a project's labor productivity by rippling into the parade of constructor entities collaborating in the complex and ever-changing space they are creating. With the design-build methodology more of these types of costs can be avoided.

Working through state statutory traditional delivery requirements, practitioners can use modern project management tools and techniques to approximate, as much as possible, the benefits from modern methodologies. For example, public owners have begun to use building information modeling (BIM) technology on their projects to some degree. Vertical building projects have been more initially amenable to BIM use, due to a well-defined site and a defined set of stakeholders involving only the owner, the designer and the constructor network. Horizontal infrastructure projects, such as transportation projects, due to a more geographically expansive site and involving other private entity stakeholders, such as utility companies with infrastructure facilities in the same space, have been slower to utilize BIM. An owner's expansion, however, of BIM from the design phase into the construction phase of a project can help approximate some of the benefits that accrue to the design-build methodology from earlier collaboration between designer and constructor.

Once an owner fully expands BIM across a project's life cycle, from project planning to life cycle operations and maintenance, as other industries have done much earlier, it is possible for the owner and project team to use the shared information platform to apply elements of industrial production and related management techniques, such as total quality management, to discrete projects. The construction industry has adapted total quality management as "lean construction" and it permits project teams to increase the efficiency of producing capital projects and reduce waste, by identifying areas amenable to industrial production management techniques.<sup>260</sup>

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<sup>260</sup> Matthews, *op. cit.*, p. 165, citing Glenn Ballard and Greg Howell, "What Kind of Production Function is Construction" (1998) and the American Institution of Aeronautics and Astronautics, "Current State of the Art on Multidisciplinary Design Optimization" 36 (1991).

The aggregated project data from the BIM models can then feed back into the enterprise-wide processes, informing and linking to future capital planning and expense budgeting processes more effectively—giving the existing sets of processes established under local and state laws renewed purpose and utility.<sup>261</sup> For example, change order types and costs can inform enterprise-wide contingency policy and practice, while operation and maintenance expenses from discrete projects can be traced to the agencies responsible for initiating and using the projects, reducing negative operational impacts from the temporal realities of construction. The expanded use of BIM across the project life cycle and the application of lean construction principles and techniques during construction not only permits an owner to avoid the costs associated with segmented data flows but also permits the project team to reduce information asymmetries that traditionally have been responsible for certain types of contract provisions and allocations of risk. Assessing the impact of innovative service delivery practices that change the arrangements of archetypal project participants—owner, designer, constructor and financier—expressed in the various contracts, to perform the project tasks, from “defining and designing the project” to “operating and maintaining the assets in order to deliver the product/service”<sup>262</sup> more effectively makes it then possible to consider revisiting conventional relationships and related provisions in the contracts, not merely in the context of implementing laws but also in the context of maximizing “the economic efficiency of various options to deliver capital projects, which economics views as asset- and relationship-specific investments, at two points in time—before the deal is struck, or *ex ante*, and after the deal is struck, or *ex post*.”<sup>263</sup>

While an owner’s decision to use design-build instead of design-bid-build aims at creating efficiencies through “changes in the contractual relations among the project participants,” “building information modeling (BIM) is a technology-driven organizational model” that can also create efficiencies for projects using either design-bid-build or design-build methods, which are still segmented delivery methods that do not include a focus on life-cycle operations and maintenance costs.<sup>264</sup> One study hypothesized the future of service delivery methodology use over the next 30 years and noted that “[t]he vast majority of public infrastructure projects (75%) will continue to use design-bid-build (and Construction Management at Risk)”, “while [t]he use of design-build will continue to expand (to 10% of all projects and approximately 5% of all expenditures).”<sup>265</sup> Thus, since either segmented delivery method will continue to be used,

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<sup>261</sup> Financial Planning for the Nineties, *op. cit.*

<sup>262</sup> Matthews, *op. cit.*, p. 153, citing Bettignies and Ross, *op. cit.*, p. 140.

<sup>263</sup> Matthews, *op. cit.*, pp. 162-163.

<sup>264</sup> Sweet and Schnier, *op. cit.*, p. 386.

<sup>265</sup> John B. Miller, “Life Cycle Delivery of Public Infrastructure: Precedents and Opportunities for the Commonwealth” (Boston: Pioneer Institute December 2008), No. 44, p. 10.

it is important to use technology and project management principles to reduce, during the design phase, the likelihood of avoidable costs.

The computer model of a project that BIM creates “is both information rich and information-integrative”, providing “information about the object” in the model and “automatically adjust[ing the object] to changes in other parts of the model.”<sup>266</sup> BIM facilitates changes “in the architectural design requirements [to] ripple through the structural design without direct engineering involvement. The model can ‘design’ itself based on rules embedded in the objects themselves. . . . Not only is this process efficient, it sharply reduces inconsistencies unforeseen when the design was modified.”<sup>267</sup> The use of BIM systems by *all* project participants, including the constructor, across all project phases—from design to build completion—can help to mitigate the certainty of avoidable costs ( $\approx$  savings), especially in the design-bid-build methodology, in two ways: (1) designs in BIM make certain changes less likely during construction and (2) construction in BIM makes certain other types of changes are more likely to be detected earlier during construction. Identifying necessary changes during the Design phase, when change is relatively less expensive than during the Build phase can be accomplished by driving the use of BIM technology use from Design phase, where it has become more common, through the Build phase, where it is less common, thus reducing the likelihood of some changes occurring during the Build phase.

BIM use on a project can erase “distinctions among designer, builder and component supplier” and integrate “contractor, vendor, and fabricator information into a seamless whole,” and its informational database at its technologically-possible level of detail can “eliminate the need for [designer-produced] shop drawings,” which is another possible efficiency.<sup>268</sup> In addition, BIM, as a collaborative organizational model and tool, can directly support other collaborative innovative collaborative management techniques, such as lean construction and integrated project delivery principles, that also support opportunities for cost avoidance.<sup>269</sup> For example, on a design-bid-build project, an owner’s expanding BIM use from the design phase into the construction phase can help approximate some of the benefits that accrue to the design-build methodology’s earlier collaboration between designer and constructor. Once an owner fully expands BIM across a project’s life cycle, from project planning to life cycle operations and maintenance, as other industries have done much earlier, it is possible for the owner and project team to use the shared information platform to apply appropriate elements of

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<sup>266</sup> *Idem*

<sup>267</sup> *Idem*, citing to H. W. Ashcraft, Jr., “Building Information Modeling: Electronic Collaboration in Conflict with Traditional Project Delivery”, 27 *Constr. Litig. Rep.*, Nos 7-8, July-Aug 2006, pp. 335, 336-37.

<sup>268</sup> *Idem*

<sup>269</sup> See above from Approximating Integrated Project Delivery.

industrial production and related management techniques, such as lean construction, to construction projects. Lean construction is the construction industry's adaptation of Toyota's total quality management and it permits project teams, through a variety of methods, to increase the efficiency of producing capital projects and reduce waste, by identifying areas amenable to industrial production management techniques.<sup>270</sup>

6. Economic Efficiency of Construction Contracts. The fairly recent transaction cost economic (TCE) theory, an interdisciplinary branch of economics, combined with relational contracting theory, can provide a framework to conceptualize the efficiency of construction contracts in the face of the tendency in construction, especially public construction, for contracts to assume they are complete because they have anticipated all future events and have negotiated price accordingly (though, in some instances, the public procurement law requires that position), when that assumption becomes noticeably untenable because empirical observations on the ground reveal that project participants view actual projects as distinct from what the contract drafters wrote. Construction participants “. . . negotiate these issues *ex ante* based on *ex ante* information and related information asymmetries; and . . . work within an incomplete contractual framework to negotiate within the *ex post* environment, where a totality of change—on the ground, within the external environment, and between the parties themselves, exacerbated by changing related information asymmetries—requires functional *ex post* negotiation to reflect such modifications.”<sup>271</sup>

As important as it is to assess the roles of government in construction, it is equally important to have a useful contextual model for the environment in which construction activities occur. The term "construction" represents, as it turns out, different things to different people. Conceptually, construction ranges across the technical fields of architects, engineers and constructors to the political and civic as the constructed things take their place in the built environment.<sup>272</sup> Construction is also an important economic activity. The TCE paradigm is a model that uses the contract as the lens through which to view economic activity.<sup>273</sup> While

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<sup>270</sup> Matthews, *op. cit.*, pp. 165, 173; citing to Ballard and Howell, *op. cit.*, p. 36. See Sweet and Schneier, *op. cit.*, pp. 381-382.

<sup>271</sup> Matthews, *op. cit.*, pp. 162-163; citing to Oliver E. Williamson, *The Theory of the Firm as Governance Structure: From Choice to Contract*, 16 *Journal of Economic Perspectives* 171 (2002), p. 174; see also Ian R. Macneil, *Contracts: Adjustment of Long-Term Economic Relations Under Classical, Neoclassical, and Relational Contract Law*, 72 *Northwestern University Law Review*, 854 (1978).

<sup>272</sup> Ronald Beiner, "Our Relationship to Architecture as a Mode of Shared Citizenship: Some Arendtian Thoughts", *Techné* 9:1 Fall 2005, p. 60.

<sup>273</sup> "Transaction cost economics is a comparative institutional approach to economic organization in which law, economics and organization are joined. The transaction is made the basic unit of analysis and the object is to align transactions with alternative modes of governance (markets, hybrids, hierarchies, bureaus) so as to effect a transaction cost economizing result." Oliver Williamson, *Revisiting Legal Realism: The Law, Economics and*

orthodox economic analysis may be helpful in analyzing broader economic issues and the options for government-as-economic-policy-maker, TCE provides a richer set of analytical tools for government-as-owner. TCE draws upon economic, organizational and legal theories and analytical tools to describe economic actors and economic activity in a way that is consonant with the actual experience of most actors involved in the activity.<sup>274</sup>

The construction environment, its practices and issues exhibit salient assumptions underlying TCE. The financial planning for and the design and construction of long-lived physical assets—vertical structures or horizontal infrastructures or combinations of both—involves sets of relationships in a shifting environment of unequal information and imperfect understanding. Conventionally described, the construction process involves three archetypical roles—the *owner*, the *designer*, whether architect, engineer or both, and the constructor, often called the *contractor*, though that term obscures what is a network of specific types of contractors, craftsmen and artisans who work together on a construction project. Public owners, like all owners, bear the ultimate responsibility for a capital project—from program definition to payment. As an owner, it is thus concerned with budget, schedule, safety and quality, or value.

The construction milieu is the poster child for asymmetric information—"a situation where two parties to a transaction involving a good or service have unequal knowledge of the properties or risks involved in making that transaction"<sup>275</sup>—and a critical objective for the owner is increasing the chances of aligning its interests in budget, schedule, safety and quality with those of its agents in construction, the designer and the contractor. The contract is the vehicle (and written record) by which the owner negotiates with the designer and the contractor, either individually or together, to align interests of principal and agent in an environment of

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*Organization Perspective* (Oxford University Press, 1996), p. 393. "The lens of contract, as against the lens of choice, becomes the cutting edge." Oliver E. Williamson, "Examining economic organization through the lens of contract," *Industrial and Corporate Change*, Vol. 12. No. 4 (12/4 ICC Association), p. 925. "One of the advantages of focusing on adaptation is that it brings added meaning to the idea of mutual gain. It is elementary that gains from trade will always be realized by moving onto the contract curve. But how is this to be accomplished in a world where complex contracts are incomplete and are implemented over time in the face of disturbances for which contingent provisions either have not been made or, if made, are often in error? More attention to the choice of governance structures that have good adaptive properties (and less to concentrating all of the action in the *ex ante* incentive alignment stage) is one of the central lessons of economic organization through the lens of incomplete contracting." *Idem*

<sup>274</sup> Williamson, *Examining*, *op. cit.*, p. 920. A fairly recent "overarching big idea" in economic thought is to "move from the orthodox lens of choice to bring the lens of contract systematically to bear on economic phenomena of all kinds." *Ibid.*, p. 922. "Transaction cost economics is an effort to implement the move from equilibrium analysis (orthodoxy) to comparative institutional analysis. . . . transactional cost economics is less differential to orthodoxy. If institutions are important in ways that are neglected by orthodoxy, then a more thoroughly interdisciplinary treatment . . . may be needed." Williamson, *Revisiting*, *op. cit.*, p. 388

<sup>275</sup> Myers, *op. cit.*, pp. 149-150, 251. See also Stiglitz, *op. cit.*, pp. 966-71.

asymmetric information.<sup>276</sup> The tools and paradigm that TCE makes available to apply to an area may help unify the fragmented nature of construction-related analyses as well as provide a way of moving beyond the application of orthodox economic analysis to the construction industry to shed light on the industry in ways that would be helpful for public policy analysis.<sup>277</sup>

In TCE, "organization both matters and is susceptible to analysis" and the construction industry is made of a variety of organizational forms among the three archetypical actors.<sup>278</sup> TCE's view of actual human actors and their behavior more closely reflects human reality than orthodox economic theory, permitting focus on adaptation, changes in process over time and choice among organizational form in response to change.<sup>279</sup> TCE cost assumes human actors are rational within the bounds of their individual capacities, are self-interested and have the capacity to look ahead.<sup>280</sup> This version of the human actor comports more closely with actors in construction than the perfectly rational man in orthodox economics. The economic consequence of bounded rationality is that "all complex contracts are unavoidably incomplete"; the economic consequence of self-interest is "opportunism, on which account parties to a long-term contract will contemplate defection from the spirit of the contract and revert to self-interested bargaining when a contract is pushed out of alignment by significant disturbances";<sup>281</sup> and, the economic consequence of foresight is that, looking ahead, "parties to a contract will "uncover salient hazards, ascertain the mechanism through which they work, and fold these back into the *ex ante* design of governance".<sup>282</sup> All these activities are quite familiar to, and expected by, those who work in the construction industry.

The transaction or unit of economic activity at the focus of TCE must have a degree of asset specificity that reduces the ability to redeploy resources, be subject to unanticipated

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<sup>276</sup> Government as client, like all owners, should be open to innovative ways to increase the chances of aligning its interests in budget, schedule, safety and quality with the interests of its agents in construction, especially since the construction milieu is the very definition of asymmetric information. Instead of increasing the alignment, however, government often establishes procurement schemes for itself that limit how it obtains construction related services due to other public policy concerns, such as transparency and fairness, which are of less concern to private owners. Examples of limits government imposes upon itself, that tend to make effective principal-agent alignment less likely, are public competitive bid requirements, awards to the lowest responsive bidder with little discretion to take other factors into account, requirements that bidding documents contain detailed plans and specifications prepared by professional designers, and multiple prime bidding requirements. Myers, *op. cit.*, pp. 149-150, 251. See also Stiglitz, *op. cit.*

<sup>277</sup> Williamson, Examining, *op. cit.*, pp. 921-922 (Footnote 4).

<sup>278</sup> Williamson, Examining, p. 938. Organization can mean sizes across archetypical organizations—small to large firms—or among the archetypical organizations themselves as types.

<sup>279</sup> Williamson, Examining, p. 938.

<sup>280</sup> *Idem*

<sup>281</sup> Ibbs, Nguyen and Lee, *op. cit.*, p. 46.

<sup>282</sup> Williamson, Examining, *op. cit.*, pp. 921-922

disturbances and must happen at sufficient frequently for participants to care about reputation in the market and to create incentives for participants to incur expenses to participate.<sup>283</sup> These aspects have an impact on the governance framework established in the related contract. "As asset specificity builds up, bilateral dependency sets in and, in combination with uncertainty (which pushes incomplete contracts out of alignment), the aforementioned contractual complications appear."<sup>284</sup> Construction projects are specific assets as an economic matter. Moreover, construction projects have to be among the most idiosyncratic assets due to the realities of building a particular thing on a particular site. Unanticipated disturbances practically define the construction environment. And, transactions—construction projects—occur frequently enough, especially in a fragmented construction market where there is a close relation between the business cycle and the construction cycle, so that reputation likely matters and there is likely a benefit from incurring the expenses of participating.<sup>285</sup>

TCE, which is partly rooted in organizational theory,<sup>286</sup> also focuses on inter-temporal transformations or changes over time that occur within the organization that is a party to the transaction or changes over time that occur between the parties.<sup>287</sup> Change can occur within the organization of either party for a number of reasons, including the feedback function of learning from performance. For a public owner, some change happens at least as frequently as changes in elected officials or economic and budgetary conditions. Change at the architect, engineering and contractor firms can occur during a project, for a number of reasons, including responding to the needs of the engagement itself. Changes between the parties occur as a result of the 'bilateral dependency' that develops during an asset specific transaction. In the industrial setting, asset specificity develops, whereas in the construction setting, asset specificity exists at the beginning of the relationship.

TCE focuses on operational adaptation by economic actors to the market at two levels. The first level of adaptation is the standard economic and apparently spontaneous adaption of the firm, as a black box, to price changes. The second level of adaptation, owing to its partial foundation in organizational theory, occurs within the hierarchy of the firm as is a "coordinated adaptation" within the organization "accomplished not spontaneously but in a 'conscious, deliberate, purposeful' way", focusing on information beyond mere price.<sup>288</sup> Since design-bid-

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<sup>283</sup> *Ibid.*, p. 923.

<sup>284</sup> *Idem*

<sup>285</sup> General economic conditions determine the demand for construction services and fluctuations in the performance of both the general economy and the construction industry share a similar pattern.

<sup>286</sup> Williamson, Examining, *op. cit.*, p. 922.

<sup>287</sup> *Ibid.*, p. 923-924.

<sup>288</sup> *Ibid.*, pp. 924-925.



build became the standard service delivery methodology in the middle of the last century, construction market participants have adapted, creating an evolving menu of service delivery methodologies that responds to changes in the various construction markets as well as changes in materials, building and information technology. Management theory related to construction has also changed over time as the "partnering" management theory that appeared in the 1970s has recently been joined by lean construction principles and BIM. Further, despite the presence of large construction firms, the construction industry is by and large still dominated by small firms. The variance in organization form among the architect, engineering and contracting firms is matched by the variance in organization form on the owner side, especially when both public and private owners are included in the analysis. Finally, TCE also focuses on governance, the nature of governance structures and the alignment of modes of governance with transactions as they relate to organizational adaptation to change under contracts that are incomplete—contracts that cannot provide for every possible event.<sup>289</sup> The construction milieu certainly seems to provide the sufficient grist for research opportunities opened up by the TCE paradigm.

TCE seems custom made for analyzing certain issues in the construction milieu. Few construction contracts happen without *many* contracts drafted and negotiated by *many* lawyers, whose practice is often to revise their contracts based on the results of litigation on projects gone wrong—theirs and others. Revising contracts, looking in the rear-view mirror, to mitigate possible future events of a similar nature is not, however, conducive to relationships on new projects with new goals and different parties. Contracts are more than simply protection from litigation or positioning for litigation. "Thinking contractually", the work of TCE, requires:

- viewing the "firm as a governance structure (an organizational construction)" not "a black box (a technological construction)"
- focusing on "the efficient alignment of transactions with modes of governance"
- interpreting "contractual and organizational variety principally in economizing terms".<sup>290</sup>

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<sup>289</sup> *Ibid.*, pp. 925-928. "Examining economic organization through the lens of contract not only places the spotlight on *ex post* adaptation, but, in the process, gives prominence to the role of governance. Specifically, transaction costs economics holds that each generic mode of governance is defined by a syndrome of internally consistent attributes to which different adaptive strengths and weaknesses accrue." "Generic transactions are thus those for which markets are well suited; complex transactions are managed by hierarchy; and hybrid modes of governance are employed for those in between. This pattern applies, moreover, not merely to transactions in intermediate product markets, but to any issue that arises or can be re-conceptualized as a contracting problem." *Ibid.*, pp. 926-927.

<sup>290</sup> *Ibid.*, p. 938.

TCE's focus on contracts, however, requires the training and experience of legal academics and practitioners.<sup>291</sup> From the purely academic perspective, Karl Llewellyn's concept of the contract as a framework for the parties [to resolve issues that occur during the term of the contract but that the contract does not necessarily anticipate or that do not work as well as the parties had envisioned at execution] provides the analytical foundation for the legal part of the inquiry.<sup>292</sup> This inquiry would also, however, require the "deep knowledge of the subject matter" that practitioners can best provide, linked to the framework of TCE.<sup>293</sup> TCE's focus on *ex post* governance issues in a transaction for which the contract is incomplete leads to legal analyses of how the framework of a particular contract reflects and/or is well suited to the capacities of the organizations that are parties to it and permits such organizations to respond to changes unanticipated by the contract without a party walking away from a dispute and/or resorting to litigation to resolve the dispute.<sup>294</sup> Combining an awareness of the organization as reflected in the negotiated contract and the incomplete contract as framework for the parties to resolve issues unanticipated the contract terms,<sup>295</sup> a TCE-based comparative contract analysis across archetypical participants in construction would permit quantitative assessment of various archetypical risk allocation provisions.<sup>296</sup> "The object is to discover delayed or indirect consequences, to which organizational theory is often attentive, thereafter to work out the ramifications for dealing more knowledgeably and effectively with phenomena in question by folding these delayed or indirect effects back in."<sup>297</sup>

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<sup>291</sup> Williamson, *Revisiting, op. cit.*, pp., 393, 411.

<sup>292</sup> *Ibid.*, p. 393.

<sup>293</sup> *Ibid.*, p. 411. "Transaction cost economics is an effort to apply comparative contractual reasoning to any problem that arises as or can be reformulated as a contracting problem." "Upon observing an 'inefficiency' of any kind, it is useful to pose three questions: What is the contract that would remove the inefficiency: What impediments preclude this contract from being implemented? What are the best feasible contractual alternatives for dealing with this condition?" *Ibid.*, pp. 412-413.

<sup>294</sup> *Ibid.*, p. 386. "Among the ways in which L&E and LEO differ are that the former works predominantly out of a firm-as-production construction in which contracts are assumed to be complete (or at least comprehensive) and the action is concentrated in *ex ante* incentive alignment whereas the latter works out of a firm-as-governance structure construction in which contracts are assumed to be incomplete and the action is concentrated in the mechanisms of *ex post* governance." *Idem*

<sup>295</sup> "Taken together, and with the support of apparatus that serves to operationalize these concepts, a positive and predictive theory of contract (more generally, of the law) might be within reach. *Ibid.*, p. 412.

<sup>296</sup> ". . . the rational spirit approach does not imply hyper-rationality. Strong form, semi-strong form and weak form rational spirits are usefully distinguished. Whereas the strong form contemplates maximization and/or comprehensive contracting and is associated with orthodoxy, the latter two work out of bounded rationality. Semi-strong form analysis joins bounded rationality with farsighted contracting. Weak form joins bounded rationality with myopic contracting." *Ibid.* p. 398.

<sup>297</sup> *Ibid.*, p. 413. "What [this type of analysis] adds, if one buys into TCE, are (i) a view of the firm as governance structure (rather than production function), (ii) greater respect for organization and for politics more generally (iii) greater emphasis on the purposes served by *ex post* governance (as against *ex ante* incentive alignment), (iv) a more microanalytic perspective in which the action resides in the details of transactions and governance and (v)

Instead of the orthodox economic approach that forces a calculation in an *ex ante* manner<sup>298</sup> due to the "black box" assumption that complete contracting can be accomplished, TCE assumes incomplete contracting in which "[t]he object of farsighted contracting is to look ahead, recognize potential hazards, and use *ex post* governance (as well as *ex ante* incentive alignment) to reduce hazards and avoid regrets."<sup>299</sup> TCE also permits the component analysis to "... examine each legal issue through the lens of comparative, farsighted contracting in which TCE-izing is featured; be relentlessly calculative; and because all feasible forms of law and organization are flawed, work through the remediableness criterion."<sup>300</sup>

**C. Design-Build (and the other methodologies) and the MCPIP.**<sup>301</sup> The 2007 Model Code for Public Infrastructure Procurement (MCPIP), based on the MIT Framework that distills all methodologies into basic typologies, treats Design-Build, Design-Build-Operate-Maintain and Design-Build-Finance-Operate-Maintain, functionally alike from procurement process perspective. Design-Build, along with Design-Bid-Build, with the Construction Manager at Risk variant, and Operate+Maintain are in Quadrant IV of the MIT Model, which are segmented delivery methods that do not require a focus on life-cycle costs and are financed with traditional public debt. These three methods are all distinct from Design-Bid-Build because they do not separate the designer from the constructor, and the last two differ from the first because they are integrated methodologies that require a focus on life-cycle cost. While the procurement function for all three are the same, the MCPIP permits the public owner to align the necessary delivery and contract aspects with the delivery methodologies. The MCPIP, from a procurement perspective is simple and elegant but provides necessary flexibility for the public owner to tailor the procurement documents to meet specific project needs and the specific delivery method associated with the project. The MCPIP is not overly prescriptive but it protects public owners' fiscal and operational responsibilities while also supporting fair competition in public procurement.

Section 3-103(1) of the MCPIP establishes the conditions for use of the Competitive Sealed Proposal method of source selection, which is distinct from the open competitive bidding procurement vehicle for Design-Bid-Build projects, with the award going to the bidder with the

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the remediableness criterion (whereupon failure is not established by a demonstrated deviation from a hypothetical ideal)." *Idem*

<sup>298</sup> *Idem*

<sup>299</sup> *Idem*

<sup>300</sup> *Ibid.*, p. 414.

<sup>301</sup> The following materials are from a PDF of the MCPIP; it is available from <https://www.americanbar.org/products/inv/book/215203/>.

lowest price for the project. All other service delivery methodologies, such as Design-Build, Design-Build-Operate-Maintain, or Design-Build-Finance-Operate-Maintain (P3s), the last two of which can focus on life-cycle costs beyond the price of the project, require a public owner to be able to consider other selection criteria in addition to price. This section leaves open for the jurisdiction using the MCPIP to specify procurement-related operational procedures that would govern and control a public owner's use of the Competitive Sealed Proposal method. The Commentary related to this section notes that the "competitive sealed proposal method (similar to competitive negotiation) is available for use when competitive scaled bidding is either not practicable or not advantageous. The competitive sealed proposal method is mandated for the project delivery methods described in Article 5: design-build, design-build-operate-maintain, and design-build-finance-operate-maintain."<sup>302</sup> The Commentary further notes that both "[t]he competitive sealed bidding and competitive sealed proposal methods assure price and product competition. The use of functional or performance specifications is allowed under both methods to facilitate consideration of alternative means of meeting [a public owner's] needs, with evaluation, where appropriate, on the basis of total or life cycle costs. The criteria to be used in the [MCPIP] evaluation process under either method must be fully disclosed in the solicitation. Only criteria disclosed in the solicitation may be used to evaluate the items bid or proposed."<sup>303</sup> Contrasting Competitive Sealed Bidding with Competitive Sealed Proposals, the Commentary noted that "[u]nder competitive sealed proposals, judgmental factors may be used to determine not only if the items being offered meet the purchase description but may also be used to evaluate the relative merits of competing proposals[;] . . . the quality of competing products or services may be compared and trade-offs made between price and quality of the products or services offered (all as set forth in the solicitation) [; and] discussions after proposals have been opened [are permitted] to allow clarification and changes in proposals provided that adequate precautions are taken to treat each offeror fairly and to ensure that information gleaned from competing proposals is not disclosed to other offerors."<sup>304</sup> The term "advantageous" in a Competitive Sealed Proposal evaluation process includes determining: "(a) whether to utilize a fixed-price or cost-type contract under the circumstances; (b) whether quality, availability, or capability is overriding in relation to price in procurements for research and development, technical supplies, or services (for example, developing a traffic management system); (c) whether the initial installation needs to be evaluated together with subsequent maintenance and service capabilities and what priority should be given these requirements in the best interests of the [public owner]; or (d) whether the marketplace will respond better to a solicitation permitting not only a range of

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<sup>302</sup> Note 1.

<sup>303</sup> Note 2.

<sup>304</sup> Note 3.

alternative proposals but evaluation and discussion of them before making the award (for example, computer software programs).<sup>305</sup>

Section 3-103 (2) (a) of the MCPIP requires that a public owner solicit proposals through Request for Proposals when soliciting for Design-Build, Design-Build-Operate-Maintain, or Design-Build-Finance-Operate-Maintain (P3s), which: “(a) shall include design requirements; (b) shall solicit proposal development documents; and (c) may, when the [public owner] determines that the cost of preparing proposals is high in view of the size, estimated price, and complexity of the procurement: (i) prequalify offerors by issuing a Request for Qualifications in advance of the Request for Proposals; and (ii) select a short list of responsible offerors prior to discussions and evaluations under subsection 3-103(6), provided that the number of proposals that will be short-listed is stated in the Request for Proposals and prompt public notice is given to all offerors as to which proposals have been short-listed; or (iii) pay stipends to unsuccessful offerors, provided that the amount of such stipends and the terms under which stipends will be paid are stated in the Request for Proposals.” The Commentary notes the two requirements for public owners consist of clearly setting forth “the functional requirements of each project through design requirements, and ... [requiring] require qualified offerors to submit proposal development documents for evaluation” and further that the [p]rocurement mechanisms must be sensitive to the relatively high cost of preparing “priced” offers for design-build, design-build-operate-maintain, and design-build-finance-operate-maintain.”<sup>306</sup> The Commentary on the evaluation factors notes that the Request for Proposals must “set forth the relative importance of the factors and any subfactors, in addition to price, that will be considered in awarding the contract. A statement in the RFP of the specific weighting to be used by the jurisdiction for each factor and subfactor, while not required, is recommended so that all offerors will have sufficient guidance to prepare their proposals.” The first requirement supports fair competition, while the second suggestion supports receipt of responsive proposals. Additional requirements in Section 3-103(b) include (1) stating “the relative importance of (1) demonstrated compliance with the design requirements, (2) offeror qualifications, (3) financial capacity, (4) project schedule, (5) price (or life-cycle price for design-build-operate-maintain and design-build-finance-operate-maintain procurements), and (6) other factors, if any;” and requiring that each offeror, “when the contract price is estimated to exceed \$10,000,000, when the contract period of operations and maintenance is ten years or longer, or in circumstances established by regulation, . . . identify an Independent Peer Reviewer whose competence and qualifications to provide such services shall be an additional

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<sup>305</sup> Note 4.

<sup>306</sup> Note 4

evaluation factor in the award of the contract.” The Commentary notes that since “[c]omplex numerical analysis of numerous factors is likely to diffuse, rather than focus, competition among potential offerors” . . . [c]ompetitive proposals can be sought through the simple statement of five or six evaluation factors: e.g. (1) demonstrated compliance with the design requirements, (2) offeror qualifications, (3) financial capacity, (4) project schedule, (5) price (or life-cycle price in appropriate circumstances), and (6) other factors.” It further notes that “design requirements establish the key performance requirements of the project [and the MCPIP] requires proposals to be submitted at the end of design development, which provides the Jurisdiction with ready comparisons of each proposal as to functional compliance, quality, price, and schedule. Proposals provide independent confirmation of the Jurisdiction’s pre-solicitation assessment of price, time, and quality.”

Finally, Section 3-103 (7) provides that the public owner award the contract “to the responsible offeror whose proposal conforms to the solicitation and is determined in writing to be the most advantageous to the [public] taking into consideration price and the evaluation factors set forth in the Request for Proposals”.

Article 5, of the MCPIP, which governs the procurement of public infrastructure facilities and services, contains more specific provisions relating to all service delivery methodologies, including Design-Bid-Build (which includes Construction Management at-Risk), operations and maintenance, Design-Build, Design-Build-Operate-Maintain and Design-Build-Finance-Operate-Maintain, the last three of which the Commentary notes are integrated project delivery methods that “[offer] significant quality, cost, and time benefits to government, to taxpayers, and to ratepayers, in appropriate circumstances.”<sup>307</sup> Section 5-102(b) provides that public owners do not need to disqualify a firm that participated in a “report or study that is subsequently used in the preparation of design requirements for a project” . . . “shall not disqualify a firm from participating as a member of a proposing team in a . . . procurement unless such participation would provide the firm with a substantial competitive advantage.” The Commentary to Section 5-102 notes options for drafters to provide “procurement officials with the authority to . . . permit the selection of a design-builder based primarily on qualifications. This option has the effect of applying a Qualifications Based Selection system (“QBS”) to the design build process. Without proposal development documents, design is insufficiently developed to include a fixed price as one of the evaluation criteria at the time the design-builder is selected. This approach has been applied successfully on numerous design build projects, and is ideal where a firm limit on available funds has already been established by the public owner.”

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<sup>307</sup> Note 2; see also Section 5-102.

Section 5-103 requires the public owner’s promulgation of regulations or operational procedures describing the project delivery methods, which would “set forth criteria to be used in determining which project delivery method is to be used for a particular project; . . . grant to the Chief Procurement Officer, or the head of the Purchasing Agency responsible for carrying out the project, the discretion to select an appropriate project delivery method for a particular project; . . . describe the bond, insurance, and other security provisions contained in Part B of this Article that apply to each project; . . . (d) describe the appropriate contract clauses and fiscal responsibility requirements contained in Part C of this Article that apply to each project; and . . . (e) require the procurement officer to execute and include in the contract file a written statement setting forth the facts which led to the selection of a particular project delivery method for each project.” The Commentary notes that “[n]umerous state and local governments are looking for ways to better allocate scarce resources across all of their infrastructure holdings [and the MCPIP] encourages procurement officials to make the project delivery decision in the context of an overall capital development program for infrastructure asset management.”<sup>308</sup> The Commentary further notes that since “[t]he specific terms in a Request for Proposal for design-build, design-build-operate-maintain, or design-build-finance-operate-maintain services will necessarily vary based upon the specific financial, engineering, architectural, and technological issues confronting a particular project . . . [t]his Section of the Code authorizes the [public owner] to issue appropriate regulatory guidance for the application of these methods to infrastructure facilities and services.”<sup>309</sup>

Section 5-104 adopts a Quality Based Selection criteria for architectural and engineering services, and the Commentary and further provides for an architectural and engineering selection committee process set forth in operational procedures that includes an opportunity for firms to make an annual submission of “ a statement of qualifications and performance data” and evaluation of “current statements of qualifications and performance data on file with the [public owner], together with those that may be submitted by other firms regarding the proposed contract.”<sup>310</sup> The selection committee must “conduct discussions with no less than three firms regarding the contract and the relative utility of alternative methods of approach for furnishing the required services, and then shall select therefrom, in order of preference, based upon criteria established and published by the Selection Committee, no less than three of the firms deemed to be the most highly qualified to provide the services required.”<sup>311</sup> The

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<sup>308</sup> Note 2.

<sup>309</sup> Note 3.

<sup>310</sup> Section 1-04 (2).

<sup>311</sup> *Idem*; see Section 1-04 (3) for negotiation provisions.

Commentary notes that “[t]he principal reasons supporting this selection procedure for Architectural and Engineering Services are the lack of a definitive scope of work for such services at the time the selection is made and the importance of selecting the best-qualified firm” and further that the since the relationship between the architect, engineer or land surveyor the professions and the public owner on a project are different from the relationships “that normally existing in a buyer-seller situation” . . . “the qualifications, competence, and availability of the three most qualified [professional service firms] are considered initially, and price negotiated later . . . “because both parties need to review in detail what is involved in the work . . . [and o]nce parameters have been fully discussed and understood . . . [the public owner can ]make its own evaluation and judgment as to the reasonableness of the fee.”<sup>312</sup> The MCPIP permits, however, an alternative process.<sup>313</sup>

Section 5-201 sets out requirements for bid security; Section 5-202 sets out requirements for contract performance and payment bonds; Section 5-203 sets out requirements for bond forms; Section 5-204 sets out requirements for errors and omissions insurance; and Section 5-205 sets out requirements for other forms of security. These provisions specifically relate to the nature and risks of these alternative service delivery methods.<sup>314</sup>

Section 5-301 focuses on contract clauses to support these service delivery methods and requires the public owner to promulgate regulations or operational procedures. It requires inclusion, in contracts, of contract provisions “providing for adjustments in prices, time of performance, or other contract provisions, as appropriate, and covering . . . the unilateral right of the [public owner] to order in writing . . . changes in the work within the scope of the contract; and . . . changes in the time of performance of the contract that do not alter the scope of the contract work; . . . variations occurring between estimated quantities of work in a contract and actual quantities; . . . suspension of work ordered by the [public owner]; and . . . site conditions differing from those indicated in the contract, or ordinarily encountered, except that differing site conditions clauses promulgated by the [Chief Procurement Officer] need not be included in a contract . . . when the contract is negotiated; . . . when the contractor provides the site or the design; or . . . when the parties have otherwise agreed with respect to the risk of differing site conditions.”<sup>315</sup>

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<sup>312</sup> Note 3.

<sup>313</sup> Note 5.

<sup>314</sup> See Commentary related to this provision.

<sup>315</sup> Section 5-301(1).



The commentary notes that the “four new delivery methods - operations and maintenance, design-build, design-build-operate-maintain, and design-build-finance-operate-maintain – do not eliminate the need for regulations [or] operational procedures . . . that incorporate standard contract clauses”, and this section is intended to work with the public owner’s prior practice.<sup>316</sup> “The Changes, Suspension of Work, and Variations clauses are standard mechanisms for government to maintain flexibility, and should be applicable to all procurement methods in Article 5. The principles underlying the Differing Site Conditions clause still apply to the design-bid-build process, and may apply to the negotiated processes (design-build, design-build-operate-maintain, design-build-finance-operate-maintain), depending upon the government’s structuring of the competition. Procurement officials may properly decide to collect and furnish subsurface information to prospective offerors, with the intent of asking those offerors to rely on the information furnished in submitting offers. In such circumstances, a standard Differing Site Conditions clause is appropriate.”<sup>317</sup> The commentary continues to note that “[t]he phrase “or other contract provisions” . . . is intended to enable the parties to deal with the effects of changes, variations in estimated quantities, suspensions of work, and differing site conditions on matters other than price or time for performance. For example, where a change order revises the specification, not only price or time for performance may be affected, but other terms or conditions such as insurance or inspection may also be affected.”<sup>318</sup>

Contract provisions covering “[a]djustments in price . . . shall be computed in one or more of the following ways [which include] , , , by agreement on a fixed price adjustment before commencement of the pertinent performance or as soon thereafter as practicable; . . . by unit prices specified in the contract or subsequently agreed upon; . . . by the costs attributable to the events or situations under such clauses with adjustment of profit or fee, all as specified in the contract or subsequently agreed upon; . . . in such other manner as the contracting parties may mutually agree; or . . . in the absence of agreement by the parties, by a unilateral determination by the [Procurement Officer] of the costs attributable to the events or situations under such clauses with adjustment of profit or fee, all as computed by the [Procurement Officer] in accordance with applicable sections of regulations [or] operational procedures . . . “.<sup>319</sup> The public owner should promulgate regulations or operational procedures that require “the inclusion in [public owner] contracts of clauses providing for appropriate remedies and covering . . . liquidated damages as appropriate; . . . specified excuses for delay or

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<sup>316</sup> Note1.

<sup>317</sup> *Idem*

<sup>318</sup> *Idem*

<sup>319</sup> Section 5-301(2).

nonperformance; . . . termination of the contract for default; and . . . termination of the contract in whole or in part for the convenience of the [public owner]”.<sup>320</sup> Variations are, however, possible, “, provided that any variations are supported by a written determination that states the circumstances justifying such variations, and provided that notice of any such material variation be stated in the Invitation for Bids or Request for Proposals.”<sup>321</sup>

Finally, an Article 7, entitled Cost Principles, is reserved for a public owner that uses the MCPIP as the basis for legislation to include additional items not already covered in the MCPIP.

**D. Operations+Managment.** From the finance side, the City’s capital eligibility rules require that certain operations and maintenance activities, which fit within life cycle costs of a capital project, be financed out of the expense budget, instead of the capital budget, which tends to discourage such activities and result in the City’s historic practice of deferred maintenance that transforms smaller expense-funded renovation projects over time into larger renovation projects eventually becoming eligible for capital financing; while the practice spares each agency’s expense budget in the short-term, it also incrementally increases city-wide capital project costs/debt service over the longer term. At the agency level in practice, especially in difficult budget environments, expense funds allocated (or not) each year for such small projects typically falling under the rubric of maintenance compete with agency operating programs and often result in systemic reallocation of expense budget funding of maintenance renovations to operations and deferred maintenance across agencies. Another impediment at the agency level is the lack of procurement and contracting ease for these expense budget projects, which require design and construction service that are not unlike those for capital-funded projects.”

On the operational side, “Section 1110-a of the Charter [, implemented in 1988,] requires the City to assess its assets on an annual basis. Sections 228 and 248 require the City to develop a ten-year capital strategy every two years. These local process mandates stem from the City’s “state of good repair” (SOGR) efforts begun in the early 1980s, with Comptroller Jay Goldin’s evaluation of the state of assets within the City and Mayor Ed Koch’s long-term capital planning exercises for City agencies. These requirements were codified as part of the 1988 and 1989 charter revision processes. Section 1110-a eventually led to the creation and implementation of the City’s Asset Information Management System (AIMS).”<sup>322</sup>

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<sup>320</sup> Section 5-301(3).

<sup>321</sup> Section 5-301(4)

<sup>322</sup> New York City Bar Association, Construction Law Committee, *Improving New York City's Design and Construction Processes and Practices*, November 17, 2017 (hereafter, *Improving*), p. 5, at

One problem for life cycle analysis in the context of AIMS is that AIMS is limited “to a subset of the City’s total assets, and its reports represent a limited ‘snap-shot’ focus on some aspects of the City’s inventory of capital assets. The [threshold for] the requisite evaluation is for City-owned assets or asset systems with a replacement cost of \$10 million or more and a useful life of more than 10 years. [Moreover, AIMS does not require an assessment that relates] directly to the structural integrity of the asset, such as equipment and special operating systems and programmatic needs and/or efficiency improvements not directly related to structural integrity. [And, AIMS] does not ‘reflect any policy considerations [that] could affect the appropriate amount of investment, such as whether there is a continuing need for a particular facility or whether there have been changes to the use of a facility.’”<sup>323</sup>

“While there is a structural disconnect between the annual AIMS reporting document and the 10-year capital strategy, any four-year capital plan, which includes the adopted capital budget, and related financial plan, the City does, however, prepare a reconciliation report to compare recommended SOGR capital investment in the AIMS reports with capital spending allocated in any four-year capital plans. ‘The most recent Reconciliation Report, issued in July 2018, concluded that the capital investment in the five-year capital plan for fiscal years 2018 through 2022, released on April 26, 2018, for the specifically identified inventoried assets, funded 70% of the total investment recommended in the preceding AIMS Report issued in December 2017. Capital investment allocated in the Ten-Year Capital Strategy published in April 2017 funded an additional portion of the recommended investment. In the same Reconciliation Report, OMB estimated that 60% of the expense maintenance levels recommended were included in the financial plan.’”<sup>324</sup>

“Several years ago, the prior administration announced a plan to review the methodologies used in surveying and estimating the cost of maintaining its fixed assets in a state of good repair, to incorporate current technology and standards into the City’s ongoing AIMS-related reviews and to upgrade and expand AIMS to allow for more comprehensive inspections and reporting to improve the City’s management of its facilities. Specifically, the administration planned to develop a facility condition assessment program ‘in order to improve the City’s ability to prevent the escalation of capital project costs which are a result of deferred capital investment or maintenance . . . and . . . improve the ability of agencies to define and prioritize

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[https://s3.amazonaws.com/documents.nycbar.org/files/2017149-NYCdesignPractices\\_FINAL\\_11.16.17.pdf](https://s3.amazonaws.com/documents.nycbar.org/files/2017149-NYCdesignPractices_FINAL_11.16.17.pdf)  
accessed 04-29-19 at 4:46 p.m.

<sup>323</sup> Improving, p. 5; updating information from Official Statement, *op. cit.*, p. 51.

<sup>324</sup> *Ibid.*, pp. 5-6; updating information from Official Statement, p. 52.

state of good repair funding requirements.’ The aim of this project was to ‘[reduce] the deferred maintenance backlog, and [maintain] life-cycle replacement requirements’ in order to increase the ability of the City ‘to realize cost savings through the reduced downtime and costs associated with emergency repairs and breakdowns.’ Planned initially as a pilot with a small number of agencies to be expanded over time to all agencies, the intention of the initiative was to ‘evaluate the market of facility condition assessment systems providers, software, and inspectional services, and the potential integration of facility assessment systems resident at City agencies in order to develop an acquisition plan and management strategy for the City . . . with the development of standardized reports . . . that [would] allow for improved management of maintenance needs across the agency’s portfolio of assets.’ This planned initiative was not completed.”<sup>325</sup>

**E. Comparative Analysis of Design-Bid-Build and Design-Build.** In addition to the elements of design-bid-build noted above, the separation of the designer and constructor in the design-bid-build methodology generates avoidable costs, which is a weakness of the methodology, because it “deprives the owner of contractor skill during the design process, such as sensitivity to the labor and materials, knowledge of construction techniques, and their advantages, disadvantages, and costs . . . [and contractor] ability to evaluate the coherence and completeness of any design and, most important, the likely costs of any design proposed.”<sup>326</sup> Moreover, the separation of the design phase and the construction phase and segmented sequencing of the work “not only precludes work from being performed while the design is being worked on but also deprives the contractor of the opportunity of making forward purchases in a favorable market.”<sup>327</sup> For these reasons alone, a shift to design-build on a project is thought to save time and project costs.<sup>328</sup> Other weaknesses of design-bid-build are thought to include a market reduction in “the number of prospective prime contractors who could bid for the work . . . thereby reduc[ing] the pool of competitors,” and “its emphasis on a fixed-price contract and competitive bidding, also can create an adversarial relationship between owner and contractor.”<sup>329</sup> Design-bid-build’s “linked set of contracts—owner-design professional, owner-contractor, contractor-subcontractors—[tend] not [to] generate a collegial team joining together with a view toward accomplishing the objectives of all the parties” and

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<sup>325</sup> *Ibid.*, p. 6; citing to Message of the Mayor to the Fiscal Year 2009 Executive Budget, May 1, 2008, pp. 70-71, at [https://www1.nyc.gov/assets/omb/downloads/pdf/mm5\\_08.pdf](https://www1.nyc.gov/assets/omb/downloads/pdf/mm5_08.pdf), accessed 05-07-19 @ 2:39 p.m.

There had also been accompanying agency efforts to operationally expand evaluation practices to routinely produce better needs assessments and scope information within the existing AIMS process.

<sup>326</sup> Sweet and Schneier, *op. cit.*, p. 358.

<sup>327</sup> *Idem*

<sup>328</sup> *Idem*

<sup>329</sup> *Idem*

“[s]ome note that the designer and the contractor often generate a semiadversarial mood, which can generate accusatory positions when trouble develops” all contributing to a high level of disputes on a project.<sup>330</sup> The role of the architect as the owner’s representative during the build phase is not only problematic on its own, but also the trend has been for the “modern design professional[s to] seek to exculpate themselves from responsibility for the contractor’s work and to limit their liability exposure . . . [and it is thought that] many design professional lack the skill necessary to perform those services properly.”<sup>331</sup> The separation of design from construction, which, “in theory [can] creat[e] better design and more efficient construction, had the unfortunate result of dividing responsibility” and creating inefficiencies that design-build, uniting design with construction, seeks to resolve.<sup>332</sup> On the other hand, design-bid-build, which has been around for a long time, “has relatively clear lines of responsibility . . . and [r]isk allocation methods—insurance, indemnity and contract disclaimers—are easy to devise.” This requires the risk-related insurance and indemnity industry to create new methods of risk allocation and products to serve an alternative delivery method, such as design-build, that “blur[s] the lines of responsibility” and for the law, which “often lags behind organizational and functional shifts in the real world” to create, from rules developed for one delivery method, appropriate and “predicable legal rules” for the newer delivery methods.<sup>333</sup>

The well-known and documented deficiencies of the design-bid-build methodology led to the creation of design-build, an alternative methodology that combines the design and construction functions and facilitates cost and schedule efficiency. In addition to solving for the deficiencies of design-bid-build, as noted above, design-build permits the constructor to bring its expertise to bear earlier in the process to complement that of the designer, since “it can no longer be assumed that ‘the most advanced construction technology and knowledge of the most construction methods lie with architects and engineers.’”<sup>334</sup> In addition to knowledge to be contributed by contractor firms during design, such “knowledge lies increasingly with ‘specialty contractors and building-product manufacturers’; in addition, “it increasingly has become difficult to prepare complete and accurate drawings and specifications,” so that design-build can bring such further specialized knowledge to the design phase, ameliorating the time and cost for preconstruction services under the design-bid-build methodology.<sup>335</sup>

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<sup>330</sup> *Idem*

<sup>331</sup> *Ibid.*, p. 359.

<sup>332</sup> *Idem*

<sup>333</sup> *Idem*

<sup>334</sup> *Ibid.*, p. 374, citing to J. W. Hinchey, “Karl Marx and Design-Build”, 21 *Construction Lawyer*, No. 1, Winter 2001, p. 46.

<sup>335</sup> *Idem*

There are several types of design-build organization. “One method is an architect promising to design and build and employing a contractor to execute the design. Because of the capital needed, a more common technique is for the D/builder to be a contractor who engages a design professional to create the design. Finally, a DB project can be a joint venture between a design professional and a contractor.”<sup>336</sup> Professional and trade organizations, such as the American Institute of Architects, the Association of General Contractors, the Design-Build Institute of America, and the Engineers Joint Contract Documents Committee have all issued standard construction document forms, which “regulate the relationship between the D/Builder and the person it engages to create the design”, address various professional licensing laws and allocate risk reflective of the organization’s members’ interests.<sup>337</sup> In New York, where design-build had been used for some time on private projects, “design-build contracts must be carefully constructed to be valid in New York.”<sup>338</sup> The Charlebois v. J.M. Weller Associates, Inc. case stands for the proposition that the nature of the design-build contract itself will determine whether it is valid in New York.<sup>339</sup> The contract at issue in Charlebois, based “on a standard Associated General Contractors’ form, specifically provided that the design services would be furnished by the contractor pursuant to a separate agreement between it and a licensed professional engineer who happened to be the contractor’s president.”<sup>340</sup> In New York, a design-build contract under which the contractor performs design services would be invalid, so that a valid design-build contract must provide “that the design services . . . be performed by a *separately retained* licensed engineer.”<sup>341</sup>

This type of requirement, however, begs the question about the “the relationship between owner and designer,” which is not an issue under the design-bid-build methodology.<sup>342</sup> In the design-bid-build methodology, the owner and designer are in contract privity, with the designer responsible to the owner for the design. In the design-build methodology, the owner and designer of record have no contract privity, though licensed professional designers have “obligations to the public and to the owner even though the owner has no contract with him.”<sup>343</sup> A “bridging” technique can help “give the owner more direct control over the design”.<sup>344</sup> Under a bridging document between the owner and a designer, “the owner’s consultant, generally an architect or an engineer, develops the schematic design and budget . . .

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<sup>336</sup> *Ibid.*, p. 375.

<sup>337</sup> *Idem*

<sup>338</sup> Biser *et al.*, *op. cit.*, p. 15.

<sup>339</sup> *Idem*; 72NY2d 587, 535 NYS2d 356, 531 NE2d 1299 (1988).

<sup>340</sup> *Idem*

<sup>341</sup> *Idem*

<sup>342</sup> Sweet and Schneier, *op. cit.*, p. 375.

<sup>343</sup> *Ibid.*, p. 376.

<sup>344</sup> *Idem*.

and ‘prepares an extensive legal and technical request for proposal (RFP) for a design-build contract.’”<sup>345</sup> The architect/engineer of record working for the D/builder selected by the owner provides the final design for the project and the construction documents, “[b]ut the owner’s consultant administers the project.”<sup>346</sup> This bridging technique may solve some problems but it may create others—design-build’s single point of responsibility virtue may be blurred or lost and the owner may shift liability for defects in design from the D/builder back to the owner and “create uncertainty as to where owner’s design parameters end and where the D/builder’s begins.”<sup>347</sup>

Since many state public procurement statutes, like New York’s, initially embedded the traditional service delivery method in the functional authorization to procure and contract, with source selection based on open competitive bidding and lowest price as the single criterion, it is typically necessary for the state to authorize public owner use of the design-build methodology because “it does not fit comfortably with the requirement that the competitive bidding process be used to award construction work.”<sup>348</sup> “According to the DBIA, as of 2010, 22 states and the District of Columbia authorize DB on all public projects, while 27 states authorize DB on some public projects.”<sup>349</sup> New York State began, in 2011, to authorize design-build, initially for certain state agencies on certain types of projects, expanding authorization over the years to more state agencies and introducing more flexibility for use on projects.<sup>350</sup> In 2018, the State legislature extended design-build authority to New York City for certain enumerated projects. New York State design-build authorization includes a “two-step process to select a contractor,”<sup>351</sup> which is similar to the federal Clinger-Cohen Act of 1996 that “authorizes a two-step system under which the first step looks primarily at competence and qualifications. After the most qualified offerors are selected, they are asked to submit proposals for the second phase, which includes cost or price.”<sup>352</sup> The “two-step process is intended to avoid focus on low cost to the detriment of technical qualifications” and resembles the quality-based selection process from federal Brooks Act for selecting design professionals.<sup>353</sup> Other statutory elements intended to conform design professional selection criteria under design-build requirements to those found in design-bid-build include setting forth specific standards that a public agency must meet when using the design-build methodology, including requiring the public agency to

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<sup>345</sup> *Idem*, citing Hinchey *op. cit.*

<sup>346</sup> *Idem*

<sup>347</sup> *Idem*

<sup>348</sup> *Ibid.*, p 377.

<sup>349</sup> *Idem*; DBIA stands for the Design-Build Institute of America.

<sup>350</sup> Biser *et al.*, *op. cit.*, p. 17.

<sup>351</sup> *Idem*

<sup>352</sup> Sweet and Schneier, *op. cit.*, p. 377.

<sup>353</sup> *Idem*

engage a licensed professional to prepare a design criteria package, to select a design-build firm from a minimum number of design-build firms considered, to specify criteria procedures and standards for proposal evaluation, and to consult with the retained professional that prepared the design criteria during bid evaluation.<sup>354</sup> The MCPIP includes references to these types of requirements as well.

When comparing design-build and design-bid-build methodologies, “[t]he principal advantage of DB . . . is speed. One entity replaces different entities who design and build with inevitable delay caused by using two entities whose work intersects. Those who design and build frequently do repetitive work and acquire specialized expertise.”<sup>355</sup> A weakness of design-build, however, is the idea that the “absence of an independent design professional selected by the owner can deprive the owner of the widest opportunities for good design.”<sup>356</sup> Since the design professional in design-bid-build performs functions during the build phase, it is thought that, in design-build, “[a]n unsophisticated owner [may lack] the skill to determine whether the contractor is doing the job well or as promised, . . . [resulting] not only in substandard work but also in excessive payments being made early in the project or in slow payment or nonpayment of subcontractors.”<sup>357</sup> Since design-bid-build contracts typically are fixed price contracts with the price determined at contract award, the design-build methodology exposes a tension between the fixed price contract and the cost-plus contract. Owners typically prefer fixed price, but for a design-build project, “the owner may not even know what is to be built when it enters into contract.”<sup>358</sup> Contractors, prefer cost-plus for a design-build project because it “cannot know with any certainty what it will be expected to build; design may be completed after contract signed.”<sup>359</sup> Mechanisms to solve this tension include the owner’s preparation of “a set of performance specifications . . . [that at the very least can] “prescribe intelligent criteria for performance in advance” . . . [and the preparation of] a budget for each phase of the work . . . [designating] the budget estimate as a target price. If the actual cost is greater or less than the estimate, the contract price can be adjusted.”<sup>360</sup> Finally, for design-build projects, “it may be useful for each party to agree on an independent certifier for progress payments.”<sup>361</sup>

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<sup>354</sup> *Ibid.*, pp. 377-378; referring to Florida’s 1989 legislation.

<sup>355</sup> *Ibid.*, p. 378

<sup>356</sup> *Idem*

<sup>357</sup> *Idem*

<sup>358</sup> *idem*

<sup>359</sup> *Ibid.*, p. 379.

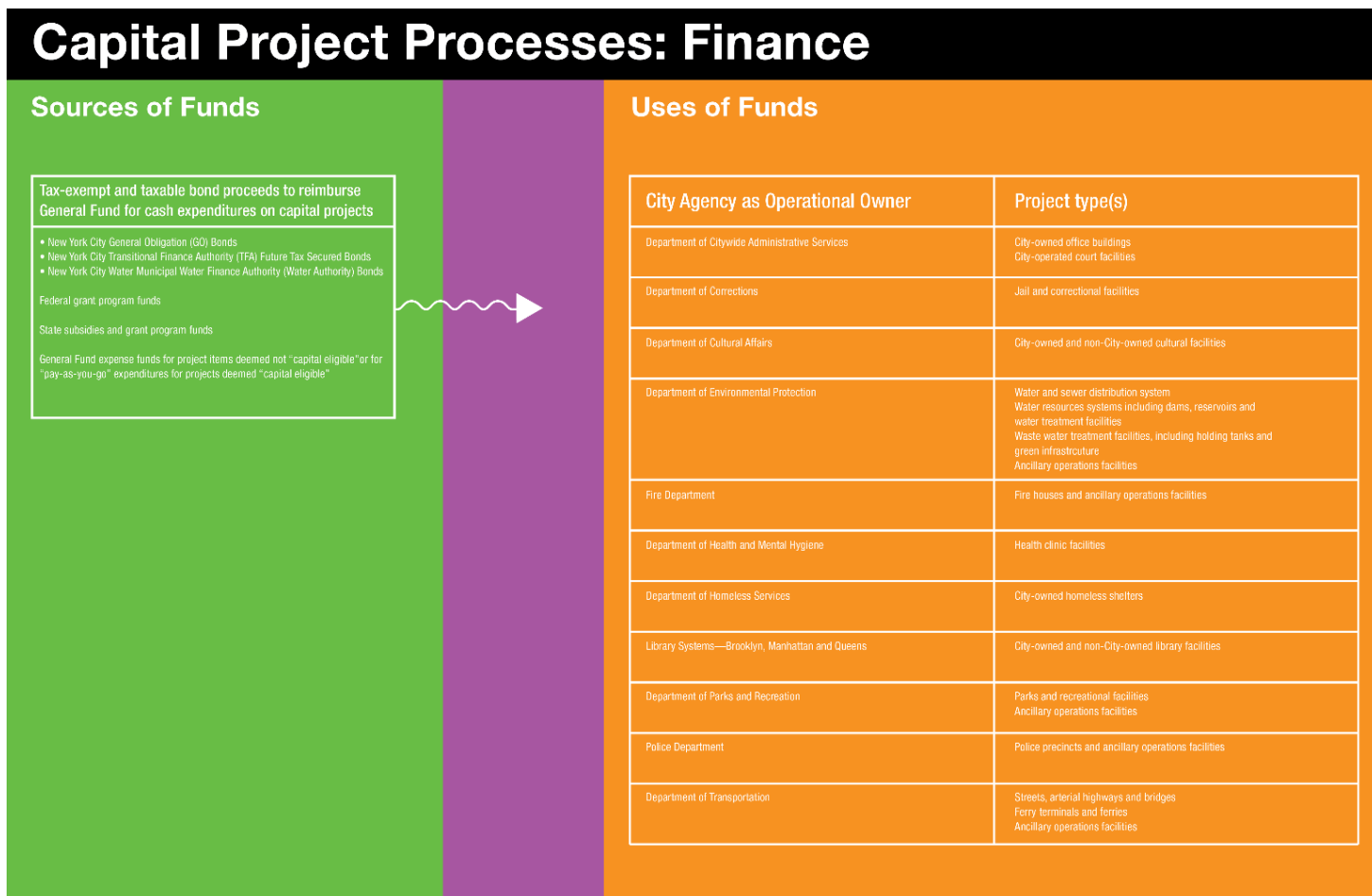
<sup>360</sup> *Idem*

<sup>361</sup> *Idem*



Issues in Traditional Public Infrastructure/Building Finance

(See TABS 5-A – 5-B in COURSE MATERIALS APPENDIX)



**A. New York Indebtedness in Nutshell.** All state and local government issuers must issue indebtedness pursuant to laws authorizing such incurrence of debt, and if a state or local government issuer fails to comply with these authorizing laws, the indebtedness will be considered invalid and not binding on the issuer. Since local governments are the creation of their respective states, all such laws are state laws. In New York, Article VII, Section 11 of the State constitution places limitations on the issuance of State indebtedness by requiring it be issued pursuant to authorizing legislation that is limited to a single work or purpose, which is

the subject to public state-wide referendum before authorization is complete.<sup>362</sup> This is a type of debt limitation that is common among many states as discussed in TAB 6, **A. History of Public Finance and the P3**. Debt limitations of this type have been associated with the development of public authorities created by states to issue bonds for state public purpose projects, which bonds are “subject to appropriation”, backed by a “moral obligation” of the state, or that are paid from revenues of various kinds.<sup>363</sup> State laws also govern the ability of their political subdivisions, such as local governments, to issue indebtedness. In New York, Article VIII of the State constitution requires the legislature to authorize and restrict local governments in borrowing money, incurring indebtedness and loaning its credit.<sup>364</sup> In New York, instead of applying the referendum type of debt limitation to its local governments, Article VIII of the State constitution limits debt “based on the average full valuation of taxable real estate in a locality.”<sup>365</sup> This type of debt limitation is common across the country, as discussed in in TAB 6, **A. History of Public Finance and the P3**. Since some local governments have multiple revenue sources in addition to property taxes, this type of debt restriction is considered by some to be “out of date”, tying general obligation debt capacity to local real estate values, which varies greatly, and ignoring other revenue sources such as local income taxes and sales taxes;<sup>366</sup> this type of debt restriction also creates incentives for local governments, pursuant to state authorization, to issue revenue bonds tied to the non-property tax revenues, create public utilities supported by fees, and create, to the extent permitted by state law, local versions debt issuing authorities.<sup>367</sup>

A bond is evidence of indebtedness that enables its holder to sue on the bond for payment without having to introduce into evidence the underlying contractual obligation for payment and contains, at a minimum, a promise of the issuer to pay the principal amount of the indebtedness at a specified time or times, on specified interest payment dates, at a specified rate or rates of interest. It may be helpful to remember that the issuer of bonds is essentially a borrower, that bondholders, collectively, are essentially a lender, and that the aggregate principal amount of any bond issue is essentially the amount of the loan. Bonds and any other obligations issued by public entities are always debt, as opposed to equity, because the nature of public entities and the laws that create them and empower them to borrow money dictate

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<sup>362</sup> New York City Bar Association Report of the Task Force on the New York State Constitutional Convention, The Record, Volume 52, No. 5 (Chapter 9 State and Local Government Finance and Taxation), p. 612.

<https://www.nycbar.org/pdf/report/uploads/603--ReportoftheTaskForceontheNYSConstitutionalConvention.pdf> accessed 04-30-19 @ 3:40 p.m.

<sup>363</sup> *Idem*; see also Sbragia, *op. cit.*, pp. 22-23.

<sup>364</sup> *Ibid.*, p. 613.

<sup>365</sup> *Ibid.*, p. 615.

<sup>366</sup> *Idem*

<sup>367</sup> Sbragia, *op. cit.*, pp. 22-23.

that no one own them and that, existing solely to fulfill any number of public purposes, no profit inure to any of those who control them.

Public owners that can issue bonds do so as one way, among many, to finance their capital projects. Other ways include a public owner with the power to raise revenues either through taxes or fees paying for a project with revenues on hand (“pay-as-you-go “financing) or paying for a project with received from state or federal grant programs. Usually, however, in order to borrow money based on taxes or fees historically collected and/or reasonably projected to be collected, public owners go to the publicly-offered securities market (“public market”) or the privately-placed securities market (the “private placement market”) to finance their capital projects because these markets enable public entities to obtain the funds they need at the time they need them at tax-exempt interest that are typically lower than taxable lending rates.<sup>368</sup>

There are many ways to categorize bonds, but one common way to categorize them is based on the source of re-payment of the debt in the form of amortized principal and interest payments. *General obligation bonds* (G.O. bonds) are bonds issued by a state or its political subdivision of, including its subordinate local governments (State and Local Governments), and secured by a State’s or its Local Governments’ pledge of general *ad valorem* (real property or sales taxes) or special tax revenues. Revenue bonds are issued by a State or Local Government or a special purpose public agency or authority created for a State or Local Government under State law for the purpose of acquiring or constructing a revenue producing project, some or all of the revenue of which is pledged to pay principal of and interest on the bonds. Bonds issued by State and Local Governments and their related public agencies and authorities are often tax-exempt.<sup>369</sup> Projects financed with the proceeds of tax-exempt bonds correspond to what many consider the most basic and traditional of government functions such as building schools and building and maintaining roads and highways. So long as a public entity owns and operates the facility financed with bonds, the bonds are likely to fall within the tax-exempt category. Although the issuers may contract with a private third parties for the *construction* of projects financed with the proceeds of tax-exempt bonds, the issuers or other public Owners must generally own and operate these projects. The private use restrictions of the 1986 Code substantially limit the ability of government to enter into “public private partnerships” for projects to be financed with

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<sup>368</sup> Purchasers of tax-exempt securities will “lend” money at lower rates of interest than they would for taxable securities because the interest earned on tax-exempt securities is not included in gross income for federal income tax purposes and their investment yield is not reduced by the payment of taxes.

<sup>369</sup> Section 103(a) of the 1986 Internal Revenue Code excludes, from gross income, interest on any State and Local Government bond, which are bonds issued by states, cities, towns and public authorities for projects of traditional governmental nature such as schools, roads and sewer systems.

tax-exempt bonds. For more detailed information about the City's Financing Program, see **D. The City's Financing Program.**

**C. Quick Guide to Terms and Concepts**<sup>370</sup> A bond like a note, is evidence of indebtedness which enables its holder to sue only on the bond for payment without having to introduce into evidence the underlying contractual obligation for payment. A bond certificate will contain, at a minimum, a promise of the issuer<sup>371</sup> to pay the principal amount of the indebtedness at a specified time or times<sup>372</sup>, on specified interest payment dates, at a specified rate or rates of interest<sup>373</sup> either from the date the bond is dated or the last interest payment date to which interest has been paid.

Both private corporations and public entities issue bonds to evidence their indebtedness. A corporate bond represents debt and not equity, and its holder is a creditor of the issuing corporation and not a part owner of the issuing corporation entitled to share in the corporation's profits, as is the holder of its stock. Bonds and any other obligations issued by public entities are always debt, as opposed to equity, because the nature of public entities and the laws that create them and empower them to borrow money dictate that no one own the public facilities financed with them and that, existing solely to fulfill any number of public purposes, no profit inure to any of those who control these public facilities.

Public entities issue bonds as one way among many to finance their capital projects. A public entity with the power to raise revenues either through taxes or fees could finance a project with revenues on hand wait to accumulate or raise taxes or fees sufficient amount of revenues ("pay-as-you-go" financing) or it could finance a project through moneys received through state or federal grants. Usually, however, to borrow money based on taxes or fees historically collected and/or reasonably projected to be collected, public entities go to the publicly-offered securities market ("public market") or the privately-placed securities market (the "private placement market") to finance their capital projects because these markets enable public

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<sup>370</sup> Generally, from Terri Matthews, *Introduction to Public Finance Practice* (2000).

<sup>371</sup> It may be helpful, at times, to remember that the issuer of bonds is essentially a borrower, that bondholders are collectively, essentially a lender, and that the aggregate principal amount of any bond issue is essentially the amount of the loan.

<sup>372</sup> The issuer may repay the entire principal amount of the indebtedness on the maturity date of the bonds (a "bullet" or "balloon" payment) or it may repay the principal amount of the indebtedness in regular intervals, usually in substantially equal installment payments ("amortized installment" payments).

<sup>373</sup> Bonds may bear interest at a rate that varies according to an expressed set of conditions.

entities to obtain the funds they need at the time they need them at tax-exempt interest that are lower than bank lending rates.<sup>374</sup>

*Approval of Issuer.* Approval of a bond issue requires some official act by the issuer, required by state law, that is typically a resolution to be adopted by the issuer which includes, among other things, public findings required by law, authorization of bonds not to exceed a certain amount, approval of bond and sale documents in substantially final form, and delegation of authority of officer(s) to execute the bond and sale documents.

In addition, in order to make the various qualified bonds tax-exempt, §147(f) of the 1986 Code requires what is referred to as a “TEFRA hearing”. This requirement (as distinct and separate from any local and state law requirements) for public approval was originally required by the Tax Equity and Fiscal Responsibility Act of 1982 (hence “TEFRA”) and applies to “private activity bonds” where there is an impermissible amount of private-sector use of the debt-financed public facility or private-sector source of payment for the debt, as opposed to “governmental bonds”. It requires the publication of notice of a hearing in connection with the bond issue, the taking of minutes at the hearing and approval of the bond issue by a governmental unit. Failure to comply with this requirement directly and adversely affects the tax-exempt status of the bonds.

*Kinds of Bonds.* There are different ways to categorize bonds to highlight various features, some of which are not mutually exclusive.

The first classification of bonds is usually on the **basis of the source of payment for the debt** (principal and interest):

1. General obligation bonds (“G.O. bonds”) are issued by a state or a political subdivision of a state and secured by a state’s or its political subdivision’s authorized pledge of general ad valorem or special tax revenues.
2. Revenue bonds are issued by a public agency, municipal corporation, or state for the purpose of acquiring or constructing a revenue producing project, some or all of the revenue of which is pledged to pay principal of

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<sup>374</sup> Purchasers of tax-exempt securities will “lend” money at lower rates of interest than they would for taxable securities because the interest earned on tax-exempt securities is not included in gross income for federal income tax purposes and their investment yield is not reduced by the payment of taxes.

and interest on the bonds. Bonds secured by both ad valorem taxes and project revenues are called “double barreled” bonds.

Another classification is on the **basis of function**:

1. Refunding bonds are bonds that replace or pay off outstanding bonds which, in some cases, holders may surrender in exchange for the new security.
2. Conduit bonds are bonds issued by a state-created public authority to finance a specific revenue producing facilities owned by private entities, which facilities have a certain amount of public benefit.<sup>375</sup> Although the authority is the borrower, it is largely a conduit of tax-exempt status to the private entity to which the authority loans the proceeds of its offering. The private entity is the true borrower or credit. The authority enters into a loan agreement with the private entity and pledges, as security for its bonds, its right to payment from the private entity.

In a conduit financing, the non-governmental entity, which cannot by itself issue tax-exempt debt, can take advantage of the power of a state, public agency or municipal corporation to issue tax exempt debt, by borrowing the proceeds of a tax-exempt debt offering from the issuer at tax-exempt rates. Tax-exempt rates are generally lower than rates available from conventional loans or from other taxable markets, so a borrower can effect savings by borrowing proceeds from tax-exempt bonds. The private or not-for-profit corporation is the real obligor for and beneficiary of conduit revenue bonds issued by a state, public agency or municipal corporation.

3. Industrial development revenue bonds (often referred to as “IDBs”) are a subcategory of conduit issuer bonds to finance commercial activities for the purpose of enhancing economic development.
4. Pooled or “pool” bonds are conduit issues that provide moneys to be loaned, currently or in the future, to a pool of eligible borrowers, or to

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<sup>375</sup> In New York, New York State Not-for-Profit Corporation Law, Section 1411, authorizes the creation of “local development corporations”, which local governments have used to create conduit issuers.

banks that will lend the money to a pool of eligible borrowers, to finance eligible projects. Who the eligible borrowers and what the eligible projects are depend on the state law governing the issuer. The authority for an issuer to issue bonds for a loan pool must explicitly exist in the issuer's enabling legislation and tax law limits the ability of issuers to do pooled financing on a tax-exempt basis.

Bonds can be classified by certain **structural features**:

1. Serial bonds are the part of a series of bonds that mature annually or semi-annually, sometimes in relatively small amounts over a period of years.
2. Term bonds are bonds of an issue that have a single maturity. The bond documents set aside moneys for term bonds in a reserve fund at regular intervals for orderly amortization of term bonds over the life of the debt ("sinking fund installments"). Mandatory sinking fund redemption requires that the annual sinking fund installments be used to call bonds or purchase bonds on the open market, so that the term bond is effectively retired in a serial manner. It is typical for a 30-year issue to have serial bonds in the early years, with term bonds in the later years.
3. Variable or floating rate bonds have interest rates that, in connection with other structural and credit enhancement features, vary to enable the issuer to take advantage of changing market conditions to attract various investors in the secondary market. If bonds are not variable rate bonds, they are fixed rate bonds. Interest rates can vary according to an objective standard (e.g., an index) or on a daily, weekly, monthly bi-annual or annual basis at the option of an issuer. The variable rate bonds can convert to a fixed rate either at the option of the issuer (within certain constraints imposed by tax concerns) or automatically upon the happening of certain events described in advance.
4. Callable or redeemable bonds are bonds which the issuer may pay before their stated maturity because the issuer had reserved the

right to pay to the bondholders a specific amount (the call or redemption price) to retire the bonds before their maturity date. If the issuer agrees to pay more than the face amount of the bonds when “called” or “redeemed” early, the excess of the payment over the face amount of the bond is the “call or redemption premium”.

A premium is intended to compensate the investor for the reduction in the yield to maturity of its investment because the issuer redeemed the bond prior to its maturity. The competing interests of the issuer—that of being able to retire its debt early and effect an interest cost savings—and of the investor—that of being able to receive the yield to maturity—usually results in a period when the issuer cannot, at its option, call the bonds prior to maturity (“call protection”), a subsequent period when the issuer must pay a premium to call the bonds at its option, and a final period when all bets are off and the issuer can call the bonds at any time without paying a premium. An issuer will pay more in greater interest rates in order to call bonds prior to maturity (even with call protection and a premium structure) than with no option to redeem, but such an additional cost may be worth the ability to retire debt early.

5. “Option tender” or “put” bonds are bonds—usually variable rate bonds—which the bondholder has the right to return, at certain times prior to the stated long-term maturity, to a specified party on behalf of the issuer who must purchase the bonds tendered at par (full payment of principal amount of the bonds) with accrued interest regardless of existing market conditions.
  
6. “Zero coupon” or “capital appreciation” bonds are bonds for which interest is not paid semi-annually but rather accrues semi-annually, usually on a compounded basis. Principal and interest accrued to a particular date becomes the “accrued value” of the bond at any particular time—usually needed to calculate redemption price for early calls.



**Notes** are short-term borrowings (duration often determined by statute). They are classified according to the source of funds to repay them.

1. Tax anticipation notes or TANs are short-term securities which are to be repaid at maturity with the proceeds of a forthcoming tax collection.
2. Bond anticipation notes or BANs are short-term securities, usually offered at a discount, secured by a pledge of the proceeds of an anticipated bond issue to pay the notes at maturity.
3. Revenue anticipation notes or RANs are short-term securities for which the proceeds of future revenues are segregated to be applied to the payment of the notes at maturity.<sup>376</sup>

Notes can be fixed or variable interest notes and, if variable, can have optional tender features, as described above.

*Other Obligations.* Sometimes it becomes necessary—for example, to avoid having debt be considered “debt” for state debt limitations law purposes—for issuers to create vehicles to issue obligations that look a lot like debt. Certificates of Participation or COPs are one example and are certificates issued by a trustee, to which a state or a political subdivision has assigned its right to payments or revenues from a project, that evidence a proportionate interest in such assigned rights, the interest portion of which is exempt from federal income taxes and state and local income taxes within the assignor’s state.<sup>377</sup> COPs must, however, be considered debt for federal tax law purposes.

*Federal Tax Perspective.* Once, obligations of state and local governments were considered tax-exempt on the basis of the constitutional doctrine of reciprocal immunity. The source of this doctrine of constitutional immunity was *dicta* in a very old case which posited that since the states could not tax obligations of the federal government, the federal government could not tax those of the states.<sup>378</sup> For some time, this area of the law slept until tax and public policy

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<sup>376</sup> See New York General Municipal Law, Section 109-b, for installment purchase agreements the payment of which are subject to annual appropriation.

<sup>377</sup> In New York, special state legislation is required for state or local government create a COPs transaction.

<sup>378</sup> Some were able to hold this view even in the face of a reality in which the states taxed interest income on U.S. Government bonds. In retrospect, the states’ defense of the tax-exempt status of their bonds with this doctrine was at odds with their own practice which may have contributed to the discredit of the doctrine.

academics in the 1960s began to view exemptions under the federal income tax structure as a “tax expenditures”. In particular, the revenues foregone due to the exemption of interest on municipal bonds functioned as an expenditure—a subsidy from the federal government to state and local governments, and an inefficient one at that.<sup>379</sup>

This analytical development occurred simultaneously with the rapid development (or, to some, abuse) of IDB financing. After state courts finally held economic development to be a valid public purpose for which public debt could be issued, Congress began to regulate issuance of bonds to finance economic development primarily through tax legislation in order to deal specifically with perceived abuses in the IDB area. Before being amended by the Internal Revenue Code of 1986, Section 103 of the Internal Revenue Code of 1954 regulated, in excruciating detail, almost every aspect of IDBs. Although some questioned the authority of Congress to legislate in this area in view of the reciprocal immunity doctrine, federal *regulation* of tax-exempt bonds was accepted at this time.

When time to simplify the federal tax structure *and* raise revenues came in 1986, the academics’ tax expenditure model became operative. Since federal exemption of interest income on state and local government bonds was seen as a foregone revenue, Congress was going to make this tax expenditure as efficient as it could. Congress, when drafting the 1986 Code, applied the extensive manner of regulation used on IDBs in the 1954 Code to the entire spectrum of municipal bonds. This change in orientation is important to understand the structure of the tax law as it applies to state and local government obligations as briefly described below. Instead of the exemption from federal income tax of interest earned on municipal bonds flowing in some vague way from the structure of federalism, subject to regulation, the drafters of the 1986 Code treated tax exemption of municipal bonds as a legislative creation which Congress was under no obligation to continue.

The public policy behind the 1986 Code sought, in particular, to control and reduce the volume of bonds other than those of state and local governments. The 1986 Code constrained the issuance of tax exempt bonds by creating two broad categories of bonds exempt from taxation and applying to these categories several additional constraints ranging from limits on the amount of private benefit from tax-exempt bond financed projects (private use restrictions) to

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<sup>379</sup> Stanley S. Surrey, Tax Incentives as a Device for Implementing Government Policy: A Comparison with Direct Government Expenditures, 83 Harv. L. Rev. 705 (1970); Tax Incentives--Conceptual Criteria for Identification and Comparison with Direct Government Expenditures, Tax Institute of America, Symposium on Tax Incentives 3 (1971); Federal Income Tax Reform: The Varied Approaches Necessary to Replace Tax Expenditures with Direct Governmental Assistance, 84 Harv. L. Rev. 352 (1970).

limits on the amount of interest earnings an issuer can achieve from investing bond proceeds during project construction (arbitrage yield restrictions).

The 1986 Code classifies bonds as either “state and local government bonds” the interest earned on which is tax-exempt income in the hands of the holder or “private activity bonds” the interest earned on which is taxable income in the hands of the holder. The 1986 Code treats certain otherwise private activity bonds as “qualified bonds” and grants tax exempt treatment to them. Qualified bonds include conduit bonds issued to finance, among other types of projects, hospitals, educational facilities, certain enumerated “exempt facilities” and certain redevelopment projects. Sections 141-150 of the 1986 Code contain definitions of private activity bonds, qualified bonds, and arbitrage bonds and the many rules (in complexity patterned after Section 103 of the 1954 Code) necessary to obtain and maintain tax-exempt status.

In South Carolina v. Baker, 108 S.Ct. 1355, reh. den. 108 S.Ct. 2937 (1988), the Supreme Court finally put to rest the untested notion that the constitutional doctrine of reciprocal immunity guaranteed tax exemption of state and local government obligations and held that the exemption from federal income tax of interest on bonds issued by state and local governments was not mere regulation by Congress, but a creation of Congress which is free to change or abolish.

State and Local Government Bonds. Section 103(a) of the 1986 Code excludes, from gross income, interest on any state and local government bond. State and local government bonds include bonds issued by states, cities, towns and public authorities for projects of traditional governmental nature such as schools, roads and sewer systems. Although the issuers may contract with a private third parties for the construction of projects financed with the proceeds of state and local government bonds, the issuers generally own and operate these projects.

Projects financed with the proceeds of state and local government bonds correspond to what many consider the most basic and traditional of government functions such as building schools and building and maintaining roads and highways. So long as a state or local government or special purpose public authority owns and operates the public facility, the bonds are likely to fall within this category. The private use restrictions of the 1986 Code substantially limit the ability of government to enter into “public private partnerships” for projects to be financed with tax-exempt bonds.

Qualified Bonds. As the role of government expanded over time to include more than basic governmental functions, so, too, did the types of projects which state and local governments financed with the proceeds of tax-exempt bonds. The expanded role of government required more services, expertise and personnel than state and local governments traditionally possessed. Since it was not practical or possible for state and local governments to satisfy, out of their own resources, the expanded concept of public need (which had grown to include economic development), it became necessary for state and local governments or special purpose public authorities to issue bonds and lend the proceeds to non-governmental entities to build and operate projects that satisfied expanding public needs. (See “Conduit Bonds” above.)

If conduit bonds meet the requirements of Sections 142 through 145 of the 1986 Code, they will be deemed bonds of a special category of private activity bonds called “qualified bonds” that merit the tax-exempt treatment of state and local government bonds. Sections 142 to 144 enumerate the types of projects that can be financed with qualified bonds, subject to all the other private use and yield restrictions. Section 145 deals with projects owned and/or operated by not-for-profit entities with §501(c)(3) determination status.

*Securities Law Perspectives.* Bonds are securities under federal and state securities law. The basic rule is that bonds issued by state and local governments as well as state-created public authorities are exempt from the registration requirements,<sup>380</sup> but not the anti-fraud provisions, of the federal securities laws—the Securities Act of 1933 (the “1933 Securities Act”) and the Securities and Exchange Act of 1934 (the “1934 Exchange Act”). Despite the general exemption from registration, much of securities law applies to tax exempt bonds. Tax exempt issuers prepare and disseminate Official Statements as disclosure documents and strive to provide ample evidence of compliance with the anti-fraud provisions—namely, the presence of full and accurate information, the absence of materially false or misleading statements, and the absence of omitted material information which would make the printed information misleading.

Although legislation expressly forbids the Securities and Exchange Commission (“SEC”) to require municipal issuers to register their bonds as corporate issuers do,<sup>381</sup> a number of regulations of brokers and dealers by the SEC or the Municipal Securities Rulemaking Board (“MSRB”), in effect regulate municipal issuers’ disclosure documents and create continuing

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<sup>380</sup> Section 3(a)(2) for governmental issuers and section 3(a)(4) for not-for-profit corporations.

<sup>381</sup> Securities Acts Amendments of 1975, with Tower Amendments, adopted as part thereof.

obligations to update disclosure while bonds are outstanding in the secondary market. The most recent regulations of brokers and dealers—Rule 15(c)(2)(12) of the 1934 Securities Act, and MSRB Rules [G-36 and G-37]—attempt to simulate in the tax-exempt market the adequate and continuing secondary market disclosure that is present in the corporate securities market.

SEC Rule 15(c)(2)-12 has imposed, upon issuers and ultimate borrowers, a continuing obligation to annually update certain components of the disclosure in the O.S. and disseminate the updated information to nationally recognized municipal securities information repositories (“NRMSIRs”) for so long as the bonds are outstanding. The undertaking to provide continuing disclosure is in the form of a continuing disclosure agreement, various forms of which have been used in the industry since the Rule became effective. A partner may have a preferred form originating from correspondence with the SEC shortly after the Rule became effective. The issuer may have a preferred form of its own. Again, as with all documents, you should obtain, from the senior associate or partner, the appropriate form of continuing obligation agreement to use as the basis for your draft.

Furthermore, as state and local governments move away from traditional financing vehicles to newer financial products, it is important not to take the municipal exemption for granted and to conduct an analysis of the exemption of the security from federal registration requirements. The interposition of a trust between an issuer and bondholders in certain certificate of participation financings requires careful analysis of the nature of the exemption from registration requirements.

Finally, each state has its own securities law for any bond issue marketed and sold in its jurisdiction—the analysis to identify the applicable state securities law compliance is typically referred to as the “Blue Sky” analysis.

**D. The City’s Financing Program.** The City generally finances its capital program with bonds.<sup>382</sup> Since the City has a more varied set of taxes and revenues that can be pledged to repay its obligations than other local governments, the City has a fairly sophisticated set of options, not commonly found among most other local governments, to finance its capital program.

The three principal credits the City uses to finance its capital program consist of its general obligation bonds, bond issued by the City’s Transitional Finance Authority (“TFA”) and bonds issued by the City’s Water Authority.<sup>383</sup> The City’s general obligation debt, payable from real

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<sup>382</sup> The City also uses federal and state grant proceeds for its capital projects.

<sup>383</sup> Official Statement, *op. cit.*, p. 52.

property tax revenues, is subject to the State Constitution that limits all local government general obligation debt to 10 percent of a rolling five-year average of the full value of the locality's taxable real property (the "general debt limit").<sup>384</sup> General obligation bonds are "indebtedness" under the State Constitution, and the "State Constitution authorizes the City to levy a real estate tax without limit as to rate or amount (the "debt service levy") to cover scheduled payments of the principal of and interest on indebtedness of the City . . . [but] the State Constitution [further] limits the amount of revenue which the City can raise from the real estate tax for operating purposes (the "operating limit") to 2.5% of the average full value of taxable real estate in the City for the current and last four fiscal years, which amount may be further limited by the State Constitution or laws."<sup>385</sup> "The City has traditionally assessed real property at less than market value" and a special equalization ratio expressing "the relationship between taxable assessed value and market value", determined annually by law, is used to measure "the City's compliance with the operating limit and the general debt limit."<sup>386</sup>

The City's real estate tax is "the single largest source of the City's revenues," which includes, in addition, "a variety of local taxes, user charges and miscellaneous revenues, as well as . . . federal and State unrestricted and categorical grants."<sup>387</sup> Other taxes include taxes on City residents' personal income, general corporations, banking corporations, unincorporated business income, sales, commercial rent, real property transfers, mortgage recordings, utilities and cigarettes, among others.<sup>388</sup> "Miscellaneous revenues include revenue sources such as charges collected by the City for the issuance of licenses, permits and franchises . . . and reimbursement to the City from the proceeds of water and sewer rates charged by the New York City Water Board (the "Water Board") for costs of delivery of water and sewer services paid to the City by the Water Board for its lease interest in the water and sewer system . . .".<sup>389</sup>

Created as a city-controlled public benefit corporation in 1997, the TFA issues debt "to finance a portion of New York City's capital improvement plan", which debt is payable either from State Building Aid (for education projects) or the City's personal income tax revenues and sales tax revenues, to the extent such sales tax revenues are available after paying certain other expenses.<sup>390</sup> As a result of recent legislation, any TFA indebtedness in excess of its statutory

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<sup>384</sup> *Ibid.*, p. 57, and Independent Budget Office, *op. cit.*, p. 10.

<sup>385</sup> *Ibid.*, p. 21.

<sup>386</sup> *Ibid.*, p. 22.

<sup>387</sup> *Ibid.*, p. 21.

<sup>388</sup> *Ibid.*, p. 25.

<sup>389</sup> *Idem*

<sup>390</sup> TFA FY 2018 Annual Report, pp. 3, 25, at <https://www1.nyc.gov/site/transitionalfinance/index.page> accessed 05-08-19 @2:53 p.m.

cap counts as part of the City's constitutional debt limit.<sup>391</sup> In addition to its general obligation and TFA credits, the work horses of the City's capital program, the State has created, on the City's behalf, revenue-based debt issuing and operating authorities to finance and/or operate portions of City's capital program. This model identifies and moves off the City's expense and revenue budgets certain operations that are suitable for a fee- or utility-based finance and operations structure in order to augment the City's general obligation capacity to finance the City's capital needs. Though created by State law, these entities, however, are controlled by the City. The New York City Water Authority is one such entity, created in 1984, whose bonds finance, and are secured by revenues of, the City's water resource and distribution system and sewer and waste water treatment system on a utility basis.<sup>392</sup> None of the debt of the Water Authority is included in the calculation of the City's constitutional debt limit.<sup>393</sup>

The City plans to use a combination of its General Obligation bonds (\$20.7 billion), Future Tax Secured Bonds of the TFA (\$23.9 billion) and bonds of the New York City Municipal Water Authority (Water Authority) (\$8.7 billion for the City's water and wastewater systems) to finance commitments during the Fiscal Year 2020-2023 Plan period.<sup>394</sup>

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<sup>391</sup> Independent Budget Office, *op. cit.*, p. 11.

<sup>392</sup> Official Statement, *op. cit.* p. 52. The Water Authority also utilizes the debt issuing capacity of the State's Environmental Facilities Corporation on specific capital projects. New York City Health+Hospitals, created in 1969 in a manner similar to the Water Authority, can issue its own revenue bonds, but it also utilizes the project-based revenue bond credit of the Dormitory Authority of the State of New York for some of its capital financing. H+H is a "Covered Organization" and is independent agency "funded in whole or in part through the City Budget." *Ibid.*, p. 29.

<sup>393</sup> *Ibid.*, p. 57.

<sup>394</sup> Mayor's Message Summary., p. 76. For more information on the general obligation credit, see pp. 78-79; Water Authority, see pp. 80-81, TFA, see pp. 81-82.

**The Big Picture: Bringing Forward Concepts from Day One**  
and  
**Case Studies in Design Build Operate Maintain**

(See TAB-6A in COURSE MATERIALS APPENDIX)

**A. History of Public Finance and the P3.** The distinctive historical characteristics of public capital investment in the United States, from its early days, has been one of public rather than private power, and of State and local power rather than national.<sup>395</sup> America’s early use and acceptance of State and local public debt for infrastructure often thought of as national infrastructure—for example the railway system—is in stark contrast to the British experience, in which the private sector participated more directly and expansively during the Industrial Age.<sup>396</sup> Reasons for public capital investment in America during that period include the relative lack of access to private capital at a scale necessary for these types of projects;<sup>397</sup> “less of experience with the private corporation as an organization capable of mobilizing the financial and administrative resources necessary to complete capital works of gigantic scale and cost”;<sup>398</sup> and, when steam locomotion technology became available, building railroads opened “new, unsettled territory” with traffic and revenues “heavily dependent on any future settlement that occurred along the railway line,” as opposed to, in Britain, connecting existing trade channels that had used earlier transportation technology.”<sup>399</sup> The U.S. was, as William Seward, U.S. Secretary of State (1861-1869) and former New York Governor and U.S. Senator, noted, “a great and extensive country . . . in need of roads and canals earlier than there [was] an accumulation of private capital within the state to construct them.”<sup>400</sup>

Twenty-three years after adoption of the U.S. Constitution, Albert Gallatin, Jefferson’s secretary of the Treasury, drafted a ten-year plan for significant capital investment, which “represented

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<sup>395</sup> Sbragia, *op. cit.*, p. 19.

<sup>396</sup> *Idem*, citing Andrew Shonfield, *Modern Capitalism: The Changing Balance of Public and Private Power* (New York and London: Oxford University Press, 1965), pp. 301-302.

<sup>397</sup> *Ibid*, p. 21. Lenders in Britain, the capital exporter at the time, “strong preferred lending to governments rather than to private firms.” *Idem*

<sup>398</sup> *Idem* And, as any law school student can attest to, early American corporate case law focused on the notion of *ultra vires* for private corporations.

<sup>399</sup> *Ibid*. p. 22.

<sup>400</sup> *Idem*. Citing *Annals of Congress*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., p. 851, cited in Carter Goodrich, *Government Promotion of American Canals and Railroads, 1800-1890* (New York: Columbia University Press, 1960), p. 7.



the federal government's landmark attempt to control the field of internal improvements."<sup>401</sup> Presented to the Senate, in 1808, the plan based national action on "the scarcity of domestic capital, its reluctance to invest where returns were risky, and the difficulty that canal and turnpike companies would have in finding foreign lenders", but it coincided with military investment needs from the War of 1812, which "strained the federal budget and effectively killed it."<sup>402</sup>

The death of the Gallatin Plan led to state and local governments becoming the financing vehicle by default for elements of national infrastructure within their jurisdictions.<sup>403</sup> State and local financing for this type of infrastructure was on top of financing for what is considered strictly local—local streets and bridges, state highways and bridges, public buildings for public safety functions, such as police and fire, public buildings for education and other local governmental purposes, water resource provision, and water and sewer transmission infrastructure within jurisdictional boundaries. (See *Public Built Environment Systems and Analytical Performance Paradigms* in TAB 4 above for New York PBE systems.)

As the default mechanism for the nation's evolving transportation network—first with canals and then with railroads—in the years leading up to the Civil War and after, "all levels of the American public sector were both intimately and rambunctiously involved with its birth and extension."<sup>404</sup> State governments intervened in the development of internal improvements through eminent domain and the issuance of debt, with a significant amount of action based on interstate rivalry.<sup>405</sup> During this period "the basic argument that the state should use improvements as an instrument of economic-development policy was not seriously nor widely challenged"<sup>406</sup> and the Supreme Court only began to "restrict what subnational governments could do in the pursuit of economic development" after the 14<sup>th</sup> Amendment was ratified.<sup>407</sup> "The ability of governments and the inability of corporations to attract lenders encouraged state governments to play an activist role in the entire field of internal improvements", with the ante-bellum debt burden borne more by the states than the federal government.<sup>408</sup> During the 1839 economic depression, the most severe up to that time, saw "intense public resistance to increased taxation, and the perception that state bonds had been illegally marketed created a

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<sup>401</sup> *Ibid.*, p. 23.

<sup>402</sup> *Idem*

<sup>403</sup> *Idem*

<sup>404</sup> *Ibid.*, p. 21. See also, pp. 24-35.

<sup>405</sup> *Ibid.*, pp. 27-30.

<sup>406</sup> *Ibid.*, p. 31.

<sup>407</sup> *Ibid.*, p. 27.

<sup>408</sup> *Ibid.*, p. 32.

climate conducive to default or, worse, repudiation.”<sup>409</sup> State debt issuance continued, but while the federal government “became much more active generally in assisting railways, primarily through the granting of federal lands”, “this federal aid supplemented the ongoing state and local aid; it did not channel or impose controls on subnational assistance.”<sup>410</sup> In reaction to the defaults and repudiations, and perceptions of “corruption, unsound or incompetent companies, an unexpected engineering difficulties”, the states *en masse* moved to impose constitutional debt limits on themselves, by restricting “the use of state credit for private corporations, and in general [restricting] borrowing for any reason.”<sup>411</sup> Not surprisingly, at the local level, “[l]ocal borrowing increased dramatically between 1840 and 1880”<sup>412</sup> for transportation and other purposes, the most secure of which were “tax bonds”, which were “secured by a pledge of earmarked taxes.”<sup>413</sup> This type of debt had been authorized by either general or special state laws.<sup>414</sup> Unlike state debt that financed development of state territories as part of the national network as a precursor to developing regional markets, local debt financed local routes and local economic growth.<sup>415</sup> “[E]nthusiastic majorities typically approved the borrowings”, including public referenda.<sup>416</sup> Defaults and repudiations<sup>417</sup> of mostly local railroad bonds accompanied the Panic of 1873, which led to similar constitutional restrictions on local debt as on state debt.<sup>418</sup> These types of debt restrictions, however, later led to widespread state creation of public authorities, at both state and local government levels, to finance and/or construct their respective public works as part of a “strategy of circumvention that has tempered the need to attach anachronistic state restrictions directly.”<sup>419</sup> Constitutional debt limitations from this period are still in effect and have a continuing impact on state and local governments’ ability to use the “public-private partnership” model of service delivery.

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<sup>409</sup> *Ibid.*, p. 36. See also Miller *op. cit.*, p. 7; citing his Ph.D. dissertation at p. 167.

<sup>410</sup> *Ibid.*, p. 39.

<sup>411</sup> *Ibid.*, pp. 40-42.

<sup>412</sup> *Ibid.*, p. 56.

<sup>413</sup> *Ibid.*, p. 57.

<sup>414</sup> *Ibid.*, pp. 52-53.

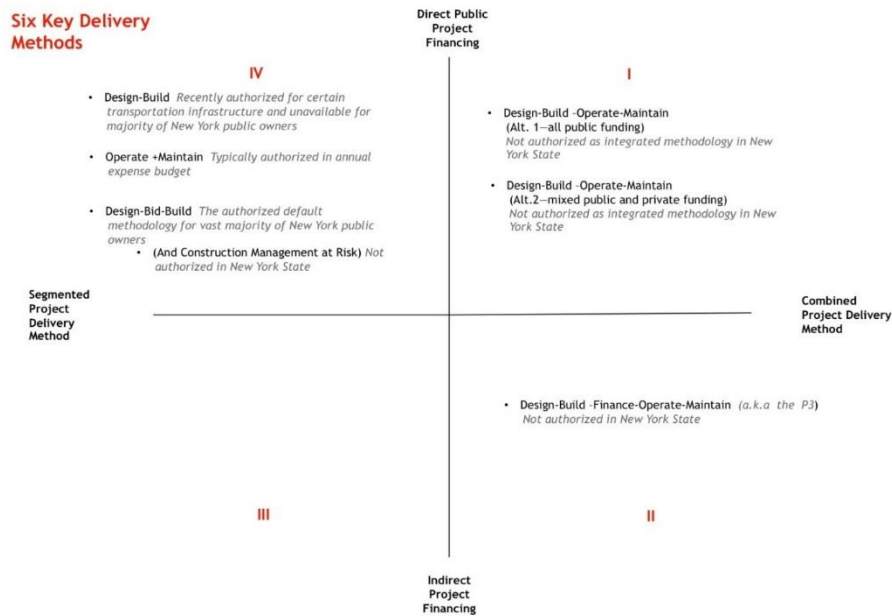
<sup>415</sup> *Ibid.*, pp. 51-57.

<sup>416</sup> *Ibid.*, p. 59.

<sup>417</sup> “Borrowing was carried out with widespread approval, and so were the repudiations and defaults that plagued the railway-assistance bonds provided by such borrowing.” *Idem*

<sup>418</sup> *Ibid.*, pp. 56-61.

<sup>419</sup> *Ibid.*, pp. 22-23.



Dr. John B. Miller, "Life Cycle Delivery of Public Infrastructure: Precedents and Opportunities for the Commonwealth", Pioneer Institute White Paper, No. 44, December 2008, p. 6 (emphases added).

The public-private partnership (P3), described functionally as a service delivery method, integrates project design, build, and life cycle operations and maintenance functions, and facilitates life cycle delivery, in contrast to initial delivery.<sup>420</sup> The P3 can be financed (1) directly with (a) all public debt or with (b) a combination of public and private debt or (2) indirectly with no public finance, and often with private equity, requiring user fees of several types to generate revenues for repayment of private financing and life cycle operations and maintenance costs.<sup>421</sup> Analysis of the period between 1789 and 1933 reveals that the federal government pursued a "dual track strategy for infrastructure financing" of "canals, roads, railroads, navigation aids, bridges, ferry landings, telegraph networks, cable connections, water supply systems, wastewater treatment facilities, and power generation facilities and distribution networks."<sup>422</sup> The justification for public investment in creating "[i]nfrastructure capacity and level of service were seen then, as now, as fundamental platforms on which local, interstate and international commerce rely."<sup>423</sup>

<sup>420</sup> John B. Miller, "Life Cycle Delivery of Public Infrastructure: Precedents and Opportunities for the Commonwealth" (Boston: Pioneer Institute December 2008), No. 44, pp. 6 and 22.

<sup>421</sup> *Idem*

<sup>422</sup> *Ibid.*, p. 8; citing John Miller, *Principles of Public and Private Infrastructure Delivery* (Boston: Kluwer Academic, 2000), pp. 79-170.

<sup>423</sup> *Ibid.*, p. 7.

The pre-1933 federal dual track strategy refers to the two types of P3s described above—those with some or all direct public finance (Quadrants I and IV) and those with all indirect private finance (Quadrants II and III).<sup>424</sup> Direct finance project types included harbor improvements, navigable rivers projects, navigation aids, territorial roads and trails, military roads and public buildings, while indirect finance project types included most canals, commercial docks and piers, post roads, railroads, telegraph and telephone, and power.<sup>425</sup>

Of the 800 projects identified for that period, “over 90% were delivered using a Combined strategy similar to [P3s]” because “Congress was primarily interested in obtaining infrastructure services over many years and not simply focused on initial delivery of an infrastructure, but rather, on life cycle delivery of infrastructure services.”<sup>426</sup> Congress directly funded projects that the Constitution requires the federal government to handle, such as “clearing obstructions and establishing navigation aids . . . on navigable rivers” in part due to the unlikelihood that individual states would be responsible for and finance such projects.<sup>427</sup> In the context of capital constraints for both federal and state government levels and for projects based on unproven technology, during this period, “many of the nation’s infrastructure needs had to be solved with the assistance of private investment.”<sup>428</sup> These indirectly funded projects used concession and leases to attract “private sector debt and equity financing” and “put the risk of performance (including design, construction and operations), along with the risk of financing, on the private sector.”<sup>429</sup>

The Eisenhower Administration’s grant policy authorizing 90% federal funding for the interstate highway network (with 10% matching state funding) signaled a significant change from the earlier period. In 2008, however, the National Surface Transportation Policy and Revenue Study Commission moved back to the earlier paradigm when it recommended 40% direct federal support of life cycle costs for the nation’s transportation infrastructure network.<sup>430</sup>

Public infrastructure facility and service provision is historically dynamic and has always been driven by the evolution of the evolution of science and technology generally and as they apply to infrastructure, demographic changes and changes in in the nature of “‘high quality’

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<sup>424</sup> *Ibid.*, p. 8.

<sup>425</sup> *Ibid.*, p. 9 (Figure 6); citing *Principles*, Figure 3-1.

<sup>426</sup> *Ibid.*, pp. 7-8. “During this period, Congress used design-build-finance-operate-maintain as its delivery and finance strategy in five out of every eight (62.5%) of the projects it promoted through legislation.” *Ibid.*, p. 8.

<sup>427</sup> *Idem*; the exception to direct federal funding were “waterways such as the Hudson River where the benefit came solely to the commerce of a single state”. *Idem*

<sup>428</sup> *Idem*

<sup>429</sup> *Ibid.*, pp. 8-9.

<sup>430</sup> *Ibid.*, p. 9

transportation, water supply, waste water treatment, telecommunication, and power supply".<sup>431</sup> This historical dynamic system also includes service delivery and finance involving both public and private sector investment in public infrastructure networks, with "the proportions of direct and indirect government funding" regularly changing overtime "and within infrastructure classes."<sup>432</sup> Public infrastructure has always involved private sector investment to fund "[a]dvances in science, materials, equipment, engineering methods, and construction practices", and "different combinations of available technology, labor, materials, and equipment have mixed with available public funds to deliver infrastructure assets."<sup>433</sup> In the context of continually changing "workable combinations of technology, equipment, materials, and labor that are focused on delivering better infrastructure value, higher levels of infrastructure service, and a competitive advantage to the American economy in an increasingly international marketplace", this historical dynamic supports the view "that there is no static (or correct) answer in determining whether direct [public] or indirect [private] financing should always be preferred for particular classes of infrastructure projects."<sup>434</sup>

**B. Public Economics of Construction.**<sup>435</sup> Government is an owner and client of construction services that implement its capital program. The public works or capital programs of all levels of government are, in essence, work orders for facilities relating to "social" or "public" goods and to "mixed goods" that correct for negative and positive externalities.<sup>436</sup> Public welfare economics deems government to be the appropriate actor to correct for market failures in efficiently producing—or allocating resources for the production of—the politically desired levels of pure social goods and services as well as correcting for negative and positive externalities with mixed social goods and services. One only has to review the State and local governments' capital budgets to easily identify physical manifestations of pure and mixed social goods. The practical inability to exclude consumers from the benefits of certain goods or services and the inefficiency of such exclusion because consumption by one does not appreciably diminish others' ability to consume, renders certain goods and services, such as national defense, public safety, roads, highways and light houses, "social" or "public" goods. The market also fails to provide the efficient amount of certain mixed public and private goods and services due to the problem of "externalities." "Externalities" is a term economists use to describe instances, either in a negative context or a positive context, where the market fails to

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<sup>431</sup> *Ibid.*, p. 10.

<sup>432</sup> *Idem*

<sup>433</sup> *Idem*

<sup>434</sup> *Idem*

<sup>435</sup> The following material comes from the 2008 Report, pp. 9-10 with text from related footnotes brought into this material.

<sup>436</sup> Musgrave and Musgrave, *op. cit.*, pp. 5-9, 41-58, 446-453; *op. cit.*, Myers, pp. 39-40, 147-159, 184-186, 191.

provide the socially desired amount of certain mixed public and private goods and services because the market's pricing mechanism is inadequate. When the market does not include the cost of negative consequences to private transactions, such as pollution or unsafe construction practices, it produces too much of the item generating "negative externalities." Conversely, the private market often produces too little of an item generating "positive externalities" for society, such as education, health care or sustainable buildings. State and local governments have varying abilities to intervene in the economy to correct for market failures. Of the three categories of fiscal, monetary and direct policy intervention, state and local governments are able to participate in two in varying degrees—direct policy intervention, through legislation, and fiscal intervention, through expenditures in the budget, as well as taxes and subsidies.<sup>437</sup>

In addition, by allocating capital fund resources to public goods and mixed social goods, a unique function of government, the State and its local governments can produce economic efficiencies to help to stabilize the State and regional economies.<sup>438</sup> Government performs an active management role in the economy when it increases capital spending or strategically targets existing levels; it can also perform such role, when decreases in capital funds are likely, by reforming the existing statutory scheme, at existing or lower funding levels to increase productivity and efficiency. When exercising its unique policy and regulatory roles, however, government often enacts laws and regulations at odds with its role as client and owner that can diminish its ability to efficiently exploit capital programs as economic tools.

The construction industry and the buildings and infrastructure they create make “. . . an important contribution to a country's economic, social and environmental well being" so that a legislative framework can increase productive economic efficiency.<sup>439</sup> Not only does the construction industry, however defined, directly contribute to a state's economy and its gross state product,<sup>440</sup> but its processes, employees and products also provide an additional secondary economic impact. The secondary impact of construction activity on an economy, termed the "multiplier effect", is the positive increase in an economy's income due to the related increase in expenditure.<sup>441</sup> General economic conditions determine the demand for construction services, which is called a derived demand,<sup>442</sup> and fluctuations in the performance

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<sup>437</sup> *Ibid.*, pp. 8-9. 41-58. 446-453.

<sup>438</sup> Government, even as approximated at lower state and local levels, performs a macroeconomic stabilization function when it uses budget policy, including the capital budget, "as a means of maintaining high employment, a reasonable degree of price level stability, and an appropriate rate of economic growth. . .". *Ibid.*, pp. 113-129; Myers, *op. cit.*, pp. 181-192.

<sup>439</sup> Myers, *op. cit.*, p. 7.

<sup>440</sup> Myers, *op. cit.*, pp. 1, 10, 17, 71, 193, 197-198.

<sup>441</sup> Richard G. Lipsey and Peter O. Steiner, *Economics, 4/e* (New York: Harper & Row, 1975), p. 559

<sup>442</sup> Myers, *op. cit.*, pp. 60, 191, 193, 201-203.

of both the general economy and the construction industry share a similar pattern.<sup>443</sup> Thus, legislative changes affecting construction, such as authorizing P3s, have the potential to impact positively, if thoughtfully analyzed, the future of a state's long-term economic condition and industrial competitiveness,<sup>444</sup> as well as those of its local governments.

From an economic perspective, the span of government action should correlate with the physical or spatial dimensions of the positive and negative externalities emanating from the private activities it seeks to correct.<sup>445</sup> The traditionally fractured nature of the construction industry and the balkanized nature of sub-units within public owners and among public owners with overlapping jurisdictions have become newly highlighted as a result of the widely embraced environmental sustainability agenda. Much of what the environmental sustainability agenda seeks to accomplish is effected through the built environment and affects the built environment. As the environment does not respect jurisdictional boundaries, neither does the environmental sustainability agenda's intent to make explicit both positive and negative externalities—in particular imposing the true costs of modern activity on parties to economic transactions. Within this new paradigm, the realities of the traditionally fractured construction industry and the traditional hierarchical and often siloed, and bureaucratic public sector entities present a challenge. Further, the realities of the environment present a challenge for effective governmental responses within existing jurisdictional boundaries, in some jurisdictions with overlapping sub-jurisdictional public owners.

**C. P3s and the MCPIP.** As noted above, in TAB 4, **C. Design-Build (and the other methodologies) and the MCPIP** above, the MCPIP (the 2007 Model Code of Public Infrastructure Procurement) provisions cover Design-Build-Operate-Maintain and Design-Build-Finance-Operate-Maintain methodologies. The public-private partnership (P3), described functionally as a service delivery method, integrates project design, build, and life cycle operations and maintenance functions, and facilitates life cycle delivery, in contrast to initial delivery.<sup>446</sup> The P3 can be financed (1) directly with (a) all public debt or with (b) a combination of public and private debt or (2) indirectly with no public finance, requiring user fees of several

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<sup>443</sup> *Ibid.*, pp. 7, 190. The performance of the construction industry is conceptualized as a building cycle, and it is thought that studying building cycles, in view of the strong relationship between the building and business cycles, ". . . may contribute to a better understanding of business fluctuations." *Ibid.*, p. 190. At the same time, however, changes in the building cycle—both expansion and contraction—are thus more volatile than those in the general business cycle, giving statutory changes the potential for great economic impact in both directions. *Ibid.*, pp. 190-191.

<sup>444</sup> Musgrave, Richard A. and Peggy B. Musgrave. *Public Finance in Theory and Practice*, 5/e (New York: McGraw-Hill Book Company, 1989), p. 6; Myers, *op. cit.*, p. 181.

<sup>445</sup> Musgrave and Musgrave, *op. cit.*, pp. 7-9, 54, 446.

<sup>446</sup> Miller, *op. cit.*, pp. 6 and 22.

types to generate revenues for repayment of private financing and life cycle operations and maintenance costs.<sup>447</sup> Design-Build-Operate-Maintain and Design-Build-Finance-Operate-Maintain with all or some public debt is in Quadrant I of the MIT Model, while Design-Build-Finance-Operate-Maintain with all private finance is in Quadrant II of the MIT Model. Design-Build-Finance-Operate-Maintain with all private debt is generally considered a “pure” P3.

**D. P3s as Solution to Financing Gap.** The recently articulated need for the P3 methodology (mixed finance and pure private finance) has emerged as the result of a financing gap. “[A]ging infrastructure, coupled with decreased public revenues (a combination of political decisions to maintain low tax rates, exacerbated the so-called ‘great recession’ beginning in 2008), has led to a financing gap for federal, state and local governments to undertake capital improvements.”<sup>448</sup> As an example, while the City manages its capital needs well to fit within the envelope of its overall debt capacity and the outstanding debt burden, the City has noted that “[c]urrently, if all City capital projects were implemented, expenditures would exceed the City’s financing projections in the current fiscal year and subsequent years. The City has therefore established capital budgeting priorities to maintain capital expenditures within the available long-term financing.”<sup>449</sup>

For public owners to use the P3 methodology, legislation authorizing this methodology must be adopted, like the design-build methodology, because the P3 methodology “differ[s] from traditional public contracts in financing, operation, and procurement methods. Under PPPs, the private sector finances, builds, renovates, maintains and/or operates specific public sector activities in exchange for a contractually specified stream of future revenues generated by that activity. The PPP shifts to the private sector the cost and economic risk of a project or service which traditionally would have been provided by the government through the public procurement process.”<sup>450</sup> A P3 financing is suitable for physical infrastructure for which it is feasible for its public owners to associate with a fee or toll for use (and exclude from use those who do not pay) or to generate cost savings as some energy-related improvements can create.<sup>451</sup> Since P3 financing does not permanently “transfer . . . actual responsibility for, and title to, the asset to the private sector,” it is not the same as what is termed “ ‘privatization’ or ‘outsourcing’ ” but it is rather a means to bring in private capital to serve public purposes and fill a portion of the financing gap for projects that might not otherwise be done due to constraints

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<sup>447</sup> *Idem*

<sup>448</sup> Sweet and Schneier, *op. cit.*, p. 383.

<sup>449</sup> Official Statement, *op. cit.*, p. 51.

<sup>450</sup> Sweet and Schneier, *op. cit.*, pp. 383-384.

<sup>451</sup> *Ibid.*, p. 384.



at the time.<sup>452</sup> Modern P3s permit private capital to fill gaps in a way that “seeks to avoid [the types of] financial risks to the public sector [that historically led to constitutional debt limits] by shifting financial sources to the private sector [through] . . . a [duration-limited] concession agreement, which spells out the predicted long-term relationship between the public entity and the private sector party.”<sup>453</sup> P3s, which are integrated service delivery methods, also support cost-effective life-cycle operations and maintenance activities, something that the traditional service delivery methods do not explicitly focus on or are intended support.<sup>454</sup>

The rise of P3s has occurred “when American government perceives itself, and is perceived by citizens and taxpayers, as being unable to cope with its ‘crumbling infrastructure.’”<sup>455</sup> Some contend that necessary “elements of modern public-private partnerships . . . such as compensation events, non-competition provisions, and limits related to adverse action . . . also tend to limit the ability of the contracting government entity to act as a representative and democratic governmental entity during the term of the transaction.”<sup>456</sup> Objections to P3s “[Additional o]bjections to PPPs center around the loss of socio-economic programs associated with public procurement and the lack of control by the public in the event of dissatisfaction with the private sector’s operation of the activity.”<sup>457</sup> It is thus necessary to quantify these objections as costs within an overall public cost benefit evaluation of public projects being accomplished within the context of a growing public financing gap.

Placing the P3 “in the context of economic analytical models [can] provide helpful insights into the relative economic efficiencies that ‘organizational innovation’ can impart ‘to the delivery of public services’ at a time when ‘governments around the world struggle to provide more and better services’ to their citizens on limited budget[s].”<sup>458</sup> Capital projects can be deconstructed into “four principle ‘tasks’ [consisting of] . . . “defining and designing the project,” . . . “financing the capital costs of the project,” . . . “building the physical assets (e.g., road, school, etc.), and” . . . operating and maintaining the assets in order to deliver the product/service.”<sup>459</sup> These elements “can be performed by any combination of public and private sector actors,” and, a project, thus deconstructed, can become the subject of cost benefit analyses to “assess

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<sup>452</sup> *Idem*

<sup>453</sup> *idem*

<sup>454</sup> *Idem*

<sup>455</sup> Matthews, *op. cit.*, pp. 152-153; citing to Ellen Durkin, “Crumbling Infrastructure, Crumbling Democracy: Infrastructure Privatization Contracts and Their Effects on State and Local Governance,” *Northwestern Journal of Law and Social Policy*, Vol. 6 (Winter 2011), p. 50.

<sup>456</sup> Matthews, *op. cit.*, p. 153; citing to Durkin, *op. cit.*, pp. 54-73.

<sup>457</sup> Sweet and Schneier, *op. cit.*, p. 384.

<sup>458</sup> Matthews, *op. cit.*, p. 153; citing to de Bettignies and Ross, *op. cit.*, p. 135.

<sup>459</sup> de Bettignies and Ross, *op. cit.*, p. 137.

the relative economic efficiencies of particular organizational structures to deliver and operate capital projects.”<sup>460</sup> Such a cost benefit analysis can not only assess efficiencies of identified complementarities across tasks, but also the issue of government’s time-limited reduction of control.<sup>461</sup> In addition, “[s]ince the ‘value for money’ concept . . . is both a justification and an evaluation tool for public private partnership transactions, it is critical that [an eventual] New York [P3] law permit a comparative analysis that is both valid and fair to all combinations of public and private sector actors in any number of bundling options for project tasks and functions [since i]n the absence of access to the design-build methodology, New York public owners will find analyses of public private partnership, in particular the ‘value for money assessment[,] skewed in favour of private finance.’”<sup>462</sup>

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<sup>460</sup> Matthews, *op. cit.*, p. 153; citing to de Bettignies and Ross, *op. cit.*, pp. 137, 140; and to Miller, *op. cit.*, pp. 20-31.

<sup>461</sup> *Idem*

<sup>462</sup> *Ibid.*, pp. 159-160; citing to de Bettignies and Ross, *op. cit.*, pp. 137-138; and to Allyson M. Pollock, Jean Shaoul and Neil Vickers, “Private Finance and ‘Value for Money’ in NHS Hospitals: A Policy in Search of a Rationale?”, *British Medical Journal*, Vol. 324 (2002), p. 1205. See also Footnote 50 in Matthews, *op. cit.*, p. 159.

## COURSE MATERIALS APPENDIX

TAB 3-A 2008 Wicks and Other Amendments

TAB 3-B Maintaining Assets Presentation

TAB 3-C Charter Capital Budget Excerpt

TAB 3-D 2008 New York City Initiatives

TAB 4-A DB Legislation for NYC-BQE

TAB 4-B DB Legislation for NYC-Rikers

TAB 4-C DB Legislation for DASNY.1

TAB 4-D DB Legislation for DASNY.2

TAB 4-E Request for Information for Replacement of the Brooklyn Queens Expressway  
from Atlantic Avenue to Sands Street, Kings County (Brooklyn), New York

TAB 4-F Request for Information for Proposed Borough-Based Jail System DB Projects

TAB 4-G DASNY ESCO RFP

TAB 5-A New York City Debt

TAB 5-B Traditional Public Finance

TAB 6-A P3 101

TAB 6-B Draft P3 Legislation in New York