The Big Dig Disaster: Was Design-Build the Answer?

In 1991, Boston Commuter was excited because his new daily commute was only twenty miles to an office park north of Boston. Moreover, he understood that construction had begun on an historic roadway project that would drastically improve his commute.1 Thirteen years later, he sat in his car cursing the “Big Dig.” The tunnel was leaking again, project costs were increasing, and Commuter’s car idled in the tunnel for the third consecutive day.2 With nothing else to do, he listened to a radio report about recent Massachusetts legislation reforming public construction laws.3 Commuter thought to himself, “What a disaster; where were they thirteen years ago?”

I. INTRODUCTION

Boston’s Central Artery Project, the Big Dig, replaced the city’s elevated highways with a series of underground tunnels.4 Since its inception in 1983, the Big Dig has plagued the Commonwealth of Massachusetts with problems.5 The initial $2.6 billion project budget has soared to over $14 billion.6 Further, environmental regulations, community opposition, and design changes have

1. See Boston’s CAT Project Warrants a Better Review, ENGINEERING NEWS-REC., Aug. 11, 1997, at 94 [hereinafter Boston’s CAT Project] (reporting new Central Artery to comfortably carry 250,000 vehicles per day); see also Mac Daniel, Big Dig Benefit: A Quicker Downtown Trip, BOSTON GLOBE, Feb. 15, 2006, at A1 (reporting drastic time reduction in Boston commute after Big Dig). The old artery’s capacity was only 75,000 vehicles, but high traffic demands forced it to carry over 190,000 vehicles daily. Boston’s CAT Project, supra, at 94. The average commute through Boston has improved from 19.5 minutes to 2.8 minutes. Daniel, supra, at A1. Additionally, 800,000 more people can get to Logan Airport in less than forty minutes. Id. But see Mac Daniel, Beyond Big Dig, Jams Continue, BOSTON GLOBE, Feb. 16, 2006, at B3 (reporting commute improvements limited to immediate Boston area).

2. See infra notes 6-8 and accompanying text (discussing Big Dig failures such as budgeting, scheduling, and quality control).


5. Id. (reporting cost overruns and delays).

delayed the completion date from the mid 1990s to December 2005. Finally, not only is the project well over budget and behind schedule, but the recent death of Milena Del Valle in one Big Dig tunnel and persistent tunnel leaks also have led many to question the tunnels’ design quality and construction integrity.

In 1982, when the Big Dig was in its infancy, state construction laws mandated that the Massachusetts Highway Department (MHD) use design-bid-build as the project delivery method. In response to years of criticism regarding state construction laws, however, Massachusetts legislators passed construction reform legislation in 2004. The reform included a new project delivery method whereby authorized agencies could use design-build instead of the traditional design-bid-build method for roads, bridges, and tunnels. Under design-build, instead of contracting with designers and contractors separately,
owners contract with a single entity that is responsible for both the project design and construction. 12 Saving time and reducing costs are among the proposed advantages to the design-build delivery method. 13

This Note examines whether the use of the design-build method would have mitigated the problems on the Big Dig had the alternate delivery method been available earlier. 14 Whether design-build could have saved the Big Dig helps predict the success of other states’ design-build legislation. 15 This inquiry is also germane now that several states are considering expansive roadway projects similar to the Big Dig. 16

To begin, Part II.A of this Note reviews the relative merits of the traditional delivery method versus the design-build method. 17 Part II.B then explains Massachusetts construction reform and the ideals that shaped its passage. 18 Part II.C reviews the complexities of the Big Dig and summarizes its myriad of problems and controversies. 19 This Note then analyzes, in Part III.A, whether the problems would have been resolved using the design-build method. 20 In sum, this Note proposes that the complex nature of the Big Dig would have precluded design-build’s effectiveness. 21 As discussed in Part III.B, however, there were several ways the Commonwealth could have shifted the project’s inherent risks away from the Commonwealth. 22 Finally, in Part III.C, this Note recommends several steps that the Commonwealth could take to promote design-build so that it might become an effective alternative project delivery method. 23

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12. See James J. Myers & Ronald G. Busconi, Massachusetts Construction Law § 16-1(a) (2004) (describing use of limited specifications under design-build in place of completed designs under design-bid-build). The design builder assumes responsibility for the entire project instead of separate liability for the designer and contractor. Id.

13. See infra notes 59-63 and accompanying text (detailing design-build advantages).

14. See infra Part III (arguing design-build methods would not have mitigated Big Dig problems).

15. See The Comm. on Constr. Law, supra note 9, at 275-76 (disclosing twenty-three states approved of or used design-build method since 1990); Sara B. Miller, Will Big Dig Woes Deter Other Megaprojects?, CHRISTIAN SCI. MONITOR, Dec. 9, 2004, at 2 (suggesting Seattle authorities monitored Big Dig before beginning $4.1 billion elevated highway repair project).

16. See Bayles, supra note 6, at 1A (citing nine state funded highway projects with budgets exceeding $1 billion each).

17. See infra Part II.A (comparing strengths and weaknesses of design-bid-bid with design-build).

18. See infra Part II.B (reviewing Massachusetts public construction laws and policies behind enactment).

19. See infra Part II.C (highlighting shortcomings and challenges of Big Dig).

20. See infra Part III.A (applying Big Dig contractual issues to design-build requirements and public policy behind construction reform).


22. See infra Part III.B (proffering ways of shifting assumption of risk to Big Dig management consultant).

23. See infra Section III.C (theorizing lower threshold and better Mass IG guidance might improve usage of design-build in Massachusetts).
II. HISTORY

A. Comparing Old and New Public Sector Project Delivery Methods

1. Established Design-Bid-Build

Traditionally, the government required public owners to use design-bid-build for construction projects. For example, in 1963, Massachusetts legislators introduced design-bid-build as a primary project delivery method. The federal government required design-bid-build as its project delivery method from 1947 to 1996. In fact, as recently as 2003, only thirty-five states allowed public owners to deviate from the design-bid-build method.

Under design-bid-build, public owners perform two distinct contracting steps. First, they contract with a designer to provide a set of design plans or they produce the plans in house. Procurement statutes generally do not permit public owners to contract for design services based on price, but instead require owners to select designers based on other qualitative factors. Second, owners incorporate the completed design into a competitive bid that they


29. Id. (observing first step of providing design plans in design-bid-build process).

distribute to a separate set of construction contractors. The public owner then impliedly warrants the design to the bidding contractors. Most state and federal legislation requires public owners to award this portion of the contract to the lowest responsive bidder.

Proponents of design-bid-build attribute its popularity to satisfaction of at least two out of three public procurement principles. First, the objective award criteria based on accepting lowest bid reduces the likelihood of collusion or favoritism. Second, because awarding authorities do not require contractors to include design services, competition is not limited to large firms, thus creating an open and fair competition to all those wishing to participate. Finally, opponents and proponents of design-bid-build disagree over whether it promotes the final principle: obtaining the best value. Proponents of design-bid-build argue that requiring the lowest bid ensures the best value; opponents counter that cost savings can be achieved more effectively through the benefits of design-build such as reduction of pre-construction costs.

In addition to design-bid-build promoting public sector construction principles, there are several other advantages. First, the method provides for a definitive design and defined relationships in the beginning stages of the project. Second, the designer contracts with the owner and, therefore,

31. See Hunt & Darling, supra note 28, at 21 (observing bidding stage in second step of design-bid-build).
32. See United States v. Spearin, 248 U.S. 132, 137 (1918) (holding government warrants adequacy of contractor’s design specifications included in government’s bid packages). In Spearin, even though the government included a provision requiring bidders to examine the construction site, the government nonetheless impliedly warranted the design specifications regarding the site conditions provided by the designer. Id.
33. See 41 U.S.C. § 253(a)(2) (2000) (requiring governmental agency to use sealed bidding and competitive proposals in certain circumstances). In sealed bidding, the Agency must award the contract to the lowest responsive bidder. See 41 U.S.C. 253b(c) (2000) (setting forth procedures for sealed bidding and competitive proposals); see also MASS. GEN. LAWS ch. 30 § 39M(a) (2004) (codifying Massachusetts sealed bidding requirements based on lowest responsive bid for high construction exceeding $10,000); Papernik & Smith, supra note 30, at 32 (reporting state agencies award construction contracts to lowest responsible bidder).
34. See infra notes 35-37 and accompanying text (outlining three public procurement principles and design-bid-build application); see also The Comm. on Constr. Law, supra note 9, at 278 (rationalizing design-bid-build encourages competition and prevents favoritism).
35. See Darrel J. Bostwick, Should Design Build Used for Public Works Projects?, INTERMOUNTAIN CONTRACTOR, Sept. 1, 2005, at 26 (declaring prevention of collusion and favoritism as one of three inviolable, basic, public procurement principles).
36. See id. (naming opportunity for many to participate as one of three public purchasing principles).
37. Id. (listing best value for taxpayers as one of three public principles).
38. See Kelly Lucas, Design/Build Alliances Allow Choices for Industry, IND. LAW., June 21, 2000, at 9 (debating whether design-build or design-bid-build guarantees best value); Wichern, supra note 24, at 36 (describing various ways design-build reduces overall project costs).
40. See Carter Burgess, supra note 39 (listing advantages of more precise designs and clear contractual roles between designer and owner); see also John B. Tieder, Jr. & Shelly Ewald, Globalization of Construction: Evolving International Standards of Construction Law, in CONSTRUCTION LAW § 21.03 (Steven G.M. Stein ed.,
represents the owner’s interests over the interests of the builder.\textsuperscript{41} Finally, the design-bid-build method makes the owner more likely to accept the final design of the project.\textsuperscript{42}

2. Emerging Design-Build

Design-build is one of several emerging alternative project delivery systems.\textsuperscript{43} While design-build is relatively new in the public sector, the method has deep roots in construction contracting dating back thousands of years.\textsuperscript{44} More recently, between 1993 and 2003 at least sixteen states passed legislation authorizing alternative public construction procurement methods, including design-build.\textsuperscript{45} The states in the mid-Atlantic region may be the heaviest users of design-build.\textsuperscript{46} There, all states actively use design-build except Delaware, which requires legislative approval for use on each individual project.\textsuperscript{47} Several other large states are less enthusiastic about design-build.\textsuperscript{48} For

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\item See Carter Burgess, supra note 39 (noting advantage of designer representing owner interests); see also Tieder & Ewald, supra note 40, at § 21.03 (describing benefit of outside designer’s oversight of contractor’s performance).
\item See Burgess, supra note 39 (highlighting third advantage of more certain final project acceptance by owner).
\item See Yakowenko, supra note 9, at 48 (identifying design-bid-build as traditional method and discussing emergence of design-build); see also Fed. Highway Admin., U.S. Dep’t of Transp., Design-Build—Public Private Partnerships, http://www.fhwa.dot.gov/ppp/db.htm (last visited Feb. 1, 2006) [hereinafter FHWA Design-Build] (listing seven project delivery methods and corresponding private versus public responsibility). A second emerging project delivery method popular for building construction is construction manager-at-risk. See Yakowenko, supra note 9, at 48. Under this method, a construction manager runs the construction project for the owner and assumes the financial risks of cost increases. Id. Other project delivery methods in addition to design-build and design-bid-build include private contract fee services, build-operate-transfer, design-build-finance operate, and build-own-operate. See FHWA Design-Build, supra.
\item See The Comm. on Constr. Law, supra note 9, at 282 (commenting on historic roots of design-build); see also Lucas, supra note 38, at 9 (explaining emerging popularity of design-build in international commercial construction). Design-build dates back to 1800 B.C. and was popular in America until the creation of the Commissary General in 1775, emphasizing competition in government contracting. See The Comm. on Constr. Law, supra note 9, at 282. Design-build accounts for fifty percent of European commercial construction and seventy-five percent of Japanese commercial construction. See id.
\item See The Comm. on Constr. Law, supra note 9, at 283, 284 n.16 (citing sixteen state authorizing alternative methods including design-build).
\item See Parsons, supra note 46, at 21 (describing Delaware considering privatizing funding and construction of popular Route 1).
\item See Katherine S. Robertson, Project Delivery; Design-Build Slowly Makes Inroads Amid Skepticism, N.Y. Construction, Sept. 1, 2005, at 82 (reporting New York and New Jersey laws make design-build difficult); Ted Wendling, ODOT Parks Fast-Track Bidding; Officials Cite Flaws with Design-Build, Plain Dealer (Cleveland), July 15, 2002, at B1 (reporting Ohio Department of Transportation limited use of design-build).
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example, New York has not approved design-build, and although Ohio has approved the method, it has curtailed its usage.\(^49\)

The federal government has taken the lead in authorizing design-build for federally funded federal and state projects.\(^50\) For example, the Federal Highway Administration (FHWA) introduced a program in 1990 whereby states applying for federal money could use nontraditional contracting methods including design-build.\(^51\) In 1998, Congress passed legislation requiring the FHWA to develop regulations for the use of design-build in federally funded highway projects.\(^52\)

Under design-build, public owners identify the scope of their construction needs and pre-qualify three to five bidders through an open bidding process.\(^53\) Owners then select the most advantageous proposal from the pool of pre-qualified bidders based on a number of factors beyond quoted price.\(^54\) The unique contracting relationship allows construction to begin before completion of the entire design.\(^55\) There are several subtle variations of the procedures between jurisdictions.\(^56\) For example, some jurisdictions retain design consultants to complete a percentage of the design before the pre-qualification stage.\(^57\) Other jurisdictions restrict the use of design-build based on a minimum

\(^{49}\) See HEISSE & SCHENCK, supra note 27, at NY-9 (summarizing New York law for public construction lacking design-build method); Wendling, supra note 48, at B1 (reporting Ohio lawmakers’ skepticism of design-build cost saving ability and effectiveness on large projects). According to one author, there is no single correct delivery method, but New York should allow public owners to select the best method under the circumstances. See The Comm. on Constr. Law, supra note 9, at 274. New York laws require competitive bidding that is inconsistent with implementing design-build. See HEISSE & SCHENCK, supra note 27, at NY-9.


\(^{52}\) See 23 U.S.C. § 112(b)(3) (2000) (codifying design-build provisions of Transportation Equity Act for 21st Century); see also HEISSE & SCHENCK, supra note 27, at 1-4 (describing federal government providing incentive to states to use design-build). Pursuant to this legislation, the FHWA promulgated regulations in 2002 for states wishing to use design-build procedures. See HEISSE & SCHENCK, supra note 27, at 1-4.


\(^{54}\) Id. at 553 (disclosing second step of contractor selection and award process). Owners evaluate the bids by considering both the design quality and the overall construction cost. Id.

\(^{55}\) Wichern, supra note 24, at 37 (describing design-build fast-tracking process whereby planning, design, and construction occur simultaneously).

\(^{56}\) See infra notes 57-58 and accompanying text (explaining varying percent completion standards and minimum legislative dollar thresholds for using design-build).

\(^{57}\) See McAlphine, supra note 53, at 552-53 (debating thirty-five percent completion versus five percent completion); Yakowenko, supra note 9, at 48 (describing Utah’s use of thirty percent design completion); see also FHWA Design-Build, supra note 43 (describing FHWA’s ten to fifteen percent completion recommendation). Proponents of a five percent completion requirement argue that the thirty-five percent
or maximum project cost. Common advantages of design-build include: creating a single point of contact, thus reducing litigation; encouraging design creativity; involving the contractor early in the process; and shortening project delivery through fast-track contracting. Perhaps the most noteworthy design-build success was the $1.5 billion reconstruction of Interstate 15 in Utah. Because of the ingenuity of the design-build relationship, contractors finished the project early, in time for the 2002 Winter Olympic Games. Other successes include a $490 million freeway project in California and a $240 million Louisiana bridge project. These advantages are counterbalanced by costly procurement processes, increased need for upfront owner input, decreased owner control, and increased construction risk. The lack of control, and increased construction risk,
suggest that large and evolving construction projects are not appropriate for design-build. For example, problems on a $675 million railway project in Minnesota indicated that design-build may not have been appropriate. Lack of sufficient project review may have contributed to costly change orders and increased lead-time. Additionally, design-build has proven ineffective on the Hanford Nuclear Reservation project in Washington, where costs have risen from $4.6 billion to $12 billion and managers have pushed the completion date back from 2009 to 2019. Likewise, design-build’s insufficient oversight of large-scale projects may have caused the problems in Washington. Finally, the method may reduce the number of potential bidders, which leads to less competitive proposals for the owner.

B. Massachusetts Construction Reform

"Corruption is a way of life in the Commonwealth of Massachusetts."71

Such was the sentiment of the Ward Commission following the investigation of improprieties in Massachusetts public construction during the 1960s and 1970s. The Commission estimated that out of $17.1 billion spent on construction, state officials spent $7.73 billion on projects that contained severe defects. Overall, corruption cost Commonwealth taxpayers more than one owner’s greater need of confidence in design/build team); Mullan, supra note 59, at 24 (enumerating design-build’s disadvantages).

65. See Robertson, supra note 48, at 82 (discussing New York’s limitation of design-build to smaller scale projects). Increased construction risk may arise in complex projects under design-build because owners are more likely to provide definitive preliminary designs and plan and specification approvals. See Hunt & Darling, supra note 28, at 21. This owner involvement may trigger Spearin liability; therefore, owners should insert disclaimers as part of their contracts to avoid liability. Id. at 21-22.

66. See Mike Kaszuba & Laurie Blake, Public-Works Projects Face Tortoise vs. Hare Debate; Design-build Gets Projects Done More Quickly, but Critics Say Haste Can Make Waste, STAR TRIB. (Minneapolis), May 7, 2001, at 1A (describing conflicting opinions on design-build and its application to 2001 railway project).

67. See Kaszuba & Blake, supra note 66, at 1A (revealing $2.9 million change order for structural changes without public review under design-build).

68. See Doug Most, Megaproblems Think the Big Dig is a Mess? As Tom Carpenter of the Government Accountability Project Explains, the Nations Second Biggest Public Works Project is No Better, BOSTON GLOBE (Magazine), Dec. 3, 2006, at 15 (outlining concern regarding midstream changes to design).

69. See Most, supra note 68, at 15 (recounting Government Accountability office representative’s comments on project’s flaws).

70. See David C. Walters, Choosing Architect No Easy Task, CHRISTIAN SCI. MONITOR, May 11, 1992, at 10 (reporting lack of responses for Chicago public library bid due to design-build’s constraints). The city reduced the number of expected responses from 250 to 50 due to the complex bidding process. Id. While the city reported decreased competition, the selected firm completed the project on budget and on time. Id.


72. Id. (reporting Ward commission findings of bribery and quid pro quo kickbacks for design contracts).

73. Id. (expanding upon Ward Commission findings). Other noteworthy findings included $48.7 million squandered on projects never undertaken and routine awarding of design contracts in exchange for political
billion dollars during that period. To address this problem, in the 1980s the Commonwealth created several new agencies and developed complex construction laws. Further demonstrating Massachusetts’s commitment to combating bidding improprieties, the Supreme Judicial Court has repeatedly reinforced open and honest procedures for public construction contracts.

Fallout from the Ward Commission’s findings resulted in Massachusetts having “the most regulated public construction contracting process in the country.” For example, two separate sets of construction laws apply to public building construction and public works projects. There are significant differences between the two. Public building construction requires statewide certification from general contractors and owners must collect filed sub-bids on behalf of general contractors. For public works projects, general contractors may contract independently with subcontractors and there is no required certification program. In addition, owners must follow a separate designer

contributions. Id.


75. See Lehigh, supra note 71, at E1 (describing legislative effects of Ward Commission). The Ward Commission authored a complex set of laws and created the Massachusetts Office of the Inspector General (Mass IG) to oversee public contracting issues. See id. The reforms helped clean up the Massachusetts public construction industry. See id. Others, however, suggest that Governor Dukakis had already ended the corruption during his first term. See id.

76. See Annese Elec. Servs., Inc. v. City of Newton, 730 N.E.2d 290, 294 (Mass. 2000) (noting purpose of competitive bidding to ensure lowest price through open and honest procedure); Interstate Eng’g Corp. v. City of Fitchburg, 329 N.E.2d 128, 132 (Mass. 1975) (promoting importance of subcontractors adhering to bidding laws regarding open and fair competition); Bowditch v. Superintendent of Sts. of Boston, 46 N.E. 1026, 1027 (Mass. 1897) (requiring advertised invitations for proposals for public works construction to protect taxpayers).

77. See McLaughlin, supra note 74, at 1 (citing Massachusetts textbook on construction law).


79. See infra notes 80-83 and accompanying text (explaining difference between contracting for public works and public buildings).

80. See MASS. GEN. LAWS ch. 149, § 44F (2004) (mandating filed sub-bid procedures); MASS. GEN. LAWS ch. 149, § 44D (2004) (mandating general contractor prequalification). Within seventeen listed trades, the owner collects bids from subcontractors with estimates more than $20,000. See § 44F. Owners then evaluate sub-bid proposals and send results to all potential general contractors who choose which sub-bid to include in their proposal. See § 44F(3); MYERS & BUSCONI, supra note 12, at § 5-5(e). General contractors wishing to bid on public building contracts must apply for certification through the Division of Capital Asset Management and Maintenance (DCAMM). See MASS. GEN. LAWS ch. 149, § 44D. DCAMM maintains a certificate of eligibility for all general contractors by surveying awarding authorities that have contracted with the general contractor. See MYERS & BUSCONI, supra note 12, at § 5-5(c).

81. See Sciaia Constr. Corp. v. Mass. Turnpike Auth., 591 N.E.2d 190, 192-93 (Mass. 1992) (observing MHD pre-qualification proper for public works project); MYERS & BUSCONI, supra note 12, at § 5-6(a) (stating filed sub-bid laws not applicable to public works projects). While DCAMM does not pre-qualify public works bidders, contracting authority may implement a pre-qualification step before collecting bids. Sciaia Constr. Corp., 591 N.E.2d at 192-93. Additionally, there is no pre-qualification maintained by DCAMM for public
Neither set of regulations authorizes design-build as a project delivery method and both require contract awards to the lowest responsive bidder.

Cries for construction reform began in the late 1990s. In 1999, a Pioneer Institute study concluded that Massachusetts wastes $220 million because of antiquated public construction laws. The institute proposed that Massachusetts should have more flexibility to use design-build on large projects. The same year, Governor Paul Cellucci introduced an unsuccessful bill to ease the restrictions imposed under the Ward Commission. Among other reforms, Cellucci’s bill proposed authorizing design-build for the MHD and the Massachusetts Port Authority (Massport). Then, in 2003, after the legislature rejected Governor Romney’s proposal to eliminate filed sub-bids, legislators authorized a special commission to modernize construction laws that eventually led to construction reform.

In 2004, the Legislature passed Chapter 193, “An Act Furthering Regulating Public Construction” (the Act), creating Chapter 149A that authorized the use of design-build for public works projects with a total cost greater than $5 million. According to the Act, awarding authorities must apply to the

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82. See MYERS & BUSCONI, supra note 12, at § 5-6(c). The Massachusetts Highway Department (MHD) and Metropolitan District Commission (MDC), however, require pre-qualification for projects greater than $50,000. See id.


85. See infra notes 85-88 and accompanying text (describing studies and state government initiatives criticizing Massachusetts public construction).

86. See Thomas C. Palmer, Jr., Old Laws Blamed for Waste of $220M, BOSTON GLOBE, Sept. 15, 1999, at C16 (reporting institute’s findings on survey). The study compared similar projects in four states and found that projects in Massachusetts waste seven percent of their costs and take fifty-five percent longer than the seventeen percent average in the other three states. Id.

87. Id. (criticizing design-bid-build and suggesting reform). The Institute also blamed waste on filed sub-bids laws and construction regulations that do not have designers and contractors working together from the start. Id.

88. See Corwin & Corwin LLP, Public Construction Reform, CONST. L. COMMENTS, Fall 2004, at 1, available at http://www.corwinlaw.com/newsletters/04/fall/new04.html (reporting the legislative process leading to construction reform). Governor Romney was reacting to a fiscal crisis but there was no evidence that eliminating filed sub-bids would reduce construction costs. Id. The Commission consisted of representatives from the legislature, awarding authorities, general contractors, subcontractors, and architects. Id.

89. See MASS. GEN. LAWS ch. 149a, § 14 (2004) (mandating $5 million threshold for design-build project delivery method); MASS. GEN. LAWS ch. 149a, § 1 (2004) (allowing Construction Management at Risk delivery
Massachusetts Office of the Inspector General (Mass IG) each time they wish to use design-build.\textsuperscript{91} Upon approval, the Mass IG issues the awarding authority a notice to proceed.\textsuperscript{92} MHD, however, is exempt from the application process so long as its procedures are consistent with Chapter 149A.\textsuperscript{93}

While the legislature only recently passed design-build authorization, state officials have used the method several times with special legislative approval.\textsuperscript{94} In 2000, MHD entered into a $385 million design-build contract with Modern Continental to widen Route 3 between Burlington and the New Hampshire border.\textsuperscript{95} The project would have normally taken ten years, but under design-build, the contract called for completion within four years.\textsuperscript{96} Modern Continental, however, has only recently completed the project and the Commonwealth fined them over $10,000 per day because of the delays.\textsuperscript{97}
Several agencies have used design-build for non-highway construction projects including a commuter rail project by the Massachusetts Bay Transportation Authority (MBTA).  

C. The Big Dig Experience

"[The Big Dig is] the largest and most complex urban infrastructure project ever undertaken in the modern world."  

The enormous scope of the Big Dig includes two sections of interstate highway with much of the construction underground or underwater.  

The first part encompasses five miles of Interstate 93 flowing north and south under the city and includes a state-of-the-art bridge at the northernmost point.  

The second part includes a three-mile extension of Interstate 90 to Logan International Airport.  Despite the enormity of the Big Dig, authorities managed to keep the Central Artery open while contractors demolished the existing elevated highway.  

Local approval and federal funding of the Big Dig has a history typical of Boston politics.  Governor Dukakis and his administration first considered depressing the Central Artery in 1974.  

When Dukakis lost the reelection in 1978, however, there was little support for the Big Dig until his reelection in 1982.  During Dukakis’s second term, his staff convinced him to include both the Central Artery portion and the Logan Airport tunnel as a single project; the governor then forwarded the project to Washington for federal funding.

House Speaker O’Neil and Massachusetts Senator Kennedy were
crucial in securing the federal funding in 1987.\textsuperscript{108} Initially, federal funding supported up to ninety percent of the project costs.\textsuperscript{109}

In implementing the Big Dig, the MHD did not contract with a single entity, but instead entered into several different contracts.\textsuperscript{110} In 1985, nine highway officials unanimously selected Bechtel/Parsons Brinckerhoff (B/PB) to act as management consultant.\textsuperscript{111} B/PB’s duties included overseeing the construction, managing the designs, providing cost estimates, and developing budget forecasts.\textsuperscript{112} The Commonwealth paid B/PB over two billion dollars over the twenty years B/PB acted as the project manager.\textsuperscript{113} Based on designs secured by B/PB, MHD used the traditional design-bid-build model and awarded a series of contracts for the different sections of the Big Dig.\textsuperscript{114}

\textsuperscript{108} See McNichol, supra note 99, at 37-39 (indicating Reagan’s opposition to Big Dig). President Reagan opposed the project and vetoed a transportation bill that included the Big Dig. Id. The House voted down the veto and Senator Kennedy helped secure the Senate’s support thereby securing the federal funding. Id.

\textsuperscript{109} See Micciche, supra note 104, at 36 (reporting initial expansive federal funding). The federal government capped funding at $8.5 billion, thereby funding approximately sixty percent of the project. See id. Federal funding is not always favorable for public works projects. See Alan Greenblatt, A Smarter Dig, GOVERNING MAG., Sept. 2006, at 19 (noting potential disadvantage of federal funding compared to local funding). The local, as opposed to federal, funding on a large Massachusetts Water Resources Authority project may have created more local oversight compared to the Big Dig, thus contributing to its successful and timely completion of the water project. See Greenblatt, supra, at 19.

\textsuperscript{110} See GREGORY W. SULLIVAN, MASS. OFFICE OF THE INSPECTOR GEN., A BIG DIG COST RECOVERY REFERRAL: POOR CONTRACT OVERSIGHT BY BECHTEL/PARSONS BRINCKERHOFF MAY HAVE LED TO COST INCREASES B-1 (2004) (providing example of thirteen separate Big Dig contracts); see also infra note 112 and accompanying text (describing contractual relationships between MHD and Bechtel/Parsons Brinckerhoff (B/PB)).

\textsuperscript{111} See McNichol, supra note 99, at 42 (describing contract award to design firm). In 1985, B/PB was a large company, and by 2005, it employed 40,000 people and had revenues in excess of eighteen billion dollars. See Christopher Rowland, Probes May Test Bechtel’s Clout; Responsibility on Bolts at Issue, BOSTON GLOBE, July 24, 2006, at A1. Slurry wall construction was a major project component and B/PB had extensive experience in this area. See id.; see also infra note 125 and accompanying text (describing slurry walls and ensuing problems).

\textsuperscript{112} William J. Angelo, State Sues Consultant for Central Artery Role, ENGINEERING NEWS-REC., Mar. 29, 2004, at 12 (describing broad role of design firm). MHD passed over their oversight of B/PB to the Massachusetts Turnpike Authority (MTA) in 1997. Id. B/PB was the initial designer, and also supervised and managed the final design firms. Thomas C. Palmer, DeNucci Says Design Flaws Cost Big Dig $19M Audit Says Soil Concerns Were Ignored, BOSTON GLOBE, Feb. 6, 2000, at B2. By 2000, the MTA paid B/PB $1.92 billion out of the $2.15 billion spent on project management, which amounted to fifteen percent of the project’s costs. See Primack, supra note 7, at 57. The industry standard for a billion-dollar project is eight to twelve percent of the project’s costs. See id. Additionally, the MTA lacked the expertise to provide oversight of B/PB. See id. But see Boston’s CAT Project, supra note 1, at 94 (reporting unique design-to-cost cost saving measure). Big Dig designers agreed to a construction cost before completing the final design. See id. This, and value engineering techniques, has saved $878 million. See id.

\textsuperscript{113} Sean P. Murphy & Scott Allen, Under Fire, Big Dig Firm Never Left Consortium Got $8M After Ceiling Collapse, BOSTON GLOBE, Oct. 26, 2006, at A1 (reporting B/PB’s continuing role as consultant). Even after the tunnel collapse, the Commonwealth extended consulting contracts to B/PB. See id.

\textsuperscript{114} See Sullivan, supra note 110, at B-1 (describing examples thirteen Big Dig projects).
Big Dig supporters attributed project delays to several sources outside the control of the Massachusetts Turnpike Authority (MTA) and its contractors. Initially, project organizers expected the environmental approvals to take one year. Officials ultimately took more than seven years to obtain the necessary state and federal approvals. Additionally, officials had to appease community groups to get their backing. State and federal authorities had to reapprove the environmental plan each time the design changed, which furthered delayed the project timeline.

The initial $2.6 billion project has ballooned to over $14.7 billion, making the Big Dig the subject of constant scrutiny and controversy. Perhaps the most divisive cost increase occurred in 2000, when Big Dig officials unexpectedly announced a $1.4 billion increase in the project. The surprise increase outraged the FHWA because hours before the announcement, Big Dig officials failed to disclose any budgetary issues in a financing report. As a
In 2004, a major tunnel leak wreaked havoc on the Central Artery and its commuters. Investigators found 102 breaches in the slurry wall panels and hundreds of roof-wall joint leaks. Whether taxpayers will pay the $17 million to repair the leaks is uncertain. Mounting criticism questioned the close relationship between B/PB and the MTA and B/PB’s lack of assumption of risk. Additionally, the Mass IG has repeatedly questioned B/PB’s contract management. In fact, the Massachusetts Attorney General (Mass AG) took over the cost recovery process and is deciding whether to pursue legal claims against B/PB and other contractors.

123. See Micciche, supra note 104, at 36 (outlining eleven-point agreement limiting federal contribution to $8.54 billion and replacing MTA Chairman).
124. See Greenberger, supra note 8, at A1 (investigating outcome of September 2004 breach in tunnel wall causing massive water leak).
125. See Greenberger, supra note 8, at A1 (revealing uncertainty in extent of problem as more leaks discovered). Slurry wall construction involves creating an underground support before digging out the tunnel beneath the surface. See McNichol, supra note 99, at 106. The narrow construction of slurry walls was necessary to avoid disturbing buildings or traffic. See id. The Big Dig has the largest use of slurry wall construction in the world. See id. at 105. As of December 2005, contractors repaired 157 of the 188 slurry wall leaks. See Case 19, Contractors Under Gun as Leaks Dog Dig Tunnel, BOSTON HERALD, Dec. 8, 2005, at 018.
126. Compare Mass. Turnpike Auth., Big Progress and Challenges: June 2005 – A Brief History and Review of Pending Issues, http://www.masspike.com/bigdig/updates/progress_challenges.html (last visited January 4, 2006) [hereinafter MTA Big Dig Progress] (attributing responsibility of inspections and repairs to B/PB and contractors), with Greenberger, supra note 8, at A1 (considering taxpayers may partially pay for tunnel repair from September 2004 leaks). Finding the responsible party may be difficult because of the widespread nature of the defects. See id. (highlighting conflict over determining responsible party). To investigate responsibility, engineers working for former Massachusetts Attorney General Thomas F. Reilly installed sensors into the concrete tunnel to monitor the temperature and movement of the concrete. See Sean P. Murphy, Big Dig Testing a Theory on Leaks, BOSTON GLOBE, Feb. 28, 2006, at B4. Some engineers think the steel girders shrink in the cold allowing water into the tunnel. See id. The test results, however, are confidential between the Attorney General’s office, B/PB, and the MTA. See id. A judge commented on the relationship between B/PB and state officials saying, “they were all married to each other.” Murphy, supra note 8, at 19. The state lacked leverage over B/PB because of the lack of management oversight. See Primack, supra note 7, at 57. B/PB was acting as owner without assuming ownership risks. See id.
127. See Sullivan, supra note 110, at 1 (referencing two Mass IG reports detailing B/PB mismanagement practices). The reports provided information to the MTA recommending it recover costs against B/PB. See id. The Mass IG concluded that if the Commonwealth had to pay cost overruns due to B/PB’s inability to defend arising from its failure to document the claims, B/PB should be responsible. See id.
128. See Kimberly Atkins, AG Eyes Big Dig Flaws; Still Deciding Whether to File Suit, BOSTON HERALD, Nov. 15, 2005, at 7 (reporting Attorney General’s office still considering whether to sue contractors over leaks and other mismanagement). Reilly suspended a $150 million lawsuit filed in March 2004. Id. So far, the state has spent more than $7 million on cost recovery and has only recovered $4 million. Id. The 2004 lawsuit was for breach of contractual and fiduciary obligations for purposefully underestimating project costs. See Angelo, supra note 112, at 12 (discussing allegations regarding B/PB underestimating costs to increase incentive compensation for staying within budget). The Mass IG, however, reports that B/PB disclosed a $14 billion...
Just two years later, several three-ton slabs of concrete fell from the tunnel ceiling and crushed Milena Del Valle while she and her husband drove to the airport. In response, the Mass AG filed several civil lawsuits, including a negligence action, against B/PB, Modern Continental, and a project design team. Additionally, the Mass AG convened a grand jury to consider potential criminal charges, and the Del Valle family filed a wrongful death action. Once again, critics cited a lack of project oversight by the Commonwealth.

III. ANALYSIS

A. Why Design-Build Would Not Have Worked

The intricacies of the Big Dig would have precluded design-build’s effectiveness. The dynamic environmental approvals and community input required midstream, flexible design changes. A design-build firm could not properly hedge its bid with the uncertainty of these impending design changes. The reduced competition would have resulted in a few large firms

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134. See Mishara, supra note 131, at B1 (discussing Massachusetts Senate’s and Mass IG’s proposal for independent inspector); see also S. 1847, 2007 Leg., 185th Sess. (Mass. 2007) (indicating current pending status of bill). The proposal would assign an independent inspector for construction projects greater that $50 million. See Mishara, supra note 131, at B1. The inspector would have five years of experience and could not have any relation to the project’s contractor. Id.

135. See supra notes 116-118 and accompanying text (describing broad environmental and community concerns leading to numerous changes); see also Robertson, supra note 48, at 82 (reporting design-build not appropriate for evolving projects).

136. See Yakowenko, supra note 9, at 48 (reporting extensive changes to Big Dig inevitable because of environmental, political, and community issues).

137. See Yakowenko, supra note 9, at 48 (noting difficulty of design-build bidders to bid on changing projects due to cost uncertainty); see also Mullan, supra note 59, at 25 (noting design-build inappropriate for
inflating their quotes to cover the risk of a substantial design change.\textsuperscript{138}

Even the thirty percent design completion method that was so successful in Utah would have been ineffective.\textsuperscript{139} On occasion, Big Dig engineers completely reworked plans after they finished large portions of the designs.\textsuperscript{140} For example, engineers dramatically changed the Fort Point Channel crossing design in the final design stage.\textsuperscript{141} If officials fast-tracked the Fort Point Channel crossing, either the contractor, or worse, the Commonwealth would have paid to correct the wasted construction.\textsuperscript{142} Alternatively, if officials waited for a completed design and utilized design-build, the Commonwealth would have paid a premium for shifting risks without realizing the cost savings associated with fast-tracking.\textsuperscript{143}

Had design-build been available, the Commonwealth could have paid the premium to obtain other design-build benefits aside from fast-tracking.\textsuperscript{144} Authorities, however, lacked the expertise to monitor the quality of a large design-build project.\textsuperscript{145} Under design-build, because the owner relies more on the contractor’s quality control procedures, it is critical that the owner properly monitor the contractor.\textsuperscript{146} Government officials did not have the appropriate staff or relationships to monitor their construction manager B/PB, nevermind monitoring the quality control procedures of dozens of design-build contractors.\textsuperscript{147} Without appropriate oversight, there is no assurance that design-build would have prevented the 2004 tunnel leaks, the tragedy in 2006, or other

\begin{itemize}
\item \textsuperscript{138} See supra note 70 and accompanying text (explaining lack of design-build bid responses due to complex bidding process); see also Burgess, supra note 39, (identifying bid process as expensive for design-build teams); Parsons, supra note 46, at 21 (reporting many builders fear design-build’s high-risk undertaking).
\item \textsuperscript{139} See supra notes 57 & 61 and accompanying text (explaining success of design-build on Utah highway project).
\item \textsuperscript{140} See supra note 141 and accompanying text (describing expensive late stage Fort Point Channel crossing design changes).
\item \textsuperscript{141} See McNichol, supra note 99, at 174 (describing intricate design changes to Fort Point Channel crossing). Earlier tests failed to show the weakness of the soil. See id. As a result, the revised plan increased construction in the wet soil and decreased the work done in the dry soil. See id. at 175. The change in construction required new project designs and significantly increased costs. See id.
\item \textsuperscript{142} See Tieder & Ewald, supra note 40, at § 21.03 (explaining how fast-tracking permits construction before completion of plans).
\item \textsuperscript{143} See FHWA Design Build, supra note 43 (explaining unattractiveness of fully designed plans because of inability to reduce cost and schedule).
\item \textsuperscript{144} See Mullan, supra note 59, at 23 (describing other design-build benefits aside from improving project schedule); Tieder, supra note 40, at § 21.03 (explaining design-build advantages).
\item \textsuperscript{145} See infra notes 146-147 and accompanying text (explaining awarding authority’s inability to oversee B/PB and its importance on design-build project quality).
\item \textsuperscript{146} See Wichern, supra note 24, at 43-44 (describing design-build as limiting quality control practices of owners). Public owners are unable to implement the same quality control procedures compared to those under design-bid-build. See id.
\item \textsuperscript{147} See Primack, supra note 7, at 57 (reporting Commonwealth did not hire in-house staff with expertise to oversee project); supra note 127 and accompanying text (discussing lack of oversight by Commonwealth of B/PB).
\end{itemize}
construction issues.\textsuperscript{148} Even if the Commonwealth hired appropriate staff to monitor the design-build contractors, the State’s corruptive past suggests that design-build on the Big Dig would have been against Massachusetts public policy.\textsuperscript{149} Design-build allows awarding authorities to award final contracts based on factors well beyond price.\textsuperscript{150} The Ward Commission corrected the backhanded awarding of design contracts and the use of substandard construction practices.\textsuperscript{151} The public assurance in stymieing corruption afforded by design-bid-build’s low bid award outweighs the possible design-build benefits on the Big Dig.\textsuperscript{152} For example, the use of design-build has enabled the MHD to award a contract on the Route 3 expansion to a questionable contractor—one that is in financial difficulty and that was largely responsible for the 2004 Big Dig tunnel leaks.\textsuperscript{153} Such liberal procurement practices, if used on the Big Dig, may have been even more disastrous for the Commonwealth.\textsuperscript{154}

B. What Would Have Helped

The best solution for the Big Dig involved shifting risk from government officials to B/PB, thereby providing better oversight of B/PB.\textsuperscript{155} B/PB’s contract should have been more like the “construction manager at risk” arrangement whereby construction managers assume financial risk beyond a

\textsuperscript{148} See supra note 8 and accompanying text (discussing 2004 Big Dig tunnel leaks and controversy surrounding tunnel safety); see also Most, supra note 68, at 15 (noting consequences of lack of oversight of B/PB at Hanford Nuclear Reservation under design-build model). The Department of Energy did not properly oversee B/PB; allowing them to reschedule inspections, not report problems, and hide major failures. See Most, supra note 68, at 15.

\textsuperscript{149} See supra notes 71-72 (discussing history of corruption in Massachusetts public construction procurement). The decreased competition in using design-build, coupled with design-build’s method of awarding contracts on factors unrelated to price, are diametric to Massachusetts’s commitment to open and honest procurement. See supra note 70 and accompanying text (reporting decreased competition with design-build); supra note 76 and accompanying text (citing Massachusetts’s procurement policy).

\textsuperscript{150} See FHWA Design-Build, supra note 43 (describing design-build procurement based on best value). There is no set formula defining best value, but awarding authorities merely combine technical factors and qualifications with price. See id.

\textsuperscript{151} See supra notes 71-75 and accompanying text (describing Ward Commission findings including exchange of design contracts for campaign contributions).

\textsuperscript{152} See supra note 35 and accompanying text (explaining design-bid-build’s reduction of collusion or favoritism); see also supra notes 65-70 and accompanying text (reporting poor results from design-build).

\textsuperscript{153} See supra note 95 and accompanying text (identifying Modern Continental as Route 3 design-build contractor and Big Tunnel contractor); see also Van Voorhis, supra note 95, at 5 (noting Modern Continental’s financial demise).

\textsuperscript{154} See supra notes 127-128 and accompanying text (detailing mismanagement of Big Dig construction by B/PB); supra note 64 and accompanying text (noting decreased owner control and greater reliance on design-build contractor in design-build construction); supra note 70 and accompanying text (highlighting problems of reduced competition in bidding for design-build contracts).

\textsuperscript{155} See supra note 127 and accompanying text (blaming Big Dig problems on Commonwealth’s lack of oversight and B/PB’s lack of risk assumption).
quoted price.\textsuperscript{156} Instead, officials contracted with B/PB based upon a percentage of the total project costs.\textsuperscript{157} For example, B/PB hastily blamed Modern Continental for the 2004 tunnel leaks without readily assuming any responsibility.\textsuperscript{158} Further, B/PB defended its work in the aftermath of the tunnel collapse, claiming that the Commonwealth was responsible for the final approval of the design that may have led to Del Valle’s death.\textsuperscript{159} A contract that shifted more risk to B/PB may have averted the so far unsuccessful cost recovery efforts associated with the tunnel collapse, the 2004 leaks, and the subsequent pending litigation.\textsuperscript{160}

Project oversight was particularly important because of B/PB’s potentially conflicting roles.\textsuperscript{161} B/PB performed the initial design and oversaw the final designers.\textsuperscript{162} For example, on the Fort Point Channel Crossing, B/PB developed the initial plan and then oversaw Maguire/Harris’s final design.\textsuperscript{163} After Maguire/Harris pointed out B/PB’s design flaws, B/PB defended its own design for one full year.\textsuperscript{164} While B/PB cited inflation as the primary source of cost issues beyond its control, the Commonwealth realized one year of inflation on this large and expensive part of the project.\textsuperscript{165} Big Dig officials needed a staff capable of recognizing the project delays and monitoring B/PB.\textsuperscript{166} The legislature should consider the Massachusetts Senate and Mass IG bill requiring an independent inspector for projects over $50 million.\textsuperscript{167} This way, the inspector can inform the Commonwealth regarding critical engineering

\textsuperscript{156} See supra note 43 and accompanying text (explaining construction managers’ risk). Construction-manager-at-risk is, however, unavailable to public works projects similar to the Big Dig because it is only available in building construction. See MASS. GEN. LAWS ch. 149A, § 1 (2004) (allowing construction management-at-risk method for public building but not public works).

\textsuperscript{157} See supra note 112 and accompanying text (outlining high percentage of project costs as basis of B/PB’s contract).

\textsuperscript{158} See Primack, supra note 7, at 57 (noting B/PB did not accept blame for approving Modern Continental’s defective construction). The Mass IG wrote a letter to the MTA stating that “[t]he leak problem would not have occurred if [B/PB] had simply made the construction contractors perform according to the specification in their contracts.” Id.

\textsuperscript{159} See Rowland, supra note 111, at A1 (reporting B/PB’s denial of responsibility in aftermath of tunnel collapse).

\textsuperscript{160} See supra note 129 and accompanying text (reporting unsuccessful cost recovery efforts and AG’s litigation options to recover costs).

\textsuperscript{161} See Palmer, supra note 112, at B2 (criticizing B/PB’s dual roles).

\textsuperscript{162} See Palmer, supra note 112, at B2 (reporting managing and designer among B/PB’s multiple roles).

\textsuperscript{163} See Palmer, supra note 112, at B2 (disclosing B/PB’s role in Fort Point Channel Crossing design).

\textsuperscript{164} See Palmer, supra note 112, at B2 (reporting state auditor’s conclusion regarding B/PB’s defense of Fort Point initial design).

\textsuperscript{165} See supra note 120 (exposing B/PB’s management opinion attributing bulk of Big Dig project increases to inflation).

\textsuperscript{166} See Primack, supra note 7, at 57 (describing need for group of highly skilled workers to oversee B/PB).

\textsuperscript{167} See supra note 134 (describing status and components of bill proposing independent project inspector).
decisions and facilitate cost recovery.168

C. How to Make Design-Build Work in Massachusetts for Other Projects

Aside from the Big Dig, if the Commonwealth is truly interested in making design-build successful on other projects, awarding authorities need to be comfortable with the method.169 Generally, design-build cannot be effective unless owners use it more than occasionally.170 Authorities, however, had not elected to use design-build a single time in the year following construction reform.171 Therefore, Massachusetts legislators should promote its use by lowering the design-build dollar threshold from the $5 million minimum.172

The federal government eliminated its $5 million threshold for design-build projects and the Commonwealth should do the same.173 The Commonwealth has smaller and less expensive projects compared to the federal government.174 Current legislation precludes the Commonwealth agencies and departments from experimenting with design-build on small projects.175 Further, the argument that smaller companies would be unable to participate is not persuasive.176 They could contract in ways other than serving as prime contractors.177 For example, smaller contractors could act as subcontractors or partner with other small or large contractors.178

Additionally, the Mass IG could promote design-build by providing

168. See Mishra, supra note 131, at B1 (noting duties of independent inspector). Transportation officials would be responsible for selecting the inspectors. Id.

169. See Robertson, supra note 48, at 82 (quoting director of government affairs at Design-Build Institute of America regarding design-build’s effectiveness). The director of government affairs said, “once you get over the status quo and people start doing it, they find design-build works for all types of projects.” Id.

170. See Parsons, supra note 46, at 21 (describing design-build’s ineffectiveness if used part-time).

171. See Busconi & O’Donnell, supra note 3 (reporting Mass IG issued zero notices to proceed one year after legislation). Additionally, the Mass IG only issued one “construction manager at risk” notice to proceed. See id.

172. See Busconi & O’Donnell, supra note 3 (suggesting minimum threshold may discourage use of design-build); see also supra note 90 (summarizing $5 million minimum for design-build projects).

173. See supra note 58 and accompanying text (reviewing various jurisdictional thresholds and congressional Act eliminating federal minimum threshold).

174. See Busconi & O’Donnell, supra note 3 (noting some local officials’ project smaller in scope than $5 million).

175. See Busconi & O’Donnell, supra note 3 (reasoning local official not using design-build because of $5 million requirement).

176. See Parsons, supra note 46, at 21 (noting opposition to design-build’s high cost of bidding serving as barrier to small contractors). Additionally, some argue past performance as selection criteria used in design-build does not allow young, small companies to participate. See id. at 21. But see Bergeron, supra note 58, at 33 (noting smaller contractors favor design-build because of increased early involvement).

177. See Parsons, supra note 46, at 21 (noting alternative contract opportunities for small contractors under design-build).

178. See Bergeron, supra note 58, at 22 (countering big versus small contractor argument on design-build). Smaller contractors may join with larger contractors or serve as subcontractors on design-build contracts. Id. The only change may be the mechanism by which awarding authorities distribute the work. See Parsons, supra note 46, at 21.
examples of sound design-build business practices. As it stands, the Mass IG Design-Build application for a notice to proceed merely requests components of the awarding authority’s plan and provides a general evaluation process overview. For example, the application states that awarding authorities should address their plan to control risk. The Mass IG does not, however, indicate any proper way of controlling risks. In addition to providing initial suggestions, as more agencies use design-build, the Mass IG should post their approved guidelines. These steps will improve the likelihood of design-build’s popularity thereby increasing its successful implementation.

IV. CONCLUSION

While design-build is well past an experimental project delivery method, it is not appropriate for all construction projects. Boston’s massive Big Dig project included vast design and plan changes. These last minute changes would have abrogated the fast-tracking benefit gained under design-build. While the Commonwealth could have paid more for other design-build benefits, those benefits balanced against potential cost increases and public policy concerns suggest that design-build was not the answer on the Big Dig.

Instead, the Commonwealth should have shifted more risk to B/PB. B/PB was able to operate independently, but lacked motivation and supervision to monitor the Big Dig properly. The Commonwealth should have had better agency oversight of B/PB and would have benefited from an independent project inspector.

The Commonwealth could, however, increase the success of future design-build projects by increasing its current usage. The Commonwealth should lower the minimum design-build threshold and the Mass IG should provide more substantive guidance for design-build procedures. Perhaps one day, once the Commonwealth successfully implements design-build on smaller projects, it could be expanded to large projects similar to the Big Dig. For now, Boston Commuter will have to wait in the tunnel like everyone else.

Jason H. Peterson

179. See Mullan, supra note 59, at 25-26 (suggesting agencies adapt specific standards and provide examples of design-build application).

180. See supra note 92 and accompanying text (providing several Mass IG approval criteria).

181. See MASS IG PROCEDURES, supra note 92, at 6 (listing six components of application demonstrating awarding authority’s plan regarding expertise and ability). The applicant must demonstrate the awarding authority’s ability to control risks such as design risks, warranties, and guarantees. See id.

182. See MASS IG PROCEDURES, supra note 92, at 7 (outlining Mass IG evaluation criteria). The application criteria lack any mention of how awarding authorities may control risk under design-build. See id.

183. See Mullan, supra note 59, at 25-26 (recommending agencies provide examples where particular project elements have been used).

184. See Mullan, supra note 59, at 25-26 (proposing Massachusetts improve design-build procurement by setting specific standards, educating public, and encouraging enrollment).