

# EXECUTIVE SUMMARY

In 2013, the Washington State Legislature directed the Joint Transportation Committee (JTC) to conduct a study to identify the major cost drivers and evaluate efficiency initiatives in the construction and operation of Washington State highway and bridge improvement and preservation projects.

Washington's preservation and maintenance backlog is significant and population growth is putting strain on existing transportation infrastructure. However, there is insufficient revenue available to make needed investments as gas tax revenues, the primary source of funding has been declining as vehicles become more fuel efficient. There is also a perception that the problem is not insufficient revenue, but inefficient use of funds by WSDOT. Even among those who are less skeptical about WSDOT's project delivery, a number of factors have been identified as contributing to construction costs, ranging from environmental review, to project management practices, to prevailing wage laws.

The study had three primary objectives:

1. To develop a broad understanding of the costs of transportation projects and what drives these costs
2. To specifically determine whether transportation projects in Washington State cost more than in other states
3. To identify potential reforms or efficiency measures

## OVERSIGHT AND DIRECTION

The study was guided by a nine member Advisory Panel and technical support was provided by a Staff Work Group. In conducting our research and analysis, we investigated a wide range of potential cost drivers and practices. With a relatively short project timeline, we focused our efforts on the cost drivers with the greatest potential for savings or on areas where our findings do not support the current understanding of what is driving costs.

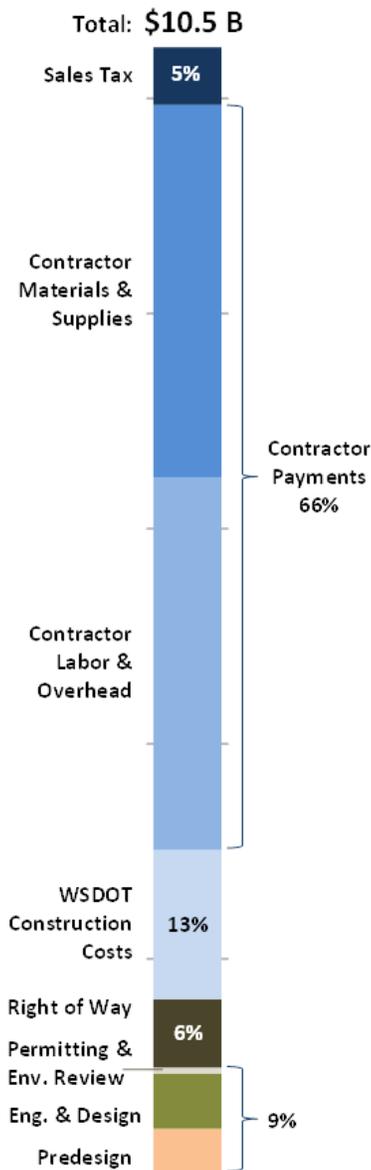
### ADVISORY PANEL MEMBERS

- Representative Judy Clibborn
- Senator Curtis King
- Senator Tracey Eide
- Representative Ed Orcutt
- Cam Gilmore, WSDOT
- Carrie Dolwick, Transportation Choices Coalition
- Mike Ennis, Association of Washington Businesses
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EXHIBIT ES- 1  
HIGHWAY AND BRIDGE PROJECT  
EXPENDITURES, 2003-2012 (2012 \$)



## Findings of Cost Analysis

The cost analysis was designed to help the JTC understand:

- What does WSDOT spend on highway and bridge construction?
- Do transportation projects cost more in Washington State than in other states?
- What are the key drivers of WSDOT's program costs?

### HIGHWAY AND BRIDGE CONSTRUCTION PROGRAM SPENDING

Historical project expenditures were analyzed to understand WSDOT spending on the highway and bridge preservation and improvement programs. The analysis only includes expenditures on projects completed between 2003 and 2012. All costs are presented in 2012 dollars, unless otherwise stated.

**Costs by Expenditure Category.** WSDOT spent approximately \$10.5 billion on highway and bridge construction projects completed between 2003 and 2012. Exhibit ES- 1 summarizes the expenditures spent on different areas of the construction program.

- Construction-related costs accounted for approximately 85% of all expenditures. Contractor payments comprised 66% of total costs, while WSDOT construction management and related costs accounted for 13% of total costs. Sales tax comprised about 5% of total costs.
- Non-construction costs accounted for approximately 15% of total costs. This includes activities such as right of way acquisition (6%) as well as planning, predesign, design, permitting, and environmental review (9%).
- While mitigation costs can be a significant contributor to project costs and were identified as an area of interest by the Legislature, WSDOT does not track mitigation costs in a way that allows them to split these out from other construction activities.

Analysis of a sample of projects suggests that mitigation accounted for approximately 16% of project costs (\$326 million out of a total of \$1,980 million) where mitigation was required. Stormwater, wetlands, and noise mitigation accounted for nearly 87% of mitigation costs.

**Costs by Project Type.** The data was also analyzed based on project attributes, such as purpose and size. Approximately 88% of WSDOT projects completed over the study period accounted for only 20% of expenditures while 3% of projects (those over \$25 million each) accounted for 59% of expenditures.

**At a programmatic level, this distribution suggests that opportunities for cost savings should focus on how WSDOT manages the planning, design, and delivery of large projects.**

**Project Delivery.** The majority of construction costs, about 66%, are generated by payments to the construction contractor. Given the magnitude of this expenditure area, it is important to analyze how well WSDOT manages and delivers its construction contracts. Data on construction contract awards and payments helps to illustrate how well WSDOT delivers projects from design to completion. Exhibit ES- 2 summarizes construction contract award and expenditure data over 10 years.

**Exhibit ES- 2**  
**WSDOT Improvement and Presentation Program Contract Costs,**  
**2003-12 (in year of expenditure dollars)**

Contract Size	Number of Awards	Amount Awarded	Amount Paid	Difference*	% Difference
Less than \$1 M	656	\$289,408,293	\$294,784,864	\$5,376,572	2%
\$1M to \$5 M	487	\$1,097,890,445	\$1,119,652,051	\$21,761,605	2%
\$5M to \$10M	80	\$552,633,373	\$578,422,918	\$25,789,544	5%
\$10M to \$25M	67	\$1,046,645,633	\$1,108,441,013	\$61,795,379	6%
\$25M to \$100M	33	\$1,418,262,752	\$1,550,438,468	\$132,175,715	9%
\$100M +	6	\$1,355,417,590	\$1,592,318,640	\$236,901,050	17%
<b>TOTAL</b>	<b>1,329</b>	<b>\$5,760,258,087</b>	<b>\$6,244,057,954</b>	<b>\$483,799,867</b>	<b>8%</b>

Source: WSDOT, 2013; and BERK, 2013.

Note: \$189.5 M of the total difference is from the Hood Canal bridge project.

- Within the sample set of projects, WSDOT paid approximately \$494 million (8%) more than the original award amount over 10 years.
- The largest variances between payments and awards were in contracts over \$25 million, which accounted for nearly \$369 million in payments above award amounts.
- Larger projects had payments higher than awards more frequently and by a larger percentage than smaller projects.

## COMPARISON TO OTHER STATES

A key question posed in this study is whether, and to what degree, WSDOT projects are more costly than those in other states. Given the challenges of identifying truly "comparable" projects across multiple states to conduct direct project-to-project comparisons, two approaches were combined to address this question:

- Project Cost Comparison
- Project Delivery Comparison

**Overall, the analysis provided no evidence that there are systematic or programmatic reasons that would make costs in Washington different from costs in other states.** The analysis did find that costs may vary among states due to factors outside the control of WSDOT or the Legislature, such as local labor rates, material prices, and competitiveness of bid environments. Each analytic component is described in further detail below.

### DESIGN-BUILD AT WSDOT

WSDOT is authorized to use two contract types for transportation projects.

**Design-Bid-Build** is the traditional project delivery method. WSDOT is responsible for design, and only the construction component of the project is contracted out.

**Design-Build** is a newer method where WSDOT awards projects at an early stage of design to a contractor who is responsible for final design as well as construction.

The state Legislature authorized WSDOT to use Design-Build beginning in 2001 for projects over \$10 M and a set of five pilot projects between \$2 and \$10 M.

In the 2003-2012 project database analyzed for this study, 16 contracts (approximately 1%) were contracted using Design-Build. Since Design-Build was more commonly used on large projects, such as the Tacoma Narrows Bridge, these contracts totaled about 24% of all construction contract costs (or about \$1.8 B).

**STUDIES INCLUDED IN LITERATURE REVIEW**

*Highway Capital Costs – Washington & US, Bill Eager, 2013*

- Analyzes 130 projects categorized by location type across WA and the US.

*Highway Construction Costs, WSDOT, 2004*

- Analyzes 21 projects in WA and 15 projects from 12 other states.

**Project-level Comparison.** This analysis is based primarily on a literature review that summarizes and critiques two studies that attempted to compare WSDOT construction costs to comparable project costs in other states. The two studies had opposing high-level conclusions about how WSDOT projects compare to other states:

- The study conducted by WSDOT concluded that WSDOT is in the same range as other states' projects on a cost per-lane-mile basis.
- The study conducted by Bill Eager concluded that WSDOT's costs are significantly higher than other states' projects on a cost per-lane-mile basis.

A critical review of the two studies, supplemented by additional research on the projects included in the studies, finds that the seemingly different conclusions are supported by relatively similar underlying project data.

- Both studies' data confirm that project costs per-lane-mile vary widely, even on seemingly similar projects.
- Both studies affirm that it is very difficult to make conclusive statements using these types of project comparisons, since projects are so rarely directly comparable.

**Project Delivery.** This analysis explores the relationship between estimates, awards, and payments in other states. Oregon DOT and Utah DOT both provided a comparable 10-year history of construction contracts. UDOT provided the same information as WSDOT – final engineer's estimate, award amount, and final expenditures by contract method. ODOT did not include data on engineer's estimates or on contracting method. Exhibit ES- 3 summarizes the results of this analysis.

**Exhibit ES- 3  
Project Delivery Metrics by State (2003-2012)**

Metric	WSDOT	ODOT	UDOT
Difference from Estimate to Award	(9%)	-	(12%)
Difference from Award to Expenditure	8%	7%	12%
Difference from Estimate to Expenditure	(1%)	-	(2%)

Source: WSDOT, 2013; UDOT, 2013; ODOT, 2013; and BERK, 2013.

- Overall, WSDOT's project delivery metrics do not differ significantly from those in Utah and Oregon.
- In all three states, final expenditures came in between 7% and 12% higher than awards. All three exhibited a pattern where larger projects were more likely than smaller projects to have final payments **higher** than award amounts.

- Utah and Washington exhibited a similar pattern of award amounts coming in lower than estimates (by 12% and 9%, respectively). For both states, final payments came in **slightly below** the final engineer's estimates as well.
- All three states experienced a pattern of large projects coming in higher than award amounts more frequently and by a higher percentage than smaller projects.

In general, the conclusion from the comparison of with Oregon and Utah is that for at a programmatic level bids tend to come in under project estimates (particularly design-bid-build where the design is complete at the time of bidding) and that final payments exceed project awards due to a variety of factors including "traditional" contingency items, such as unforeseen circumstances and changes in material cost, as well as other risk-related issues such as design errors or significant changes in scope. WSDOT's experience is in line with the two peer agencies reviewed.

## KEY COST DRIVERS

Based on analysis of costs within Washington State and at other DOTs, we have identified the following significant factors that could add costs to WSDOT projects relative to similar projects elsewhere:

- **Project Size.** Required and optional decisions around project design have an impact on how much WSDOT builds on an individual project
- **State-specific Regulations.** WSDOT must comply with federal and state regulations which can add costs to a project
- **Labor Costs.** Labor comprises a significant portion of construction costs and accounts for the vast majority of other costs (engineering, design, construction management, etc.)
- **Cost of Materials.** Materials account for large share of construction costs, so variations in materials costs can have a substantial impact on costs
- **Risk Assignment.** WSDOT's extensive use of Design-Bid-Build contracting places a significant share of project risk on the owner (WSDOT) in the event of cost over-runs

Key cost drivers within these categories are analyzed in the next section.

# Analysis of Key Cost Drivers

## PROJECT DESIGN

Project design decisions affect project costs by governing *what* is built and *how much* is built for a specific project. Project design decisions fall into two main categories:

### PRACTICAL DESIGN

Practical Design is an emerging approach to transportation system design. The purpose is to meet a state's transportation needs at a reasonable cost.

The framework for Practical Design includes identifying:

- A goal you wish to achieve.
- Project-specific purpose and need statement.
- State-specific values/filters through which all projects must pass.

According to a 2013 Transportation Research Board report, six DOTs have adopted Practical Design Policies, including Utah and Oregon.

Given how recently Washington and other states have adopted Practical Design, the benefits of the approach are not likely to be in evidence in the historical data available.

As an example of Practical Design's potential, Missouri adopted a formal Practical Design policy in 2005 and claims to have saved approximately \$400 million on projects included in its 2005-2009 STIP. Savings were invested in additional transportation projects.

**Design Standards.** State and national design standards provide guidance on design decisions related to safety and mobility, such as design speed limits, vertical and horizontal design, lane width, and load bearing capacity.

- The American Association of State Highway and Transportation Officials (AASHTO) creates design standards that serve as national guidelines.
- WSDOT publishes its own Design Manual that builds on AASHTO's standards and incorporates state-specific regulations, as do most other state DOTs (at least 30 according to FHWA).
- Overall, WSDOT and AASHTO standards are very similar to each other. Based on WSDOT and consultant team review, there are no specific variations that would likely result in significant differences in construction costs.

**Design Choices.** DOTs additionally make many other design choices that impact project scope that fall under the discretion of the department, such as project objective, alignment, or aesthetics. These decisions greatly impact a project's overall cost and eventual effectiveness as a component of transportation infrastructure.

WSDOT has a culture of continuous improvement, and a recent effort for WSDOT's project design and delivery teams has been to incorporate elements of Practical Design (see sidebar). Recent changes include:

- **Changing frameworks for Design and Delivery.** Identifying how and where to apply flexibility in design standards, and focusing on project and program goals and outcomes from design through construction.
- **Combining Similar Projects.** Combining similar projects across the state into groups to streamline methods and create economies of scale.
- **Designing Incremental Improvements with Long-term Benefits.** Identifying how goals can be achieved through spending less money in the short-term, and ensuring money spent today can be leveraged in the future for greater benefit toward a specific goal.

WSDOT hopes its focus on Practical Design will begin to realize cost savings as projects designed and delivered under the new processes are completed.

### STATE-SPECIFIC REGULATIONS

**Sales tax.** Sales tax paid on construction accounted for approximately 5% of 2003-2012 preservation and improvement project expenditures (\$541 million).

In Washington the sales tax, along with property and business and occupation taxes, are the foundation of the State's tax structure. Washington relies on sales tax for 60% of its revenue, the highest in the nation. One of the more important components of the tax base is tax that applies to construction labor and materials. This tax treatment extends to public and private construction

activities including WSDOT. Revenues from the state sales & use tax collected from construction contracts support the State General Fund.

Compared to other states, sales tax is a much more significant cost element for highway projects in Washington. Thirty-nine states apply sales tax to some portion of highway construction costs. However, only four other states apply sales tax to the full contract amount. In addition, since 1971 projects on state-owned highways have been taxed to a greater degree than projects on other publicly-owned roads and highways including city, county and federal facilities.

**Exhibit ES- 4**  
**Summary of WSDOT Sales Tax Application**

	<b>State-owned Highways</b>	<b>City, County, Political Subdivision, &amp; Federal-Owned Highways</b>
Sales & Use Tax	<ul style="list-style-type: none"> <li>• Applied to full contract price</li> <li>• Materials that become part of structure not taxed</li> <li>• Materials used by contractor during construction taxed at purchase</li> </ul>	<ul style="list-style-type: none"> <li>• Not applied to full contract price</li> <li>• All materials taxed at purchase</li> </ul>
State tax cost* for \$1 million contract	• \$71,100	• \$39,000

Note: \* Cost assumptions based on conversations with contractors and research. State sales tax rate: 6.5%; Labor & services: 50%; Consumed Materials: 10%; Installed Materials: 40%.

The different treatment and cost implications of the higher tax burden for state-owned facilities are presented in Thirty-nine states apply sales tax to some portion of highway construction costs. However, only four other states apply sales tax to the full contract amount. In addition, since 1971 projects on state-owned highways have been taxed to a greater degree than projects on other publicly-owned roads and highways including city, county and federal facilities.

Exhibit ES- 4. In 1971 state-owned highways were removed from the Public Road Construction exemption in the sales tax statute which limits sales tax to materials, which are taxed at purchase by the contractor. Since state-owned facilities do not enjoy this exemption, sales tax is charged based on the full contract price as is done for private construction activity.

As a result of this differential treatment, the state sales tax cost is approximately 82% higher for projects on state-owned highways than other public highway projects – estimated to be \$71,100 per million of construction versus \$39,000 per \$1 million of construction. The actual budget impact of this higher tax burden is even greater than this since all of the local option sales taxes, which vary based on the location of the project, would also apply.

**Prevailing wage.** The purpose of state prevailing wage law is to “protect workers from substandard earnings and to preserve local wage standards” (Washington State Department of Labor & Industries Prevailing Wage Handbook). Prevailing wage laws require WSDOT’s contractors to pay a minimum wage to each type of worker based on surveys or collective bargaining agreements that determine an appropriate (or prevailing) wage for the area in which a project is constructed. Both Washington and the federal government have prevailing wage laws.

- On state-funded projects, WSDOT must follow state prevailing wage requirements.
- On federal aid projects, WSDOT must pay the higher of the state or federal prevailing wage.

State and federal prevailing wages are difficult to compare due to differences in methodology.

Analysis of the impact of prevailing wage requirements on cost found that:

- Research studies are split on whether or not prevailing wage laws make projects more expensive.
  - A 1998 JLARC Highways Audit found that 0.44% of state highway program costs could be attributable to the requirement to pay the higher of the state rate or federal rate on federal-aid projects.
  - No specific studies on impact of prevailing wage vs. no prevailing wage for WSDOT projects.
  - Studies vary on impact of prevailing wage requirements on construction costs with no agreement as to whether these laws have an impact on overall wage levels in an area.
- There are aspects of the state program that add administrative burden, such as the use of a paper based survey.
- As a result of a series of administrative law determinations, the state prevailing wage now applies to a broader range of activities than the federal law. This is a result of definitional differences and results in a broader application of the state law in Washington.
- In the last 10 years, federal aid projects accounted for 82% of contracts awarded and would have paid the federal prevailing wage, even if there was no state prevailing wage.

**Environmental review, permitting and mitigation.** The following elements of project costs were studied together because they are interrelated:

- **Environmental review** which aids in understanding the potential impacts of a proposed project by evaluating alternatives, and identifying impacts to be analyzed in an environmental document, in accordance with SEPA and NEPA goals and policies.
- **Permitting** is the process that provides legal authority to proceed with a project subject to commitments to address any environmental impacts that need mitigation.
- **Mitigation** includes actions taken to avoid, minimize or address environmental impacts.

WSDOT projects are subject to environmental review and permitting regulations from federal, state, and local agencies. For environmental review, NEPA and SEPA are the primary regulations that impact project design decisions. Given the relationships between NEPA, SEPA and project design, you can minimize the costs of mitigation through changes to design identified through SEPA/NEPA review which serve to avoid and/or minimize impacts. Current WSDOT practices reflect the implementation of recommendations from several streamlining efforts over more than a decade.

WSDOT's current practices:

- Vast majority of WSDOT projects are excluded from NEPA and SEPA review – in 2011-13, 94% of projects had a NEPA Categorical Exclusion and 84% of projects had a Categorical Exemption from SEPA.
- Some projects require approval from both federal agencies and state or local agencies – requiring review under SEPA and NEPA. In this case, agencies are permitted (and encouraged) to prepare and issue combined documents that meet the requirements of both. This results in a single environmental document submitted under NEPA and SEPA.
- NEPA guidelines are often followed by WSDOT so that projects can qualify for federal funding in the future.
- For smaller, routine projects, SEPA is more onerous than NEPA. The SEPA checklist is more time consuming than the documentation prepared for Federal Highway NEPA Categorical Exclusions (CE). SEPA adds process requirements on projects that require SEPA checklists and Determinations of Non-Significance that does not exist with NEPA CE projects (e.g., public notice, circulation, and 14-day comment period).
- The environmental review process may increase public acceptance and lead to improvements/efficiencies in overall project design.
  - Some communities find that SEPA is not stringent enough and that some impacts have gone unmitigated

**CONTRACT BID INFORMATION**

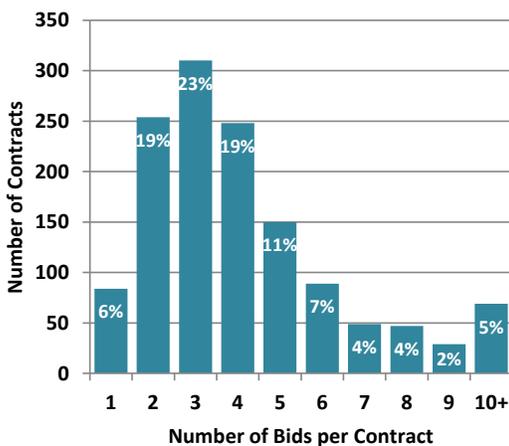
Competition for construction contracts ensures WSDOT has multiple qualified bids to choose from, and encourages contractors to submit competitive bids.

On average, WSDOT received 4.3 bids per contract over the past 10 years. Contracts between \$5 M and \$100 M received the highest number of bids, while contracts over \$100 M received an average of 2.8 bids.

Competition was fairly balanced throughout the state. While contracts in the Northwest Region received the most bids (an average of 5.0 bids per contract), all other regions still averaged between healthy bid levels of 3.7 and 4.2 bids per contract.

Exhibit ES- 5 shows the percent of WSDOT contracts that receive a certain number of bids. The exhibit shows that 76% of contracts received three or more bids.

**EXHIBIT ES- 5  
CONTRACTS BY NUMBER OF BIDS  
(2003-2012)**



**Mitigation:** WSDOT does not track mitigation costs on individual projects, making it impossible to determine what portion of the total expenditures in our cost analysis resulting from mitigation-related items. As a result, the study relied on WSDOT case studies completed in 2003, 2006, 2009 and 2013 to assess the role of mitigation costs.

Based on the case studies, costs related to mitigation accounted for an average of 16% of total project costs for these selected projects, though on individual projects the impact did range widely. More than half of mitigation costs were related to the stormwater requirements. Stormwater facilities, wetland mitigation and noise abatement comprise approximately 87% of mitigation costs. These project elements are determined by a combination of federal and state statutory, regulatory and policy requirements.

**LABOR COSTS**

Labor (wages and benefits) comprises a significant portion of construction costs and accounts for the vast majority of other costs (engineering, design, construction management, etc.). Cost of labor varies widely by state. WSDOT's labor costs are primarily driven by overall wage levels in the Pacific Northwest.

Statewide average wage levels in Washington's construction and engineering sectors are consistent with the national average. However, there is variation among states.

- Construction labor rates vary from 23% higher (Massachusetts) to 26% lower (Idaho), excluding Alaska which has the highest construction labor rates in the US.
- Engineering labor rates vary from 23% higher (California) to 27% lower (Arkansas).

Large differences in wage rates can drive significant differences in projects, as labor comprises about 40% of construction contracts (approximately \$2.8 billion over the study period). An important note is that the labor rates paid to construction contractors are set by the contractors themselves.

WSDOT has little ability to influence wages, except through the use of its competitive bidding process as a way to ensure it gets reasonable labor rates on its project. On average, WSDOT receives about 4.3 bids per award, which reflects a healthy level of competition among contractors. See the sidebar to the left for additional bid information.

**Prevailing Wage Impacts on Labor Costs.** The conclusion from the prevailing wage review described above focuses on administrative changes to improve process efficiency and potentially save costs. This analysis looks at whether prevailing wage requirements result in WSDOT paying more for labor.

- **Based on the analysis of prevailing wage and review of existing studies, there is no determination or consensus that prevailing wage generally adds to labor costs in the broader labor market.**
- **Although many changes were identified to improve the administrative process, there is no definitive evidence that suggests prevailing wage actually increases labor costs at the highway program level.**
- **Where prevailing wage may have an impact on labor costs is in the more rural parts of the state where there are fewer contractors and the wage is set based on collective bargaining agreements used to cover a large geographic area.**

## COST OF MATERIALS

Materials comprise approximately 50% of construction contracts, or about \$3.5 billion over the study period. The measure used to compare costs across states, the Construction Cost Index (CCI) has many limitations that make it an imperfect tool for comparison (see sidebar to right).

- Based on CCI analysis from 1990 to 2012, WSDOT's materials costs have increased at approximately the same rate as national averages and as other states since 1990.
- While materials are a large share of costs, WSDOT does not have significant control over the price. Costs are set by the market, and potential savings from interstate purchases of materials to achieve lower prices are typically negated by transportation costs.
- In some cases, particularly when purchasing fabricated materials created off-site, there may be enough of a cost advantage through the combination of cheaper materials and lower out-of-state wage rates to offset transportation costs. For example, installed materials with a high labor component might be cheaper to source from out of state suppliers, particularly if the project is near the state border and transportation costs are not a significant differentiating factor.

## CONTRACTING METHOD AND RISK ASSIGNMENT

Contracting method selection can impact project efficiency, project design, and cost. If WSDOT were able to leverage multiple project delivery methods, WSDOT could decide on a project by project basis:

- Risk allocation between owner and contractor based on who is in the best position to manage the risk
- Project delivery methods that best align responsibility based on project needs
- Competitiveness of the bid process and construction management to meet schedule and budget requirements

### CONSTRUCTION COST INDEX

The Construction Cost Index (CCI) tracks selected standard bid items over time. The CCI provides a point of comparison for construction cost growth across the nation, with the following limitations:

- In Washington, CCI bid items represent 7 of potentially hundreds of bid items for a project. CCI bid items account for approximately 18% of total costs.
- Each state's index includes a similar set of items, but specific definitions for items and methodologies for calculating the index vary by state.
- FHWA stopped creating a composite index after 2006 due to the limited use and value of the index and questions about reliability of the data.
- A 2007 FHWA reported that costs of commodities used in highway construction primarily varied across states due to the difference in the cost of transporting commodities.

- Beyond selecting the appropriate project delivery method, it is important that for each available method there is a corresponding management and implementation structure in place to successfully apply the selected method

**Impact of Contracting Methods.** Washington and Utah provided data on the type of contracting method used for each project. Both use Design-Bid-Build and Design-Build contracting, while Utah also uses GC/CM contracting. (While Oregon did not provide this information, our understanding is that they primarily use Design-Bid-Build contracting, with some use of Design-Build.)

**Exhibit ES- 6  
Project Delivery Metrics by Contracting Method, 2003-2012**

Contracting Method	Estimate to Award		Award to Payment		Estimate to Payment	
	WSDOT	UDOT	WSDOT	UDOT	WSDOT	UDOT
Design-Bid-Build	(9%)	(14%)	10%	11%	(1%)	(5%)
Design-Build	(7%)	(17%)	5%	14%	(2%)	(5%)
GC/CM	-	3%	-	13%	-	16%
<b>All Contracts</b>	<b>(9%)</b>	<b>(12%)</b>	<b>8%</b>	<b>12%</b>	<b>(1%)</b>	<b>(2%)</b>

Source: WSDOT, 2013; UDOT, 2013; and BERK, 2013.

- Both Design-Build and Design-Bid-Build contract awards tend to come in below estimates. However, Utah's GC/CM contract awards come in an average of 3% above the engineer's estimate.
- The previous analysis shows that project delivery metrics don't tend to vary meaningfully by contracting type.
  - For example, in Washington, if the expenditures on the Hood Canal Graving Dock are removed, Design-Bid-Build and Design-Build metrics look nearly identical.
  - If you remove projects completed through GC/CM, Utah shows a similar pattern to Washington when comparing the two contract types.
- GC/CM stands out as having a different pattern between estimates, awards, and payments than the other contracting types.
  - GC/CM is different in many ways from the other two methods. GC/CM contractors in Utah are selected through a competitive bidding process that assesses qualifications. Once a contractor is selected, UDOT and the contractor negotiate a final award amount.
  - Since the contractor is brought on so early in the process, estimates are made earlier in the design stage than with Design-Bid-Build.

- The data from Utah covers the period when GC/CM was new to the Department. From 2005-2008, the first four years GC/CM was used, contract payments came in nearly 20% over award amounts. Over the past four years (2009-2012), payments came in 8% higher than awards. Although patterns in GC/CM changed slightly over the decade, the relationships between cost points are still different than the patterns exhibited by Design-Build and Design-Bid-Build.

Based on the analysis of the three states, likely benefits of using alternative contracting methods lie outside of simply expecting project payments to come in closer to award amounts. There is not one type of contracting that appears to regularly save more money relative to project estimates of project awards.

**This suggests that contracting method decisions should be primarily about factors such as risk assignment, relative core competencies of the agency and contractor, availability and capabilities of agency staff and budget certainty.**

- Design-Build contracts come in with a similar payment to award pattern as Design-Bid-Build, even though they are on average larger and more complex.
- On big projects, where errors can be extremely costly, Design-Build may help mitigate risk. Large errors may be paid for by contractors and not WSDOT.
- Involving contractors in project design through Design-Build or GC/CM can make for better project design and improved constructability.
- On more complex projects, both GC/CM and Design-Build can result in efficiencies since construction teams are familiar with and have a say in complicated design decisions.
- On smaller and less complex projects, the traditional Design-Bid-Build approach appears to be very effective and is widely used even where other options exist, as seen in the Utah example.

# Potential Actions

What can be done to increase efficiency and reduce cost in WSDOT construction program? For each of the cost elements described above, we have identified potential actions to save costs. The following tables, organized by key driver, describe the potential actions, the magnitude of the potential impact, and whether the action would be administrative or statutory.

Alternative	Administrative or Statutory	Potential Impact
<b>PROJECT DESIGN</b>		
<b>1</b>	Adopt Practical Design methods to guide project scoping and design decisions	
	<ul style="list-style-type: none"> <li>Incorporate Practical Design into project prioritization and selection process</li> <li>On projects greater than \$10 million include a Practical Design review to determine the cost effectiveness of the preliminary design and identify alternatives considered</li> </ul>	Administrative High
<b>SALES &amp; USE TAX</b>		
<b>2</b>	Reinstate Public Road Construction exemption on state-owned highways	
	<ul style="list-style-type: none"> <li>Exempt from tax on total contract amount</li> <li>Contractor would pay tax on all materials at point of purchase</li> <li>Lowers tax paid with no risk with respect to federal projects</li> </ul>	Statutory High
<b>3</b>	Direct receipts from state sales and use tax collected from contractors on state-owned highways to transportation fund.	
	<ul style="list-style-type: none"> <li>Legislature could direct receipts to the Motor Vehicle or Multi-Model Account</li> <li>Tax paid is the same, but is returned to transportation</li> </ul>	Statutory High

Alternative	Administrative or Statutory	Potential Impact
<b>PREVAILING WAGE</b>		
<b>4</b> Exempt WSDOT projects from the state prevailing wage act		
<ul style="list-style-type: none"> <li>Retain the federal prevailing wage on federal-aid projects</li> <li>Potential wage savings; reduction in administrative burden related to determining the higher of the two wages; could lead WSDOT to program federal funds differently and use on fewer projects</li> </ul>	Statutory	Low
<b>5</b> Exempt WSDOT federal-aid projects from the state prevailing wage act		
<ul style="list-style-type: none"> <li>Use federal wage rates on federal-aid projects; This would not affect Davis-Bacon &amp; Related Acts requirements</li> <li>Potential wage savings; reduction in administrative burden related to determining the higher of the two wages; could lead WSDOT to program federal funds differently and use on fewer projects</li> </ul>	Statutory	Low
<b>6</b> Change Washington State Prevailing Wage language to match the Federal Prevailing Wage language "payment of prevailing wages to mechanics and laborers employed directly on the site of work"		
<ul style="list-style-type: none"> <li>Potential wage savings due to narrowing the range of activities covered by prevailing wage</li> </ul>	Statutory	Low
<b>7</b> Establish a threshold below which WSDOT projects are not subject to the prevailing wage act		
<ul style="list-style-type: none"> <li>Potential wage savings; reduction in administrative burden; could produce more bids in some areas of the state if prevailing wage is a barrier</li> </ul>	Statutory	Low

Alternative		Administrative or Statutory	Potential Impact
8	<p>Modify how L&amp;I sets the state rate</p> <ul style="list-style-type: none"> <li>Options: (a) Use federal rate as state rate, (b) Use collective bargaining agreements as basis for state rate, or (c) Require annual survey</li> <li>Savings are in more efficient determination of prevailing wage; eliminate large jumps for those wages not set by collective bargaining agreements</li> </ul>	Statutory and Administrative (L&I)	Low
<b>ENVIRONMENTAL REVIEW &amp; PERMITTING</b>			
9	<p>Allow smaller projects that qualify for a NEPA categorical exclusion but not a SEPA categorical exemption to submit NEPA documentation only (and not the SEPA checklist).</p> <ul style="list-style-type: none"> <li>This would require a change to the SEPA rules</li> <li>It would affect smaller projects</li> </ul>	Administrative	Low
10	<p>Expand SEPA exemptions to match the NEPA categorical exclusions</p> <ul style="list-style-type: none"> <li>Would allow more small projects to submit NEPA categorical exclusion documentation only (and not a SEPA checklist)</li> </ul>	Statutory	Low
<b>CONTRACTING</b>			
11	<p>Grant broad authority to WSDOT to determine project delivery methods</p>	Statutory	See note (pg. ES-18)
12	<p>For mega-projects the highest-level executives within WSDOT consider all possible scenarios before selecting the contracting approach, and then consider how authority should be aligned for the specific projects.</p> <p>(Mega-Project Assessment)</p>	Administrative	See note (pg. ES-18)

Alternative		Administrative or Statutory	Potential Impact
13	<p>When selecting a contracting method, the Department should: perform a thorough risk analysis and quantify all project risks; consider the amount of risk that should be retained versus transferred to the contractor; on mega projects, the Chief Engineer should review and approve the delivery strategy.</p> <p>(Mega-Project Assessment)</p>	Administrative	See note (pg. ES-18)
14	<p>Modify existing WSDOT authority for Design-Build</p> <ul style="list-style-type: none"> <li>Complete analysis of 5 pilot projects and potentially lower the threshold from \$10 million to \$2 million</li> <li>Allow for projects of any size that meet the criteria</li> </ul>	Statutory	See note (pg. ES-18)
15	<p>Specifically authorize GC/CM project delivery for WSDOT projects and authorize a separate review process from CPARB.</p> <ul style="list-style-type: none"> <li>Learn from experience in other states since the procurement process is different and price is negotiated.</li> </ul>	Statutory & Administrative	See note (pg. ES-18)
16	<p>Apply the same rigorous risk assessment process to decisions about possible changes or modifications in the selection of a contracting method.</p> <ul style="list-style-type: none"> <li>On complex projects with multiple components and contracts, any change in contracting method or modification to a contract should be reviewed using the same level of risk assessment as the original selection. Documentation should identify how a change in approach benefits the State.</li> </ul>	Administrative	See note (pg. ES-18)
17	<p>Implement a pavement warranty program and consider other opportunities to use contractor warranties (performance and/or materials and workmanship) in lieu of inspections,</p>	Administrative	See note (pg. ES-18)

Alternative		Administrative or Statutory	Potential Impact
18	Give Design-Build contractors additional design flexibility to support innovation and cost containment by not restricting them to the Design Manual but that consider lifecycle costs	Administrative	See note (pg. ES-18)

**Contract Magnitude Notes**

- Magnitude of Impact (1-6): Alternatives are related to shifting risk assignment and responsibility, which affects who pays for errors and cost overruns. While shifting risk does mean that it will be priced into contractor bids, it provides more budget certainty.
- Magnitude of Impact (7): Potential savings to contractors with respect to time and to WSDOT with respect to staff.
- Magnitude of Impact (8): Could potentially lead to more cost effective solutions based on current conditions in materials prices or state of the practice.

**OTHER POTENTIAL ACTIONS**

19	Improve data collection and management to better inform management and policy choices.		
	<ul style="list-style-type: none"> <li>• Finding: There were many questions posed in this study that were difficult or not possible to reasonably address due to lack of data or incomplete information. Some of these questions inform important policy and management issues.</li> <li>• Particularly relevant to mitigation costs, change order documentation, right-of-way acquisition, environmental review and permitting and prevailing wage.</li> </ul>	Statutory & Administrative	N/A

Alternative		Administrative or Statutory	Potential Impact
20	Focus federal funds in fewer projects to limit the impact of federal aid conditions on WSDOT project costs.		
	<ul style="list-style-type: none"><li data-bbox="147 443 634 625">Finding: WSDOT spreads its federal funds throughout its program which added federal aid project conditions to 82% of its projects completed in 2003-2012.</li><li data-bbox="147 638 634 930">A major challenge for WSDOT in this regard is the general lack of flexibility to move funds between projects. For example nickel funds are limited to nickel projects, so to consolidate federal funds on a nickel project likely requires switching money primarily among other nickel projects</li></ul>	Legislature & WSDOT	

# Significant Data Limitations Identified during the Study

This study attempted to address a very broad set of issues and strived to answer questions from numerous angles on each topic related to potential factors that might result in higher costs for highway projects. Due to data limitations, there were some key questions we were not able to fully address in a quantitative manner. To the extent that these issues remain important areas of interest to the Legislature, effort should be made to improve the data availability, quality and completeness to more adequately support policy discussions in the future,

## Areas of analysis where lack of data was a significant limitation:

<b>Mitigation</b>	Project costs do not identify the mitigation-related components.
<b>Environmental Review and Permitting</b>	A significant share of WSDOT "predesign" work is categorized as consultant agreements. There is no ability to break these costs into expenditure categories that the legislature would like to better understand such as environmental review, permitting, and preliminary design.
<b>Prevailing Wage</b>	<p>Neither WSDOT nor L&amp;I track if the state or federal rate was in effect for a particular position on a particular job. The L&amp;I affidavit process does not require contractors to report actual wages paid, only to certify that they paid at least the prevailing wage.</p> <p>The "contract number" field on L&amp;I's affidavit form is inconsistently filled out, which made it impossible to link prevailing wage affidavits back to specific WSDOT projects.</p>
<b>Change Orders</b>	In the change order database, the "reason" field is inconsistently used. Many large change orders do not have a reason listed. Additionally, the existing reason codes are not specific enough to provide usable insight into a project's history.
<b>Right-of-Way</b>	WSDOT's right of way database is not consistently filled out, even though the fields exist in the database. WSDOT has recently implemented a new database that will improve tracking and allow this type of analysis going forward.