

FINAL REPORT

Washington State Joint Transportation Committee EFFICIENCIES IN THE CONSTRUCTION AND OPERATION OF STATE TRANSPORTATION PROJECTS





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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.

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. Given the relatively short project timeline, we conducted an initial screening analysis to focus our efforts on the cost drivers with the greatest potential for savings and on additional areas of specific interest to the Legislature and the Advisory Panel members.

Findings of Cost Analysis

The cost analysis was designed to help the JTC understand:

- How much does the Washington State Department of Transportation (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 project costs?

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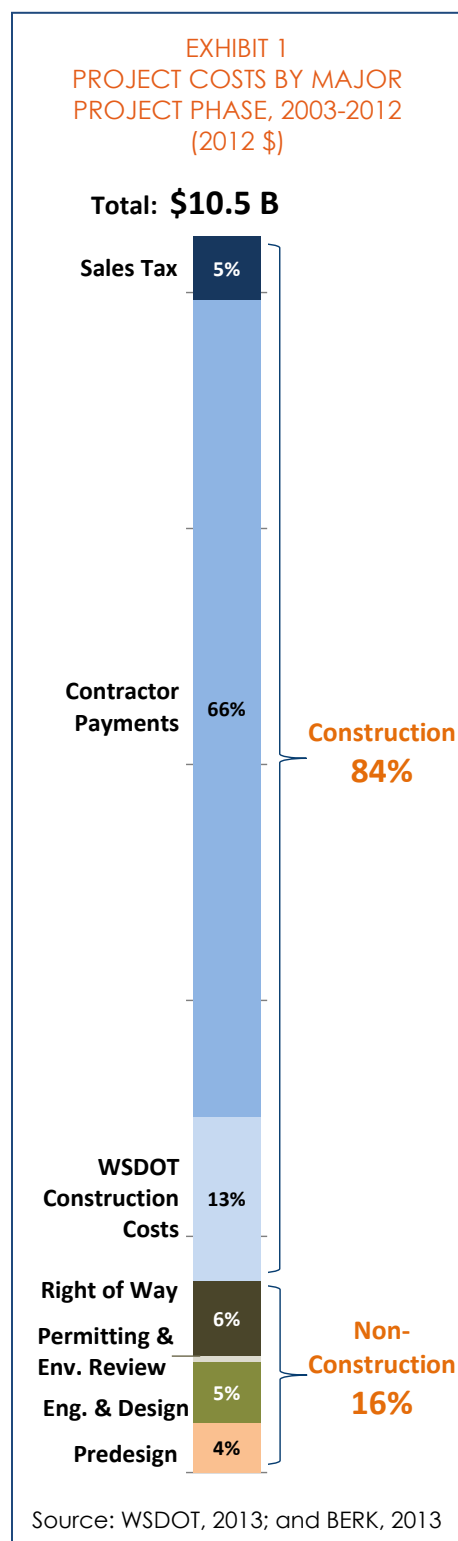
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HIGHWAY AND BRIDGE CONSTRUCTION PROGRAM SPENDING

Historical project expenditures were analyzed to understand WSDOT spending on the Preservation and Improvement Programs. The analysis includes expenditures on projects completed between 2003 and 2012. All costs are presented in 2012 dollars, unless otherwise stated.

Within each Program, expenditures are categorized into project phases. The three overarching phases that WSDOT defines are:

- **Preliminary Engineering.** Includes engineering costs incurred prior to the date of construction, such as locating and designing, making surveys and maps, preparing plans, specifications and estimates, traffic counts, and other related general engineering prior to letting a contract for construction. Preliminary engineering encompasses predesign, engineering and design, environmental review, and permitting
- **Right of Way.** Includes appraisal fees, purchase of land or interest therein, and relocation assistance for persons displaced by the purchases.
- **Construction.** Includes all costs for the construction phase, such as payments to prime contractors, state force labor costs, supervision of construction activities, inspection and testing, and general project management during construction.

Costs by Expenditure Category. WSDOT spent approximately \$10.5 billion on highway and bridge construction projects that were completed between 2003 and 2012. Exhibit 1 summarizes the project costs by major project phase.

Construction costs accounted for approximately 84% of total project costs:

- Contractor payments comprised 78% of construction costs, or 66% of project costs.
- 16% of construction costs (or 13% of project costs) come from WSDOT costs, which are primarily costs associated with construction and contract management, bid and award process, and inspections.
- 6% of construction costs (or 5% of project costs) comes from sales tax on construction.

Right of way comprised 6% of project costs. About three-quarters of this expense was for parcel acquisition.

Planning, predesign, design, permitting, and environmental review accounted for 10% of project costs.

Mitigation costs were analyzed using a set of case studies. In the sample, 16% of project costs went to mitigation, with a range among individual projects of between 2% and 45%.

Eighty-eight percent (88%) of WSDOT projects completed over the study period accounted for only 20% of expenditures. Meanwhile, projects over \$25 million accounted for 3% of projects but 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 are payments to construction contractors (78% of construction costs, or 66% of project costs). Given the magnitude of this expenditure area, we analyzed 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-1 summarizes construction contract award and expenditure data over ten years.

Exhibit ES-1
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%
TOTAL	1,329	\$5,760,258,087	\$6,244,057,954	\$483,799,867	8%

Source: WSDOT, 2013; and BERK, 2013.

Note: \$190 M of the total difference is from the Hood Canal bridge project.

- Within the sample set of contracts, WSDOT paid approximately \$484 M (8%) more than the original award amount over ten years.
- The largest variances between payments and awards were in contracts over \$25 M, which accounted for nearly \$369 M in payments above award.
- **Larger contracts had payments higher than awards more frequently and by a larger percentage than smaller contracts.**

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 to conduct direct project-to-project comparisons, we address this question in two ways:

- Project Cost Comparison
- Project Delivery Comparison

CONTRACT DEFINITIONS

Final Engineer's Estimate. Typically the final estimate prior to bid opening.

Award Amount. The initial amount for which WSDOT signs an agreement with the contractor to complete a project.

Final Payments or Final Expenditures. The total amount that WSDOT paid toward a contract after work is complete.

DESIGN-BUILD AT WSDOT

Design-Bid-Build WSDOT is responsible for project design and project construction 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 M and \$10 M.

In the 2003-2012 project database, 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).

Overall, the analysis suggests that highway construction costs in Washington are generally in line with experiences elsewhere and that aside from charging sales tax on construction, there are no systemic or programmatic factors that would make costs in Washington higher than 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.

Project-level Comparison. We reviewed two studies that compared WSDOT project costs to project costs said to be comparable in other states: *Highway Construction Costs*, WSDOT, 2004 and *Highway Capital Costs – Washington & U.S.*, Bill Eager, 2013. Both studies approached the cost comparison question by selecting projects that were reasonably similar and comparing costs on a per-lane-mile basis. Comparing the conclusions where projects were common to both studies suggests that WSDOT projects are generally in line with experience elsewhere. This conclusion was reinforced when we updated the cost information where better data existed and added comparable projects.

Project Delivery. This analysis explores the relationship between estimates, awards, and payments in two other states, Oregon and Utah. The two western states were selected for different reasons: Oregon has a similar climate and is a neighbor state, while Utah is among the states that extensively use alternative contracting methods, including almost a decade of experience with General Contractor/Construction Manager (GC/CM). Oregon DOT and Utah DOT both provided data for a ten-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-2 summarizes the results of this analysis.

Exhibit ES-2
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 contract expenditures were between 7% and 12% higher than awards.

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

In general, the conclusion from the comparison with Oregon and Utah is that, 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. These items include 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 an analysis of costs within Washington State and other DOTs, we identified the following significant factors that could add costs to WSDOT projects relative to similar projects elsewhere:

1. **Project Scale.** Required and optional decisions around project design have an impact on how WSDOT builds an individual project.
2. **State-specific Regulations.** WSDOT must comply with federal and state-specific regulations, including state sales tax requirements, prevailing wage laws, and environmental laws, which can add costs to a project.
3. **Labor Costs.** Labor comprises a significant portion of construction costs and accounts for the vast majority of non-construction costs, including engineering, design, construction management, etc.
4. **Cost of Materials.** Materials account for 50% of contract costs (or about 33% of project costs), so variations here can have a substantial impact. The ability of WSDOT to effectively manage materials costs is limited.
5. **Risk Assignment.** Different project delivery methods allocate risk differently between the project owner and contractor. 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.

Analysis of Key Cost Drivers

Project Scale

Project scale decisions affect project costs by governing what is built and how much is built. Project scale decisions fall into two main categories: design standards and design choices.

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) provide national guidance on design standards for interstate, highway, and road construction. WSDOT standards and AASHTO standards are similar.

- There are no variations that would likely result in significant differences in cost for WSDOT project construction.
- WSDOT is continually adjusting its standards to align with AASHTO and provide flexibility to project designers.

DESIGN CHOICES

DOTs make other design choices that impact project scope and fall under the discretion of the department, such as project objective, alignment, or aesthetics. These decisions can have significant impacts on project cost and effectiveness.

WSDOT's project design and delivery teams recently began incorporating 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.

The experience of Missouri (see sidebar) suggests the potential for significant costs savings with Practical Design.

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.

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 \$400M on projects included in its 2005-2009 Statewide Transportation Improvement Program (STIP). Savings were invested in additional transportation projects.

State-specific Regulations

SALES & USE TAX

Sales & use tax paid on construction accounted for approximately 5% of 2003-2012 preservation and improvement project costs (\$534M). Washington has a sales & use tax of 6.5%. Local option sales taxes can bring the effective tax rate up to 9.5% in some areas. The sales tax, along with property and business and occupation taxes, is the foundation of Washington's tax structure. The State relies on sales tax for 60% of its revenue, the highest in the nation.

An important component of the tax base is tax applied to construction labor and materials. This tax treatment extends to public and private construction activities including WSDOT projects. Revenues from the sales & use tax collected from construction contracts support the State General Fund and local government activities. 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-3 shows the different treatment and cost implications of the higher burden for state-owned highways that are no longer subject to the same exemption as highways owned by other jurisdictions.

Exhibit ES-3
Summary of WSDOT Sales Tax Application

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

Note: * State sales tax rate of 6.5% only. Contract assumptions: 10% consumed materials, 40% installed materials; 50% other costs.

LABOR COSTS SUBJECT TO PREVAILING WAGE

Due to data limitations it was not possible to specifically identify the labor portion of the \$10.5 billion in project costs that was specifically subject to the prevailing wage law. There was no way to cross-walk Labor & Industries affidavits with specific WSDOT contracts.

Based on discussions with contractors working with WSDOT, a "typical" contract may be composed of 30% labor subject to prevailing wage, 10% labor not subject to prevailing wage, 50% materials/equipment and 10% overhead and profit.

Using these metrics, labor subject to prevailing wage is estimated at \$2.1 billion (or 20%) of the \$10.5 B in project costs.

Without this exemption, sales tax is charged based on the full contract price as with private construction activity. In addition, for materials that are consumed during construction, there is a double tax with sales tax paid at the point of purchase and again when those costs are included in the total contract billing.

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 \$1 million of construction versus \$39,000 per \$1 million of construction. The actual budget impact of this higher tax burden is even greater than stated 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" (Everett Concrete Products, Inc. v. Department of Labor and Industries. Washington State Supreme Court, 1988). Prevailing wage laws require WSDOT's contractors to pay a minimum wage to each type of worker based on surveys 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.

State and federal prevailing wages are difficult to compare due to differences in job classifications and how prevailing wages are set. 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 attributed to the requirement to pay the higher of the state rate or federal rate on federal-aid projects.
 - There are no specific studies on the impact of prevailing wage vs. no prevailing wage for WSDOT projects.
 - Nationally, studies vary on the 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.
- **Aspects of the state program add administrative burden, such as the use of a paper based survey and determining the higher of the two wages (federal or state) on federal aid projects.**
- **As a result of a series of court decisions, the state prevailing wage applies to a broader range of activities than the federal law. There have been nine rule changes since 1993, five of which amended scope of work definitions for specific work activities.**

- In the last ten years, federal aid projects accounted for 82% of contracts awarded and would have paid the federal prevailing wage, even if there were no state prevailing wage.
- The prevailing wage law acts as a floor on rates and may increase costs in some circumstances, though market factors likely play a greater role.

ENVIRONMENTAL REVIEW, PERMITTING & MITIGATION

- **Environmental review** is a process 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 the State Environmental Policy Act (SEPA) and National Environmental Policy Act (NEPA) goals and policies.
- **Permitting** is a process that provides legal authority to proceed with a project subject to commitments to address any environmental impacts.
- **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. Current WSDOT practices reflect the implementation of recommendations from several streamlining efforts over more than a decade.

- **The vast majority of WSDOT projects are excluded from NEPA and SEPA review.** In 2011-2013, 94% of projects had a NEPA Categorical Exclusion and 84% 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. Agencies are allowed (and encouraged) to prepare and issue combined documents that meet the requirements of both. This results in one environmental submittal under NEPA and SEPA.
- **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). NEPA CEs have been updated many times in the past few years, whereas SEPA has not.

The environmental review process can increase public acceptance and lead to improvements/efficiencies in overall project design. However, it is worth noting that views are mixed. There are those that perceive that environmental regulations are overly burdensome, and those that believe SEPA is not stringent enough and that some impacts are not being mitigated under current law.

CONTRACT BID INFORMATION

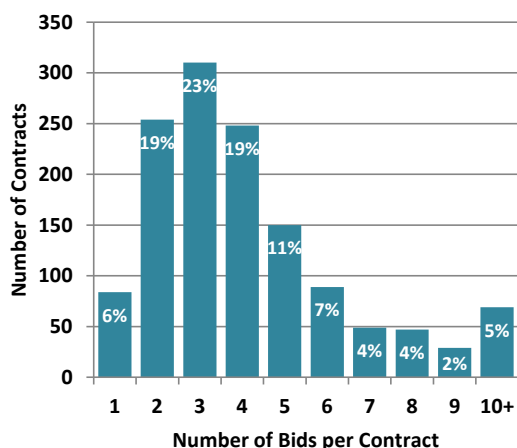
Competition for construction contracts ensures WSDOT has multiple qualified bids to choose from, and encourages contractors to submit competitive bids.

On average, WSDOT received 4.3 bids per contract over the past ten 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- 4 shows the percent of WSDOT contracts that received a certain number of bids. 76% of contracts received 3 or more bids.

EXHIBIT ES- 4
CONTRACTS BY NUMBER OF BIDS
(2003-2012)



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

Costs related to mitigation accounted for an average of 16% of total project costs for the sample projects, though on individual projects the impact ranged widely. More than half of mitigation costs were related to stormwater requirements. **Stormwater facilities, wetland mitigation and noise abatement comprised approximately 87% of mitigation costs.**

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.). Labor costs vary widely by state.

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 contract costs, which includes labor subject to prevailing wage (30% of contract costs) and labor not subject to prevailing wage (10% of contract costs). 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 projects.

Prevailing Wage Impacts on Labor Costs. The state prevailing wage law does two things that could impact the labor costs of WSDOT projects. First, the law places a floor under labor rates to be paid on WSDOT projects. The floor is the state rate for state-funded projects and the higher of the state or federal rate for federal-aid projects. Second, the wording of the state law has led the courts to conclude that the application of the state law is broader than the application of the federal prevailing wage law.

Based on the analysis of prevailing wage and review of existing studies, there is no consensus that prevailing wage generally adds to labor costs in the broader labor market. It is unclear to what extent prevailing wage laws drive overall wage levels.

Cost of Materials

Materials make up an average of about 50% of contract costs (\$3.5 billion over the study period, or 33% of project costs). While there is no database of specific material prices by state, some states maintain a Construction Cost Index (CCI) that tracks selected standard bid items over time. The CCI provides a point of comparison for construction cost growth; however, there are limitations:

- 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.
- **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.

Risk Assignment

Project delivery method selection can impact project efficiency, project design, and cost. Using a rigorous project delivery method selection process, WSDOT should decide the following 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 and the correct mix of core competencies
- Competitiveness of the bid process and construction management to meet schedule and budget requirements
- Beyond selecting the appropriate project delivery method, it is important that each available method has a corresponding management and implementation structure in place to ensure successful application

Impact of Contracting Methods. Washington and Utah provided data on the type of contracting method used for each project. Both states 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.)

- 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.
- Project delivery metrics do not vary meaningfully by contracting type.
 - In Washington, if the Hood Canal expenditures 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.

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 contract 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 its limited use and value and questions about data reliability.
- A 2007 FHWA report noted that costs of commodities used in highway construction primarily varied across states due to the difference in the cost of transporting commodities.

Exhibit ES-5
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%
All Contracts	(9%)	(12%)	8%	12%	(1%)	(2%)

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

DEFINITION: GENERAL CONTRACTOR/ CONSTRUCTION MANAGER

A general contractor is selected during the design phase to increase collaboration between owner and contractor and provide more input into constructability, cost and schedule.

GC/CM involves two contracts with a contractor: one for preconstruction services with a provision for a guaranteed maximum price (GMP) and another for construction. The owner is not liable for costs in excess of the GMP unless the scope changes. However, the owner is responsible for design, which is typically done with consultant services.

- 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.
- Utah data covers the period when GC/CM was new to the Department. From 2005-2008, contract payments came in nearly 20% over award amounts. Over 2009-2012, payments came in 8% higher than awards.

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

- On big projects, where errors can be costly, Design-Build may 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 improve constructability.
- On complex projects, GC/CM and Design-Build can result in efficiencies since construction teams can conduct early constructability reviews.
- 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? 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. For each alternative, we attempted to calculate the magnitude of the potential cost savings. Our starting point was to estimate the dollars involved (to the extent possible) with the available data and then assess the likely influence of the potential action to reduce that dollar amount.

For example, with sales tax, reinstating the public exemption would have reduced the tax paid by WSDOT over the 10 year period by \$227 million. We deem this potential saving to be high because the dollars involved are high and the action would have a significant influence on the potential savings.

With prevailing wage, while the dollars involved are significant (estimated \$2.1 billion) the potential actions outlined would not produce significant savings overall. A 1% reduction would equal about \$21 million. Based on a 1988 JLARC Highway Audit that 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, 1% seems optimistic.

Potential Action		Administrative or Statutory	Potential Impact
PROJECT DESIGN			
1	Adopt Practical Design methods to guide project scoping and design decisions. <ul style="list-style-type: none">Incorporate Practical Design into project prioritization and selection process.On projects greater than \$10 million, include a Practical Design review to determine the cost effectiveness of the preliminary design and identify alternatives considered.	Administrative	High
SALES & USE TAX			
2	Reinstate Public Road Construction exemption on state-owned highways. <ul style="list-style-type: none">Exempt WSDOT projects on state-owned highways from tax on total contract amount.Contractor would pay tax on all materials at point of purchase.Lowers tax paid; no risk with respect to federal projects.Reduces general fund and local government sales tax revenue.	Statutory	High
3	Direct receipts from state sales and use tax collected from contractors on state-owned highways to transportation fund. <ul style="list-style-type: none">Legislature could direct receipts to the Motor Vehicle or Multi-Model Account.Tax paid is the same, but is returned to transportation.Does not impact local government sales tax revenue.Reduces state general fund revenue.	Statutory	High
4	Exempt WSDOT projects on state owned roads from the requirement for contractors to pay sales and use tax at the point of purchase on materials that are consumed during construction. <ul style="list-style-type: none">Legislature could create an exemption for WSDOT projects on state owned highways that would allow contractors to treat these purchases as re-sales that are not subject to sales and use tax at the point of purchase.The effect would be to eliminate the double taxation of these purchases, which are currently taxed at the point of purchase and taxed again when included in the total contract billing.	Statutory	Medium

Potential Action	Administrative or Statutory	Potential Impact
PREVAILING WAGE		
5 Exempt WSDOT projects from the state prevailing wage act. <ul style="list-style-type: none"> Retain the federal prevailing wage on federal-aid projects. 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 them on fewer projects. 	Statutory	Low
6 Exempt WSDOT federal-aid projects from the state prevailing wage act. <ul style="list-style-type: none"> Use federal wage rates only on federal-aid projects. Potential wage savings; reduction in administrative burden related to determining the higher of the two wages; eliminate costs related to off-site construction where state prevailing wage applies but not federal prevailing wage - could lead WSDOT to program federal funds differently and use them on fewer projects. 	Statutory	Low
7 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"> Potential wage savings due to narrowing the range of activities covered by prevailing wage – would no longer apply to off-site activities. 	Statutory	Low
8 Establish a threshold below which WSDOT projects are not subject to the prevailing wage act. <ul style="list-style-type: none"> Potential wage savings; reduction in administrative burden; could produce more bids in some areas of the state if prevailing wage is a barrier. 	Statutory	Low
9 Modify how Labor & Industries sets the state rate. <ul style="list-style-type: none"> Options: (a) Use federal rate as state rate, (b) Use collective bargaining agreements as basis for state rate, or (c) Require annual survey. Savings are in more efficient determination of prevailing wage; eliminate large jumps for those wages where the prevailing wage is not the same as the rate established by collective bargaining agreements. In these cases, the wage rate is not modified until a new survey is conducted. This means there can be very large jumps in the prevailing wage rate, which is disruptive. 	Statutory and Administrative (L&I)	Low

Potential Action	Administrative or Statutory	Potential Impact
ENVIRONMENTAL REVIEW & PERMITTING		
10 Allow smaller projects that qualify for a NEPA categorical exclusion (CE) but not a SEPA categorical exemption to submit NEPA documentation only (and not the SEPA checklist). <ul style="list-style-type: none"> This would require a change to the SEPA rules. Currently, under SEPA WSDOT can only use NEPA Environmental Impact Statement (EIS) and environmental assessments. This would allow WSDOT to supply their documentation in support of a NEPA CE to satisfy SEPA checklist requirements. This would affect smaller projects. 	Administrative	Low
11 Expand SEPA exemptions to match the NEPA categorical exclusions. <ul style="list-style-type: none"> NEPA categorical exclusions have been updated several times over recent years, whereas SEPA categorical exemptions have not. This would allow small, routine transportation projects to be exempt from SEPA as they are currently under NEPA. 	Statutory	Low
PROJECT DELIVERY METHODS		
12 Grant broad authority to WSDOT to determine project delivery methods. <ul style="list-style-type: none"> Potential wage savings due to narrowing the range of activities covered by prevailing wage – would no longer apply to off-site activities. 	Statutory	See note
13 For mega-projects, the highest-level executives within WSDOT should consider all possible scenarios before selecting the contracting approach, and then consider how authority should be aligned for the specific projects. (Mega-Project Assessment)	Administrative	See note
14 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. (Mega-Project Assessment)	Administrative	See note
15 Modify existing WSDOT authority for Design-Build. <ul style="list-style-type: none"> Complete analysis of five pilot projects and potentially lower the threshold from \$10M million to \$2M. Allow for projects of any size that meet the statutory criteria. 	Statutory	See note
16 Specifically authorize GC/CM project delivery for WSDOT projects and authorize a separate review process from the Capital Projects Advisory Review Board. <ul style="list-style-type: none"> Clarify process and availability of GC/CM for highway projects. 	Statutory	See note

Potential Action	Administrative or Statutory	Potential Impact
PROJECT DELIVERY METHODS		
17 Apply the same rigorous risk assessment process used in the original project delivery method selection to decisions about possible changes or modifications in the selection of a contracting method. <ul style="list-style-type: none"> On complex projects with multiple components and contracts, any change in contracting method or contract modification 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. 	Administrative	See note
18 Explore implementing a pavement warranty program and consider other opportunities to use contractor warranties (performance and/or materials and workmanship) in lieu of inspections.	Administrative	See note
19 Give Design-Build contractors additional design flexibility to support innovation and cost containment by not restricting them to the Design Manual.		
OTHER POTENTIAL ACTIONS		
20 Improve data collection to better inform management and policy choices. <ul style="list-style-type: none"> Finding: There were many questions posed in this study that were difficult or not possible to reasonably address due to a lack of data or incomplete information. Some of these questions inform important policy and management issues. This was particularly relevant to mitigation costs, change order documentation, right of way acquisition, environmental review and permitting and prevailing wage. 	Statutory & Administrative	
21 Focus federal funds in fewer projects to limit the impact of federal aid conditions on WSDOT project costs. <ul style="list-style-type: none"> Finding: WSDOT spreads its federal funds throughout its program which added federal aid project conditions to 82% of its projects completed in 2003-2012. 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. 	Legislature & WSDOT	
22 WSDOT should prepare a report to the legislature on fish passage barrier removals that outlines what the plan is, the methodology and amount of the cost estimates, and how performance on the fish passage barrier removals that were part of the court order will be tracked.	Legislature & WSDOT	

Contract Magnitude Notes

- Magnitude of Impact (12-17): 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 (18): Potential savings to contractors with respect to time and to WSDOT with respect to staff.
- Magnitude of Impact (19): Could potentially lead to more cost effective solutions based on current conditions in materials prices or state of the practice.

Significant Data Limitations Identified during the Study

As we conducted the analysis necessary to understand the impacts of the identified cost drivers, limitations in the data affected which drivers could be thoroughly investigated. In some instances, data that would answer specific questions was not tracked by WSDOT or other state agencies. In other cases, data tracking was inconsistent and therefore did not provide a meaningful sample for our analysis. The following table summarizes the topic areas where we were unable to fully address key questions quantitatively.

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

Mitigation	Project costs do not identify the mitigation-related components.
Environmental Review and Permitting	A significant share of WSDOT “predesign” work is categorized as “consultant agreements.” There is no way to break these costs into the categories that the Legislature would like to better understand such as environmental review, permitting, and preliminary design.
Prevailing Wage	<p>Neither WSDOT nor L&I track whether the state or federal rate was in effect for a particular position on a particular job.</p> <p>The L&I affidavit database likely contains a mix of actual wages paid and the prevailing wage.</p> <p>The “contract number” field on L&I’s affidavit form is inconsistently filled out, making it challenging and time consuming to link prevailing wage affidavits back to specific WSDOT projects, if it is possible at all.</p> <p>Data validation efforts surfaced a number of obvious data entry errors in hourly wages or hours worked by contractors, raising significant data quality concerns.</p>
Change Orders	The “reason” field in the change order database is inconsistently used. Many large change orders have no reason listed. The existing reason codes are not specific enough to provide usable insight into a project’s history.
Right-of-Way	WSDOT’s right of way database is inconsistently 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.

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INTRODUCTION

Project Background

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, have 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 less skeptical about WSDOT's project delivery, there is a perception that a number of factors contribute to excessive project costs, ranging from environmental review, to project management practices, to prevailing wage laws. For example, concerns raised by legislators during public work sessions included issues such as:

- Environmental costs, such as long permitting processes and high mitigation expenses;
- Adherence to state and federal regulations and standards, such as prevailing wage costs and administration requirements or tax laws and financing practices that drive up costs; and
- Specific project scoping and estimating challenges such as the size of contingency funds for each project; instances where state standards are higher than federal standards; and adding "non-project specific elements" such as the inclusion of bike and pedestrian elements in highway projects or allocations of departmental/programmatic costs to individual projects.

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
- Vince Oliveri, Professional and Technical Employees, Local 17
- Duke Schaub, Associated General Contractors

STAFF WORK GROUP MEMBERS

- Beth Redfield, JTC
- Mary Fleckenstein, JTC
- Alyssa Ball, House Transportation Committee
- Amy Skei, House Transportation Committee
- Clint McCarthy, Senate Transportation Committee
- Lyset Cadena, Senate Democratic Caucus
- Debbie Driver, House Democratic Caucus
- Jackson Maynard, Senate Majority Coalition
- Dana Quam, House Republican Caucus
- Jim Albert, OFM
- Jay Alexander, WSDOT
- Pasco Bakotich, WSDOT
- Keith Metcalf, WSDOT
- Megan White, WSDOT

Study Objectives

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

Study Approach

OVERSIGHT AND DIRECTION

The study was guided by a nine member Advisory Panel and technical support was provided by a Staff Work Group. The project began with an investigation of a wide range of potential cost drivers and practices. Given the relatively short project timeline, we conducted an initial screening analysis to focus our efforts on the cost drivers with the greatest potential for savings and on additional areas of specific interest to the Legislature and the Advisory Panel members.

ANALYTIC APPROACH

Both the initial screening of cost drivers and the in-depth analysis were conducted using data received from WSDOT. Our primary source of information on project costs was an expenditure database that contained all improvement and preservation projects completed between 2003 and 2012.

This database:

- Included 2,292 completed projects. It did not include projects that are not yet complete, such as the 520 bridge.
- Contained more than 100,000 individual rows of data. Each row represents a unique expenditure category on a unique project.
- Each project is broken into cost components called "work operation codes" that identify the different phases and components of each project. There are more than 250 codes in the database.

All costs, unless otherwise noted, were adjusted to 2012 dollars.

SIGNIFICANT DATA LIMITATIONS IDENTIFIED DURING THE STUDY

As we conducted the analysis necessary to understand the impacts of the identified cost drivers, limitations in the data affected which drivers could be thoroughly investigated. In some instances, data that would answer specific questions was not tracked by WSDOT or other agencies. In other cases, data tracking was inconsistent and therefore did not provide a meaningful sample for our analysis. The following table summarizes the topic areas where we were unable to fully address key questions quantitatively.

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

Mitigation	Project costs do not identify the mitigation-related components.
Environmental Review and Permitting	A significant share of WSDOT "predesign" work is categorized as "consultant agreements." There is no way to break these costs into the categories that the Legislature would like to better understand such as environmental review, permitting, and preliminary design.
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Change Orders	The "reason" field in the change order database is inconsistently used. Many large change orders have no reason listed. The existing reason codes are not specific enough to provide usable insight into a project's history.
Right of Way	WSDOT's right of way database is inconsistently 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.

DATA LIMITATIONS

The analysis conducted on each of these drivers is described in the **Cost Drivers** chapter, beginning on page 35. To the extent that these issues remain important areas of interest to the Legislature, effort should be made to improve the data availability and quality.

.....

PROJECT COST ANALYSIS

The purpose of the overall project cost analysis is to understand how highway construction funds have been spent over the last decade (2003-2012). Specifically, what are the biggest expenditure areas and how have expenditures changed over time? A broad understanding of spending patterns allows us to drill down further into the areas that represent the greatest costs to assess how the different drivers impact overall costs.

The cost analysis consists of three separate analyses:

1. **Historical Expenditures.** This section looks broadly at how and where WSDOT has spent its money over the past decade.
2. **Contracting and Project Delivery.** This section looks at how well WSDOT manages its contracted services to deliver projects on budget.
3. **Comparison to Other States.** This section seeks to address how costs in WSDOT compare to costs in other states.

Historical Expenditures

Historical project expenditures were analyzed to understand WSDOT spending on highway and bridge construction. This analysis focuses on the Preservation and Improvement Programs at WSDOT, which encompass the majority of highway construction projects.

- The **Preservation Program** includes projects focused on paving and safety restoration, structures preservation, seismic retrofits, and preservation of drainage/electrical systems.
- The **Improvement Program** includes projects that improve mobility, reduce or prevent collisions, support economic development and mobility, and mitigate environmental impacts.

KEY FINDINGS: HISTORICAL EXPENDITURES

Construction costs, accounted for approximately 84% of project costs:

- 66% of project costs come from contractor payments.
- 13% of project costs come from WSDOT construction costs, which include construction and contract management, procurement, and a small portion of state force work.
- 5% of project costs come from sales tax on construction.

Right of way comprised 6% of project costs. About three-quarters of this amount was for parcel acquisition.

Planning, predesign, design, permitting, and environmental review accounted for 10% of project costs.

Mitigation costs are difficult to split out, so were analyzed using a set of case studies.

- In the sample, 16% of project costs went to mitigation, with a range among projects of between 2% and 45%.

DATA STRUCTURE

Within each Program, expenditures are categorized into project phases. The three overarching phases that WSDOT defines are:

- **Preliminary Engineering.** Includes engineering costs incurred prior to the date of construction, such as locating and designing, making surveys and maps, preparing plans, specifications and estimates, traffic counts, and other related general engineering prior to letting a contract for construction. Preliminary engineering encompasses predesign, engineering and design, environmental review, and permitting.
- **Right of Way.** Includes appraisal fees, purchase of land or interest therein, and relocation assistance for persons displaced by the purchases.
- **Construction.** Includes all costs for the construction phase, such as payments to prime contractors, state force labor costs, supervision of construction activities, inspection and testing, and general project management during construction.

The goals of this study necessitated more detail on phases. Toward this end, WSDOT provided ten years of expenditure data for projects completed from 2003 to 2012 that included three attributes that could be used to categorize expenditures:

- **Work Operation Codes.** WSDOT tracks expenditures using more than 250 unique work operation codes. These codes allow for grouping into categories such as project management, payments to construction contractors, WSDOT staff construction activity, environmental documentation, and right of way acquisition and management.
- **Project Type.** The database lists the type of project constructed, such as Urban Mobility, HOV Lanes, Paving/Safety Restoration, or Noise Reduction. There are more than 25 types of projects listed in the database.
- **Operationally Complete Date.** Each project lists the date the project was completed, which allows tracking of expenditure trends over time.

APPROACH TO DATA ANALYSIS

To align the data more closely with the goals of this project, BERK worked with WSDOT staff to assign each of the 250 work operation codes to the following six project phases that align with the cost drivers. Four of the drivers - predesign, engineering and design, environmental review, and permitting - are part of the preliminary engineering phase:

- **Predesign.** All expenditures that occur on a project prior to beginning engineering and design.
- **Engineering & Design.** All expenditures that occur on a project to create designs and put the project out for advertisement.

- **Environmental Review.** All expenditures related to scoping and conducting environmental analyses.
- **Permitting.** All expenditures related to acquiring environmental, construction, and local agency permits.
- **Right of Way.** All expenditures related to purchasing right of way, including appraisal, relocation, and contract management.
- **Construction.** All expenditures related to completing project construction, such as contractor payments, contract management, inspection and testing, etc.

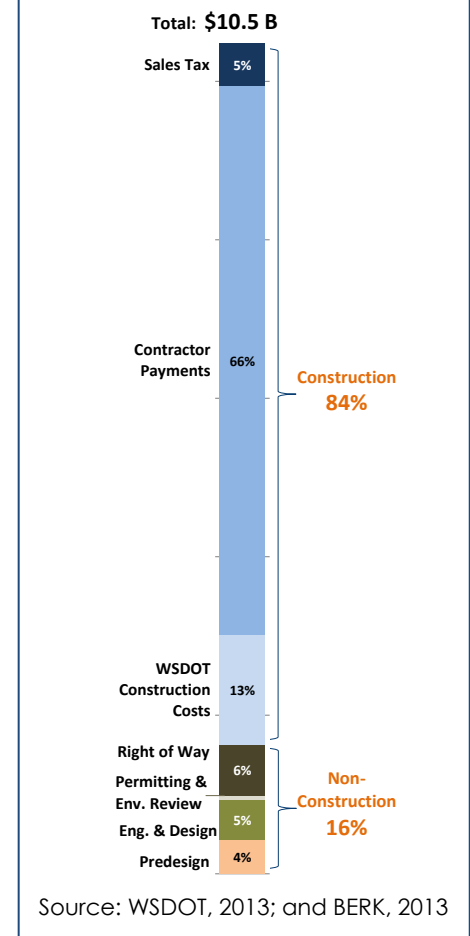
Within each of these phases, additional levels of detail were identified where the data allowed.

PROJECT COSTS BY MAJOR PROJECT PHASE

The first step in the cost analysis was to look at WSDOT spending by major project phase. This initial window into project costs shows where the majority of funds are spent, and therefore where potential opportunities for cost savings lie. Exhibit 1 summarizes the project costs by major project phase.

- Construction costs, which include WSDOT construction activities and administration, contractor payments, and sales tax, accounted for 84% of project costs over the ten-year period.
 - Construction as a proportion of project costs decreased from approximately 91% for projects completed in 2003 to 77% for projects completed in 2012. This trend was largely due to the larger size of the more recent projects, with greater right of way and predesign costs.
 - The largest portion of construction costs was for contractor payments, which comprised about 78% of construction costs (or 66% of project costs).
- Non-construction costs accounted for approximately 16% of project costs.
 - Approximately 6% of project costs were for acquisition of right of way. Right of way, as a proportion of all non-construction expenditures, has increased over time.
 - Planning, predesign, design, permitting, and environmental review account for approximately 9% of project costs.
 - Within non-construction expenditures, proportions of costs vary widely across size categories.
 - Projects less than \$5 million had a higher proportion of non-construction expenditures on engineering and design.
 - The larger the project, the higher the proportion of expenditures that went toward Right of Way.

EXHIBIT 1
PROJECT COSTS BY MAJOR
PROJECT PHASE, 2003-2012
(2012 \$)



EARLY STAGES OF PROJECT DEVELOPMENT

Costs expended during the early stages of project development amounted to about \$900M of the \$10.5B in project costs included in this analysis. It is important to note that decisions about scope and design made during these phases influence the scale of future construction costs.

Mitigation costs, which can span preliminary engineering, right of way, and construction phases, cannot be easily split out using WSDOT's work operation code system. Efforts to quantify the amount spent on mitigation are described on page 54.

Project Costs by Project Phase: Preliminary Engineering-Predesign (\$423 million)

There are 46 WSDOT expenditure categories rolled up into the Predesign phase definition used in this study. Exhibit 2 summarizes the ten largest expenditure categories within the Predesign phase

Exhibit 2
Components of Predesign Expenditures, 2003-2012 (2012 \$)

WSDOT Expenditure Code	2003-2012 Expenditures	
Agreements for Prelim. Engineering	\$ 250.0 M	59%
Traffic Data Collection & Analysis	\$ 30.0 M	7%
Traffic Design And Plans	\$ 19.3 M	5%
Survey, Location	\$ 18.1 M	4%
Hydraulics	\$ 16.1 M	4%
Base Map/Right Of Way Plans	\$ 13.2 M	3%
Project Data	\$ 12.8 M	3%
Respond to Design-build RFIs	\$ 10.5 M	2%
Proj Mgmt Plan Dev & Maint	\$ 10.3 M	2%
Public & Agency Involvement	\$ 7.2 M	2%
<i>All other categories in this phase</i>	<i>\$ 35.3 M</i>	<i>8%</i>
Predesign Total	\$ 422.8 M	

Source: WSDOT, 2013; and BERK, 2013.

Agreements for preliminary engineering (consulting contracts) comprise the majority of Predesign expenditures. These agreements cover a range of topics, but WSDOT does not track the purpose of these agreements to allow any further analysis of the type of expenditures.

Project Costs by Project Phase: Preliminary Engineering-Engineering & Design (\$513 million)

There are 62 WSDOT expenditure categories rolled up into the Engineering & Design phase. Exhibit 3 summarizes the ten largest expenditure categories within the engineering and design phase.

The largest single expenditure category within this phase is general project management, which is primarily WSDOT staff labor hours dedicated to managing the project development process. The second largest category is agreements (consulting contracts) related to project engineering and design.

Exhibit 3
Components of Engineering & Design Expenditures, 2003-2012 (2012 \$)

WSDOT Expenditure Code	2003-2012 Expenditures	
General Project Management	\$ 185.5 M	36%
Agreements	\$ 55.6 M	11%
Contract Plan Preparation	\$ 35.8 M	7%
Hq Geotech Work	\$ 27.7 M	5%
Roadway Design	\$ 26.6 M	5%
Ps&E Review And Ad Ready Prep	\$ 21.4 M	4%
Direct Project Support for PE	\$ 21.4 M	4%
Structure Design And Plans	\$ 18.4 M	4%
Training	\$ 12.2 M	2%
Design Documentation	\$ 12.1 M	2%
<i>All other categories in this phase</i>	<i>\$ 96.3 M</i>	<i>19%</i>
Engineering & Design Total	\$ 513.0 M	

Source: WSDOT, 2013; and BERK, 2013.

Project Costs by Project Phase: Preliminary Engineering-Permitting (\$13.5 million)

There are six WSDOT expenditure categories rolled up into the Permitting phase, shown in Exhibit 4 below. Overall, permitting cost \$13.5 million over the ten-year period.

Exhibit 4
Components of Permitting Expenditures, 2003-2012 (2012 \$)

WSDOT Expenditure Code	2003-2012 Expenditures	
Environmental Permits	\$ 11.6 M	85%
Consultant/Local Agcy Ps&E Rev	\$ 1.1 M	8%
Other Agency Permits/Access Mgt	\$ 0.4 M	3%
Consultant/Lag Ps&E Review	\$ 0.3 M	2%
Construction Permits	\$ 0.1 M	1%
Consult/Local Struct Ps&E Revw	\$ 0.1 M	0%
Permitting Total	\$ 13.5 M	

Note: PS&E stands for Plans, Specifications and Estimates

Source: WSDOT, 2013; and BERK, 2013.

Environmental permits make up the majority (85%) of permitting expenditures, although they represent a small portion of total project costs. Since the cost of permits is relatively low, the majority of these expenditures are related to the staff time necessary to procure permits and prepare the necessary documents.

PERMITTING & ENVIRONMENTAL REVIEW

The Permitting & Environmental Review phases account for a relatively small percent of project costs, though it is likely that some environmental review costs are included in the \$250 million of consulting contract expenditures shown earlier as part of Predesign.

To the extent that mitigation requirements are identified as part of the environmental review process these costs would be included in construction costs.

Project Costs by Major Project Phase: Preliminary Engineering-Environmental Review (\$40.4 million)

There are 26 WSDOT expenditure categories rolled up into the Environmental Review phase. Exhibit 5 summarizes the ten largest expenditure categories within the Environmental Review phase.

Exhibit 5
Components of Environmental Review Expenditures, 2003-2012 (2012 \$)

WSDOT Expenditure Code	2003-2012 Expenditures	
NEPA/SEPA Compliance	\$ 19.0 M	47%
ESA Compliance	\$ 7.5 M	19%
Environmental Discipline Report	\$ 6.4 M	16%
Environmental Review Summary	\$ 2.5 M	6%
Compliance with Salmon ESA Req.	\$ 1.2 M	3%
Discipline Studies-Wetlands	\$ 1.0 M	3%
Environment Discipline Studies	\$ 0.9 M	2%
Early Environmental Scoping	\$ 0.6 M	1%
Additional Regulatory Compliance	\$ 0.4 M	1%
Discipline Studies-Historic	\$ 0.2 M	1%
<i>All other categories in this phase</i>	<i>\$ 0.6 M</i>	<i>2%</i>
Environmental Review Total	\$ 40.4 M	

Source: WSDOT, 2013; and BERK, 2013.

National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA) compliance activities, which include WSDOT staff time to address project compliance with environmental laws and regulations, are the largest single expenditure category within environmental review, totaling about \$19 million over ten years. **The costs specifically identified as related to NEPA and SEPA review are likely to understate the total environmental review costs.** This is due to the fact that some portion of environmental review costs are buried in general consultant agreement expenditures and cannot be pulled out separately. Since these agreements can include services related to all aspects of Preliminary Engineering, they were included as a lump sum in the Predesign phase. This was one of the many data limitations that emerged in the study.

Project Costs by Project Phase: Right of Way (\$638 million)

There are 22 WSDOT expenditure categories rolled up into the Right of Way phase. Exhibit 6 summarizes the ten largest expenditure categories within the Right of Way phase.

Exhibit 6
Components of Right of Way Expenditures, 2003-2012 (2012 \$)

WSDOT Expenditure Code	2003-2012 Expenditures	
Acquisition - Parcel Payment	\$ 470.9 M	74%
Acquisition - Labor Costs	\$ 42.8 M	7%
Relocation - Other Costs	\$ 30.7 M	5%
Agreements	\$ 27.1 M	4%
General Project Management	\$ 23.4 M	4%
Appraisal	\$ 12.2 M	2%
Inventory	\$ 5.9 M	1%
Condemnation/Preparation-Trial	\$ 5.2 M	1%
Relocation - Labor Costs	\$ 4.8 M	1%
Appraisal Review	\$ 3.6 M	1%
<i>All other categories in this phase</i>	<i>\$ 11.4 M</i>	<i>2%</i>
Right of Way Total	\$ 638.1 M	

Source: WSDOT, 2013; and BERK, 2013.

Payments for parcel acquisition make up the majority of right of way costs at \$471 million over ten years. The remaining right of way costs are generally associated with acquisition, disposition and management of property.

Project Costs by Project Phase: Construction (\$8.8 billion)

As noted above, construction costs accounted for approximately 84% of project costs.

Exhibit 7 shows the different components of the costs broadly categorized as the construction phase.

Exhibit 7
Components of Construction Expenditures, 2003-2012 (2012 \$)

Construction Components	2003-2012 Cost	
Contractor Payments	6,926,815,000	78%
Sales Tax	533,650,000	6%
Project Management	501,633,000	6%
Other Construction Costs	485,397,000	5%
Inspection & Testing	307,998,000	3%
WSDOT State Force Work	90,653,000	1%
TOTAL	8,846,146,000	

Source: WSDOT, 2013; and BERK, 2013.

CONSTRUCTION LABOR

Labor costs are discussed in greater detail in the cost driver section addressing the state prevailing wage law. The 40% figure cited here is based on contractor interviews and represents a "typical" project. This includes all construction labor, not only the portion of labor that would be subject to state prevailing wage laws.

- The majority of construction expenditures went toward contractor payments (78% of construction costs, or 66% of total costs) Based on discussions with contractors, contractor payments include the following major elements:
 - Construction labor comprises about 40% of contract payments, or about 26% of project costs.
 - Supplies, both consumed and installed, comprise about 50% of contract payments, or about 33% of project costs.
 - Contractor overhead and profit make up the remaining 10% of most contracts (about 7% of project costs).
- WSDOT costs, which are primarily associated with construction and contract management, bid solicitation and award, inspection, and a small amount of state force work account for 16% of construction costs (about 13% of project costs).
 - Construction work by WSDOT's state force totaled 1% of all construction costs during the sample period. State force work means that WSDOT's maintenance or traffic operations staff are doing construction work.
 - By law, WSDOT is limited to \$60,000 in state force labor per "unit of work," which effectively means per project.
- **Sales & Use Tax** is also a major component of project expenditures, accounting for approximately \$534 million over ten years (6% of construction costs, or about 5% of total costs). The vast majority of sales & use tax expenditures occurs in the construction phase and is generated from sales tax paid on contracts. Laws and application of sales tax are explored further in the Cost Drivers chapter (page 41).

MITIGATION

Defining mitigation is a subjective exercise that generates disagreement about what should or should not be considered mitigation. Depending on how it is defined, mitigation can include many aspects of a project:

- Mitigation can take the form of **design changes** during the environmental review or permitting process to avoid environmental impacts. Sometimes these design changes add to overall project costs. These mitigation costs are difficult to track in a database.
- Some projects have **impacts that need to be mitigated**, which become project requirements. Since they are done concurrently with other project design and construction activities, it is difficult to separate these costs from general project costs.

- WSDOT also does some projects where the **whole project can be considered mitigation-like**. In these cases the project is meeting an environmental need that has arisen from the transportation system. An example is a stand-alone fish passage barrier removal project.

Mitigation-like costs are found in two places within WSDOT project expenditure data:

- Project Types.** Some projects are categorized as primarily focused on mitigation-like expenditures. These project types include Environmental Retrofits as well as some Mobility and Economic projects that may also be considered mitigation in some circumstances, such as bicycle connections and scenic highway improvements. These costs are simple to identify, as the entire project can be categorized as a mitigation expenditure.
- Project Components.** The majority of mitigation-related expenditures are included within overall project costs. For example, costs related to stormwater management may be imbedded in the project design and become just another scope element in the bid and construction process.

On projects where mitigation costs are contained within the project, WSDOT does not track costs in a way that allows identification of mitigation-related costs. To better understand the role of mitigation in project costs, WSDOT conducted four mitigation case studies in 2003, 2006, 2009, and 2013.

Each study analyzed between 7 and 14 projects selected to represent a broad mix of project types and sizes. It is important to note that not all WSDOT projects include mitigation elements. Because mitigation costs are imbedded in overall project costs, it is impossible to easily identify which of the projects completed over the ten-year period did or did not have mitigation costs.

WSDOT worked with the project managers of each of the case study projects to identify all mitigation-related expenditures, including design alterations. Given the timeline of this study, this labor-intensive process was not feasible to replicate. Exhibit 8 summarizes the findings of the four reports WSDOT has completed. Overall, about 16% of costs on these projects were related to mitigation.

TYPES OF MITIGATION

WSDOT uses the following definitions for mitigation in its case studies.

Temporary. Temporary embankments, water quality monitoring, stream by-passes, dust prevention, erosion control, etc.

Stormwater. Conveyance to treatment facility, pipes, inlets, manholes, flow control structures, fencing, property acquisition, etc.

Wetland. Retaining walls, altered alignment, bridges, property acquisition, wetland construction, fencing.

Stream. Long bridge spans, retaining walls, riparian area enhancements, etc.

Noise. Property acquisition, concrete foundations and walls, other barriers, clearing and grubbing, wall aesthetic treatments.

Context Sensitive Solutions. Community gateways, concrete stamping and coloring, unique railing or fencing, special landscaping, shared-use paths.

Exhibit 8
Summary of WSDOT Mitigation Case Study Reports, 2003-2013 (YOE \$)

Study Period	Projects Analyzed	Total Project Cost	Total Mitigation Cost	Average Mitigation Percent	Range of Mitigation Percents	
					Low	High
2003	14	426,868,000	78,304,000	18%	2%	34%
2006	7	641,277,610	111,057,000	17%	2%	24%
2009	14	670,290,000	105,214,400	16%	5%	35%
2013	11	241,940,000	31,331,807	13%	2%	45%
TOTAL	46	1,980,375,610	325,907,207	16%	2%	45%

Source: WSDOT, 2013; and BERK, 2013.

Over the four studies, 46 projects totaling almost \$2 billion in project costs were evaluated. Within the selected sample, 16% of project expenditures went to mitigation elements, with a significant range among individual projects of between 2% and 45%.

- The majority of mitigation expenditures in these case studies went toward stormwater facilities (51%).
- Wetlands restoration was the second largest mitigation expense, at 21% of studied expenditures.
- Other mitigation expenditures included noise walls (15%), stream protection (10%), context sensitive solutions (2%), temporary mitigation (0.7%), and dust control (0.3%).

Project Delivery & Contracting

By far the greatest share of WSDOT construction costs takes the form of contractor payments (78% of construction costs, or 66% of project costs). Given this fact, **the effectiveness of WSDOT's approach to contracting may be the most significant area in which to explore potential cost efficiencies**. Key questions in our analysis of historical data around project delivery and contracting were:

- Where has WSDOT spent the most on contracting?
- Where has WSDOT spent more than expected on contracting?
- Do contracting methods impact WSDOT's project delivery?
- Is WSDOT's contracting experience different from that of other states?

This section describes and quantifies the estimate, bidding, award, and payment processes. The analysis used prime construction contracts. There are fewer contracts than projects because WSDOT may complete multiple projects under a single contract.

WSDOT's project database contains 2,293 projects completed through use of 1,525 prime contracts. WSDOT provided a separate contract database that tracks the lifecycle of each contract. The contracts database matches a subset of the projects database where projects completed under the contract were finished between 2003 and 2012. Therefore, contracts for projects completed prior to 2003 or after 2012 were excluded leaving 1,329 contracts encompassing \$6.2 billion of contract costs (in Year of Expenditure dollars). To facilitate comparison between estimates, awards, and payments, dollars in the following analysis are not adjusted for inflation

COMPETITIVE ENVIRONMENT

For the majority of projects, WSDOT hires a contractor through a bidding process to deliver the completed project. Competition for construction contracts ensures WSDOT has multiple qualified bids to choose from, and encourages contractors to submit competitive bids. Exhibit 9 shows the number of bids received by contract size over the past ten years.

On average, WSDOT received 4.3 bids per contract over the past ten years. Contracts between \$5M and \$100M received the highest number of bids, while contracts over \$100M received an average of 2.8 bids, which likely reflects the fact that there are fewer contractors with the financial and technical capacity to take on highly complex large-scale projects.

KEY FINDINGS: PROJECT DELIVERY & CONTRACTING

- WSDOT receives an average of 4.3 bids per contract, reflecting a healthy level of competition across project sizes and regions.
- WSDOT paid approximately 8% more than the original award amount over the past 10 years. Contracts over \$25 million accounted for 76% of this difference.
- Design-Build contract payments came in closer to awards (5% over) than Design-Bid-Build (10% over). However, the Design-Bid-Build difference was largely driven by one project.
- WSDOT's project delivery metrics do not differ significantly from data provided by Utah and Oregon DOTs.
- In all three states, final expenditures came in between 7% and 12% higher than awards. Oregon was the lowest, at 7% over, Washington was at 8% and Utah was 12% over.
- Utah has been using GC/CM contracting since 2004.
- GC/CM results show expenditures greater than estimates most likely due to the nature of the procurement process and complexity of projects selected for this approach.
- WSDOT and ODOT do not use GC/CM.

CONTRACTS WITH 1-2 BIDS

Generally, WSDOT has benefitted from a healthy competitive bidding environment, with 75% of all awards receiving at least 3 bids.

However, 25% of awarded contracts received just one or two bids. Reviewing the bid/award/payment history on these contracts highlights the value of competition.

The contracts with only one bid generally resulted in awards that were higher than the engineer's estimate and final payments which exceeded awards to a greater degree than other contracts.

CONTRACT MILESTONE DEFINITIONS

Final Engineer's Estimate. Typically the final estimate prior to bid opening.

Award Amount. The initial amount for which WSDOT signs an agreement with the contractor to complete a project.

Final Payments or Final Expenditures. The total amount that WSDOT paid toward a contract after work is complete.

Exhibit 9
Number of Bids by Contract Size, 2003-2012

Contract Size	Number of Awards	Number of Bids	Average
Less than \$1 M	619	2,589	4.2
\$1M to \$5 M	480	1,981	4.1
\$5M to \$10M	84	385	4.6
\$10M to \$25M	60	362	6.0
\$25M to \$100M	36	186	5.2
\$100M +	6	17	2.8
TOTAL	1,285	5,520	4.3

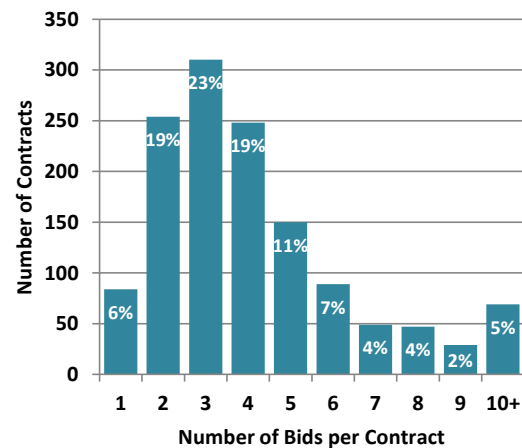
Source: WSDOT, 2013; and BERK, 2013.

Note: The data only included bid information for 1,285 out of the 1,329 prime contracts included in the contract analysis.

On a regional level, 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 healthy bid levels between 3.7 and 4.2 bids per contract.

Exhibit 10 shows the percent of WSDOT contracts that received a certain number of bids. Three quarters (75%) of contracts received three or more bids.

Exhibit 10
Contracts by Number of Bids, 2003-2012



Source: WSDOT, 2013; and BERK, 2013.

PROJECT DELIVERY

As noted above, WSDOT uses a bidding process to hire contractors:

- WSDOT engineers create an estimate for budgeting purposes and to secure money from appropriate sources. The estimate is not shared with bidders.
- Firms bid on the project and WSDOT uses a scoring system to award the project to the highest scoring bidder. Price plays a significant role in scoring.
- Throughout the project, change orders may be authorized on a project that increase or reduce the final project total.

Given that payments to contractors make up a majority of all construction costs, understanding how well WSDOT manages the contracting process is important to understanding if this category of expenditures represents a potential area for significant cost savings.

Payments Compared to Awards

Data on construction contract awards and payments helps illustrate how WSDOT brings projects from design to completion. Comparing total payments on a contract to the original award amount helps measure how estimated project costs change during the construction period. Contract costs may change after a contract is awarded for many reasons:

- Market changes in the price of materials
- Unforeseen circumstances requiring changes to the quantity of work or materials
- Delays or other schedule adjustments
- Errors or omissions in original project plans
- Management decisions to add value to a project
- Requests from third parties

Exhibit 11 summarizes the WSDOT data on contract award amounts and final contract expenditures by contract size.

POTENTIAL SAVINGS

At WSDOT, potential savings from engineer's estimates tend to be invested back into each project through change orders.

For smaller projects, these reinvestments are consistent with WSDOT's contingency allowances.

The difference between final payments and awards increases as project size increases.

Exhibit 11
WSDOT Contract Awards and Expenditures, 2003-2012 (YOE \$)

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%
TOTAL	1,329	\$5,760,258,087	\$6,244,057,954	\$483,799,867	8%

Source: WSDOT, 2013; and BERK, 2013.

- Within the sample set of contracts, WSDOT paid approximately \$484 million (8%) more than the original award amount over 10 years.
- The largest variances between payments and awards were in contracts over \$25M, which accounted for nearly \$369 million of payments above award amounts.

A significant portion of the difference between awards and expenditures is due to the Hood Canal Bridge East Half contract. This contract was originally awarded at \$204 million, but ended up with payments of \$394 million (a difference of \$190 million, or 39% of total award to payment differences over the ten-year study period).

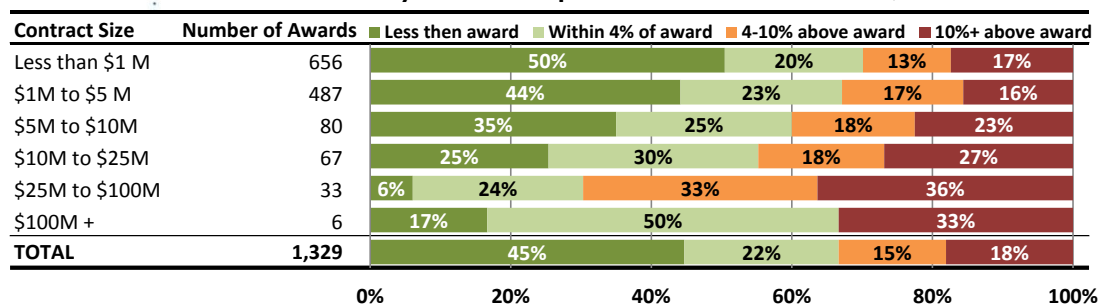
This significant difference was driven by the discovery of cultural resources at the original graving dock site in Port Angeles, where pontoons and anchors were to be built. WSDOT relocated the graving dock and WSDOT, the Lower Elwah Klallam Tribe, and other state and federal agencies have undertaken an extensive archaeological recovery effort at the original graving dock site.

Exhibit 12 shows the percent of contracts with final payments below awards, within 4% of awards, 4-10% above award, and more than 10% above awards. The 4% break was used to approximate WSDOT's risk management techniques:

Standard Contingency. On most projects, WSDOT assumes a standard 4% contingency factor for project managers to use for small changes necessary during construction.

Large Project Risk Analysis. WSDOT conducts a more comprehensive risk analysis on projects over \$10 million to ensure the agency has adequate funds to handle unforeseen changes.

Exhibit 12
Contracts by Percent Expenditures Above Awards, 2003-2012



Source: WSDOT, 2013; and BERK, 2013.

- Over the ten-year study period, approximately 33% of contracts had final payments of more than 4% above the original award.
- 22% of contracts had payments within 0% to 4% of the original award.
- 45% of contracts resulted in payments lower than the award.
- Larger contracts were more likely to end up with payments over the original award amount. More than two-thirds of contracts between \$25M and \$100M had payments 4% or more above award amounts.

Impact of Contracting Method

WSDOT is authorized by the legislature to use two types of contracting: Design-Build and Design-Bid-Build (see the sidebar for a brief overview). Exhibit 13 shows how awards and payments compared across the two contracting methods.

Exhibit 13
WSDOT Contract Awards and Expenditures by Contracting Method,
2003-2012 (YOE \$)

Contract Size	Design, Bid, Build Contracts			
	Contracts	Awards	Payments	Percent Over
Less than \$1 M	656	289,408,293	294,784,864	2%
\$1M to \$5 M	485	1,092,373,050	1,113,790,298	2%
\$5M to \$10M	79	543,469,692	565,500,178	4%
\$10M to \$25M	65	1,012,829,633	1,073,999,217	6%
\$25M to \$100M	27	1,043,828,549	1,160,766,282	11%
\$100M +	2	323,924,730	508,113,314	57%
TOTAL	1,314	4,305,833,948	4,716,954,153	10%

Contract Size	Design-Build Contracts			
	Contracts	Awards	Payments	Percent Over
Less than \$1 M	-	-	-	-
\$1M to \$5 M	2	5,517,395	5,861,753	6%
\$5M to \$10M	1	9,163,681	12,922,740	41%
\$10M to \$25M	2	33,816,000	34,441,796	2%
\$25M to \$100M	6	374,434,203	389,672,186	4%
\$100M +	4	1,031,492,860	1,084,205,327	5%
TOTAL	15	1,454,424,139	1,527,103,801	5%

Source: WSDOT, 2013; and BERK, 2013.

- 1,314 out of the 1,329 contracts studied (about 99%) used the Design-Bid-Build method. On these projects, final expenditures exceeded original award amounts by approximately 10%.
 - Larger contracts tended to land higher than award amounts more frequently and by a larger percentage than smaller contracts.
 - The Hood Canal Bridge East Half used Design-Bid-Build, and its awards and payments are in the \$100M + category. At \$190M above award, this contract drives the majority of cost differences in this category.
 - Excluding the Hood Canal Bridge, Design-Bid-Build contract payments were 5.4% higher than awards.
- For projects built using the Design-Build method, WSDOT spent 5% more than the original award amount.
 - This compares fairly equally with the Design-Bid-Build method if the Hood Canal Bridge is excluded from the analysis.
 - **However, unlike the Design-Bid-Build projects, contracts completed through Design-Build do not exhibit a trend of larger contracts coming in higher over award amounts than smaller contracts.**

WSDOT CONTRACTING METHODS

Design-Bid-Build is the traditional project delivery method. WSDOT is responsible for design, and the construction component of the project is contracted out. This is the most commonly used transportation contracting method with the least amount of risk allocated to the contractor.

Design-Build is a newer method where the design and construction phases are combined into one contract and awarded to a contractor. This method shifts more risk to the contractor as they are responsible for the design work. The hand-off from WSDOT to the contractor typically takes place at 20-30% design.

There are pros and cons to both types of contracting methods. The impacts of contracting methods are explored in more detail in the Cost Drivers chapter on page 59.

CHANGE ORDERS

At a programmatic level, WSDOT's bid/award/payment experience suggests that awards generally come in under engineer's estimates, but that change orders consume most of the potential savings. Further, actual savings on smaller projects tend to be reinvested in larger projects.

Change orders are an expected part of construction projects and WSDOT generally includes a 4% allowance to account for unforeseen costs.

Comparison to Final Engineer's Estimates

Before going to bid, WSDOT's engineering department creates a construction contract estimate for budgeting purposes. One of the challenges of this process is to ensure that the budget is based on reasonable expectations of costs in the face of market conditions, which can vary widely over time. Estimates are based on historical contract costs and prepared a few years before contracts go out to bid. Estimates include assumptions about inflation to approximate future conditions. Highly competitive bid environments can lead to a greater share of bids over estimate, since contractors can be more selective about which projects they take on and construction labor and materials costs can be bid up, and can increase engineers estimates for future bids, since historic bids are used to inform future estimates.

Estimates are used to procure funding from the Legislature and to build a complete project budget. When WSDOT delivers a project under budget, the difference is treated as "project savings" which become available for redistribution through the appropriations process. When bids come in below engineer's estimates, it creates an opportunity to potentially free up funding for other purposes. However, the experience has been that most of these potential savings are reinvested in the project through change orders.

Exhibit 14**WSDOT Contract Estimate, Award, and Expenditures, 2003-2012 (YOE \$)**

Contract Size	Number of Awards	Total Estimate	Total Award	Total Expenditure	Difference: Estimate to Award	Difference: Award to Expenditure	Difference: Estimate to Expenditure
Less than \$1 M	656	328,122,144	289,408,293	294,784,864	-12%	2%	-10%
\$1M to \$5 M	487	1,228,097,186	1,097,890,445	1,119,652,051	-11%	2%	-9%
\$5M to \$10M	80	602,236,999	552,633,373	578,422,918	-8%	5%	-4%
\$10M to \$25M	67	1,194,932,068	1,046,645,633	1,108,441,013	-12%	6%	-7%
\$25M to \$100M	33	1,515,942,965	1,418,262,752	1,550,438,468	-6%	9%	2%
\$100M +	6	1,431,673,052	1,355,417,590	1,592,318,640	-5%	17%	11%
TOTAL	1,329	6,301,004,415	5,760,258,087	6,244,057,954	-9%	8%	-1%

Source: WSDOT, 2013; and BERK, 2013.

Looking at contracts completed over the past ten years summarized in Exhibit 14:

- Bid awards have come in 9% (or \$541 million) below the final engineer's estimates.
- Given that payments have exceeded award amounts over the same time period by 8%, final payments come in an average of about 1% less than final engineer's estimates (or about \$57 million).

WSDOT Project Delivery Compared to Other States

The Oregon and Utah Departments of Transportation provided ten years of contract history for comparison to WSDOT. The two western states were selected for different reasons: Oregon has similar climate and is a neighbor state, while Utah is among the states that extensively use alternative contracting methods, including almost a decade of experience with GC/CM. Utah data included estimates, awards, payments, and contract type. Oregon provided award and payment information, but did not provide estimates or contract method. All three project datasets reflected a large sample size:

- Utah provided data on 969 contracts totaling \$3.87 B in awards.
- Oregon provided data on 1,243 contracts totaling \$3.96 B in awards.
- WSDOT's database included 1,329 contracts and \$5.76 B in awards.

Using this information, we analyzed the same metrics as noted above for Washington across all three states to understand if WSDOT's experience in project delivery is different from the other two states.

Overall, WSDOT's project delivery metrics related to estimates, awards, and payments are similar to information provided by UDOT and ODOT.

Exhibit 15 summarizes the key metrics across all three states.

Exhibit 15
Contract Estimate, Award, and Expenditure Comparison, 2003-2012

Metric	Washington	Oregon	Utah
Difference from Estimate to Award Amount	-9%		-12%
Difference from Award to Payment Amount	8%	7%	12%
Difference from Estimate to Payment Amount	-1%		-2%

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

- In all three states, final contract expenditures were between 7% and 12% higher than awards. Oregon was lowest, at 7% over, and Utah was highest, at 12% over.
- Washington and Utah provided estimate information that showed:
 - Contract award amounts came in an average of 9% below estimate for Washington and 12% below estimate for Utah.
 - Final contract expenditures came in an average of 1% below estimate for Washington and 2% below estimate for Utah.

OTHER STATES' EXPERIENCE

The pattern in bid/award/payment was similar among Washington, Oregon and Utah.

- Awards were lower than estimates.
- Payments were greater than awards.
- Larger projects tend to have higher payment to award ratios.

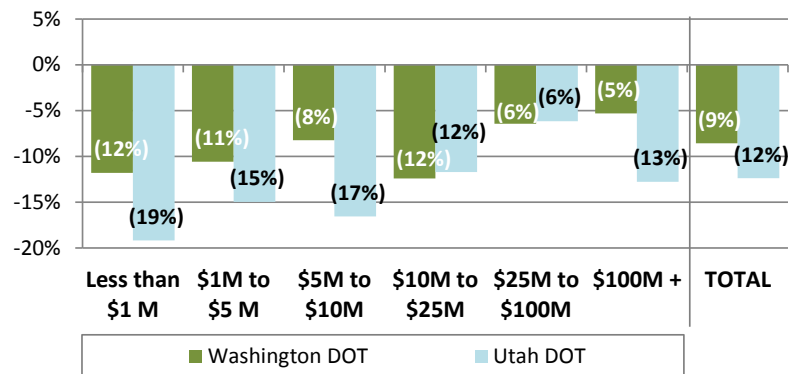
The GC/CM experience exhibits a different pattern with payments coming in consistently higher than engineer's estimates. This seems to be the result of two significant features of this approach:

- Awards are based on qualifications and a contract price is negotiated
- Projects selected for this method likely include features which would benefit from contractor involvement early in the process

As a result, it is likely that the risk management benefits and fixed price are judged to be of sufficient value to warrant higher payments. The additional cost can be interpreted as a form of insurance to protect from major cost overruns.

The following exhibits show the difference in the above metrics by project size for the three states.

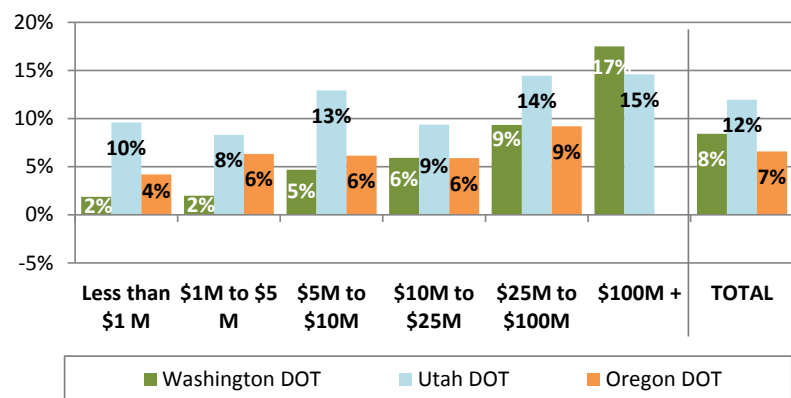
Exhibit 16
Contract Award and Estimate Metrics by Project Size and State, 2003-2012



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

- Both Utah and Oregon exhibit patterns where contract awards regularly came in below final estimates. Utah's awards tended to come in further below estimates than Washington's across most project sizes.

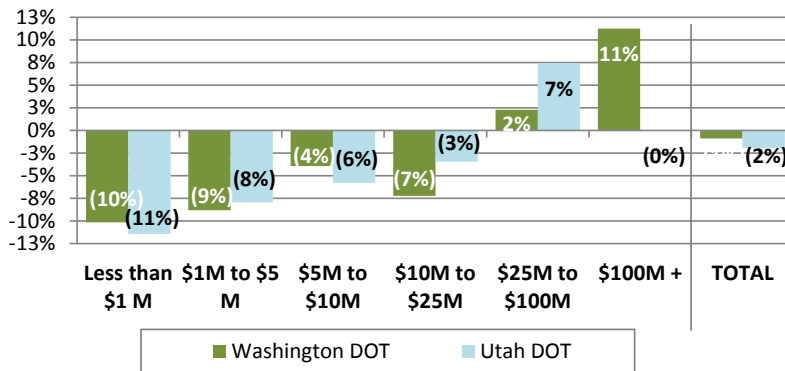
Exhibit 17
Contract Award and Payment Metrics by Project Size and State, 2003-2012



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

- In Washington, contracts over \$25 M accounted for \$369 M out of \$484 M (76%) of expenditures above award amounts over 10 years.
- In Oregon, projects less than \$25 M came in an average of 5.9% over award. Projects over \$25 M landed about 9.2% over.
- In Utah, the differences between awards and final payments did not change as much with project size as in the other states.

Exhibit 18
Contract Estimate and Payment Metrics by Project Size and State, 2003-2012



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

- In Utah, the difference between final engineer's estimates and final payments exhibited the same pattern as Washington, where final payments on larger projects came in closer to or above estimates than on smaller projects. In Utah:
 - Payments were less than estimates by 6.4% on projects below \$25 M.
 - Payments were higher than estimates by 3.8% on projects over \$25 M.

Project Delivery Method by State

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 19 summarizes the difference in project delivery metrics across award types for WSDOT and Utah.

Exhibit 19
Contract Estimate, Award, and Expenditure Comparison 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%
All Contracts	(9%)	(12%)	8%	12%	(1%)	(2%)

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

DEFINITION: GENERAL CONTRACTOR/ CONSTRUCTION MANAGER

A general contractor is selected during the design phase to increase collaboration between owner and contractor and provide input into constructability, cost, and schedule.

GC/CM involves two contracts with a contractor: one for preconstruction services with a provision for a guaranteed maximum price (GMP) and another for construction. The owner is not liable for costs in excess of the GMP unless the scope changes. However, the owner is responsible for design, which is typically done with consultant services.

- 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 do not tend to vary meaningfully between Design-Build and Design-Bid-Build contract awards.
 - 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 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. For the first four years GC/CM was used (2005-2008), 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.

CHANGE ORDERS

When a contract adjustment is necessary on a project, WSDOT authorizes a change order with the contractor to add, delete, or modify work and costs in the original contract. Through change orders, final contract payments can be higher (or lower) than the original award amount. Change orders occur for many reasons, including decisions to improve a project. They do not necessarily represent an error in project design or management.

Change orders are tracked in WSDOT's contract database, which was developed in 2007. Dates, amounts, and authorization reason codes are recorded. This change order analysis contains a subset of 173 contracts with \$3 B in contract payments and \$246 M in change orders (in year of expenditure dollars). Since more than one reason can be assigned to a single change order, it is not possible to identify exactly how many dollars were changed for each reason. Our analysis found the following breakdown of change order amounts assigned to reason codes:

- 23% (\$57.8 M) of change order dollars are coded as Unanticipated Conditions, defined as *"situations different than assumed during design."*
- 18% (\$44.5 M) are coded as Engineer's Judgment, defined as *"A change that is a good idea... makes the project work better."*
- 8% (\$19.0 M) are coded as Administrative, defined as *"administrative functions that do not relate to the actual work, such as prevailing wage and sales tax."*
- 7% (\$18.4 M) are coded as Plan Error-Information, defined as *"plans contain a mistake that resulted from the designer working with insufficient information."*
- 6% (\$14.9 M) are coded as Plan Error-Mistake, defined as *"plans contain a mistake that, given the information available to the designer, should not have been made."*
- 43% of change order dollars (\$105 M) have no specified reason.

While change orders are approved and documented through an established process, the information related to the change orders is inconsistently recorded in the WSDOT change order database. **WSDOT could improve its change order tracking and reason code assignment going forward to make it easier to assess project management and delivery performance.** Ensuring change orders are more consistently assigned a reason code in the database will reduce the number of dollars with no reason listed. Additionally, adding more detail to the reason codes available will allow WSDOT to better understand and manage the factors that drive changes in contract costs.

Comparison to Other States

KEY FINDINGS: COMPARISON TO OTHER STATES

Overall, highway construction costs in Washington appear to be generally consistent with experiences in other states. Costs vary widely, but are primarily driven by individual project specifications.

Some factors, such as tax policies and contracting authority, could be addressed by the State. However others, such as labor and materials, are driven by market factors and prevailing wage laws that are outside the control of WSDOT.

Literature Review. A review of two studies, augmented with new research, found that costs on individual projects vary and are likely driven primarily by project characteristics and local market conditions.

Labor Costs. Average wages for construction and engineering service jobs in Washington are close to the national average and have grown consistently with national trends.

Materials Costs. WSDOT's materials costs have increased at approximately the same rate as national averages and with other states since 1990. WSDOT does not have significant control over the price of materials.

A key question posed in this study is whether, and to what degree, WSDOT projects cost more than those in other states. The analysis presented on the following pages focuses on how WSDOT costs compare to costs in other states.

Given the challenges of identifying truly "comparable" projects to conduct direct project-to-project comparisons, we address this question in two ways:

- **Project-level Comparison.** 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.
- **Analysis of Key Project Components.** Explores the degree to which each major cost element might vary meaningfully between Washington and other states, with a specific focus on Utah and Oregon.

Overall, the analysis suggests that highway construction costs in Washington are generally in line with experiences elsewhere and that aside from charging sales tax on construction, there are no systemic or programmatic factors that would make costs in Washington higher than 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, site-specific conditions or features, and competitiveness of bid environments.

PROJECT-LEVEL COMPARISON

Approach

This analysis is based on a review of two studies that compared WSDOT project costs to comparable project costs in other states.

- *Highway Capital Costs – Washington & U.S.*, by Bill Eager (March 2013) - summarizes costs from a sample of projects in Washington and across the U.S. and analyzes trends in FHWA's construction cost index.
- *Highway Construction Costs*, by WSDOT (July 2004) - analyzes 21 projects in Washington and 15 projects from 12 other states.

Before reviewing the specific findings, it is important to understand the challenges and limitations of direct project to project cost comparisons:

- No two projects are the same. This becomes increasingly important as projects get bigger, more complicated, and more expensive.
- Even comparing project costs within WSDOT's program results in a wide range of overall costs and cost per lane mile as a result of the specific characteristics of individual projects, such as soil conditions, mitigation requirements, need for new right of way, connection to existing highway system, topography and slopes, and drainage requirements.

- External factors have an impact on project costs, particularly the competitive environment in the construction sector, which can result in significant variations in bids over time for similar work.
- Finally, when comparing across states, there are basic differences that will affect costs, such as overall labor rates, regulatory differences, site conditions, and tax treatment of construction work.

Summary of Findings

The two studies had opposing high-level conclusions about how WSDOT projects compare to other states.

According to the WSDOT study, WSDOT projects are more or less in line with other states' projects on a cost per lane mile basis.

- This study analyzed 21 projects in Washington and 15 projects from 12 other states. A description of each project, its total cost, lane miles, and location information are all included.
- WSDOT acknowledges challenges in comparability of projects and data collection. Online data collection was supplemented with phone interviews to verify and collect additional information on the projects.

The Bill Eager study suggests that WSDOT's project costs are significantly higher than project costs in other states per lane mile.

- This study looks at 130 projects categorized by location type (i.e. urban, suburban, etc.).
- The study focuses heavily on a comparison between specific WSDOT projects and a set of "US averages" for projects categorized as similar. The study only identifies a few of the projects included in its national averages, and does not provide project details for those projects.

Comparison of Study Conclusions

BERK reviewed the two studies and conducted additional research on seven projects to assess how project costs compare across states. While the two studies had different high-level conclusions, review of the data behind the studies shows that the conclusions are supported by similar project data.

Looking only at comparisons of specific projects, the results of the studies are in greater agreement than the overall conclusions would suggest. We analyzed projects included in both studies, adjusting all costs to 2012 dollars. The averages from the Eager study were not included, as the project data behind them was not identified. Some projects were included in both studies, but the estimated costs per lane mile were different. This highlights the difficulty of conducting these types of comparisons, and/or the impact of using budgeted or planned dollars in these studies.

CONCLUSIONS FROM REVIEW OF COST STUDIES

Both the WSDOT and Eager studies approached the cost comparison question by selecting projects that were reasonably similar and comparing costs on a per-lane-mile basis. Comparing the conclusions where projects were common to both studies, the findings suggest that WSDOT projects are generally in line with experience elsewhere,

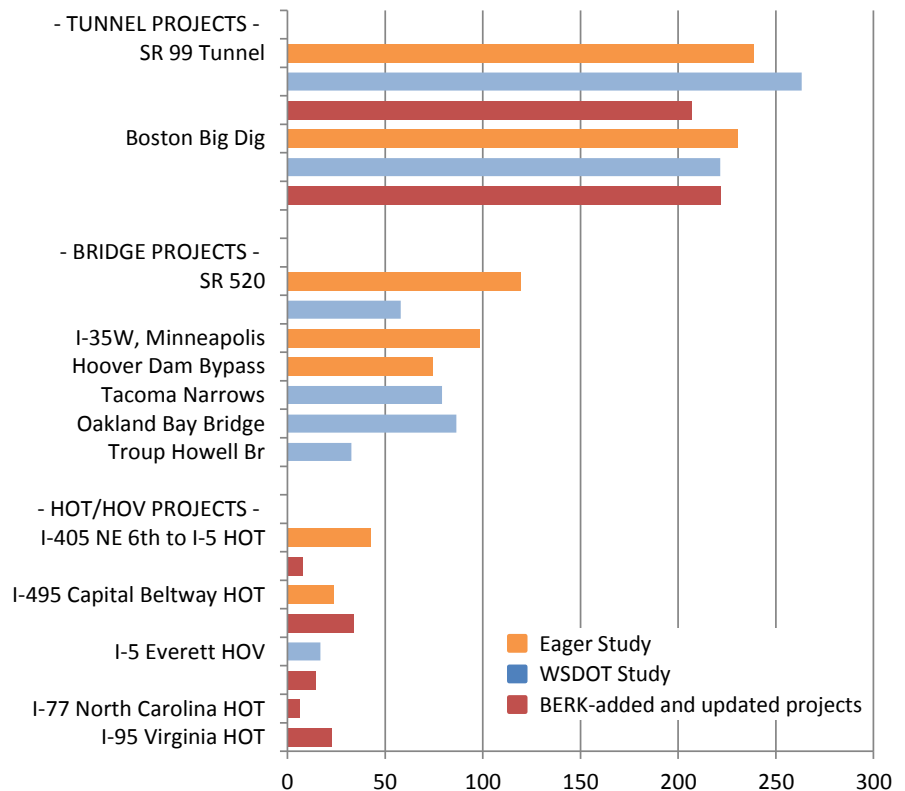
This conclusion was reinforced when BERK updated the cost information where better data existed and added a few additional comparable projects.

The degree to which the Eager study suggested that WSDOT project costs were potentially much higher than experience elsewhere was almost exclusively based on the inclusion of average per-mile costs for a number of unspecified projects.

Given the inherent challenge of defining truly comparable projects, it is impossible to draw meaningful conclusions from comparisons that do not include project-specific information.

Exhibit 20 shows the results of (1) updating all Eager and WSDOT study analyses to 2012 dollars and (2) independently researching seven projects to find updated lane mile and budget information.

Exhibit 20
Updated Project Costs per Lane Mile for Selected Projects (in millions of 2012 \$)



Source: *Highway Capital Costs – Washington & U.S.*, Bill Eager, 2013; *Highway Construction Costs*, WSDOT, 2004; WSDOT website, 2013; Massachusetts DOT website, 2013; North Carolina DOT website, 2013; Virginia DOT website, 2013; and BERK, 2013.

Looking at the projects specifically identified and that are reasonably comparable between the two studies, the two studies do not appear to be using significantly different data to draw opposing conclusions. The WSDOT conclusions rely heavily on the wide range found among all projects and among WSDOT projects to imply that project costs vary for many reasons.

The Eager study implied WSDOT projects could cost as much as 3 to 4 times higher per lane mile than national averages. However, these averages include an unspecified project list. If you remove the “averages of other projects” data points from the Eager study and focus only on the named projects, the two studies are more similar. We also researched two additional HOT projects that were not included in either original study, to provide additional points of comparison within that project type.

Tunnel Projects. Although exact project costs are slightly different, both studies make a similar conclusion that the SR 99 Tunnel is in line with but slightly more expensive per lane mile than the Big Dig.

- After adjusting all costs to 2012 dollars, the Boston Big Dig cost about 7% more per lane mile than the updated budget for the SR 99 Tunnel, which has changed since the completion of both studies.
- WSDOT's study used a range of prices given the uncertainty around the project in 2004; Exhibit 20 uses the average of this range. The original estimates for the SR 99 Tunnel included in the WSDOT study were created prior to choosing the deep-bore design.
- Estimates per lane mile for the Boston Big Dig and the SR 99 Tunnel in the two studies range from \$204 M to \$303 M, with the more recent estimates for the SR 99 Tunnel (\$230 M) and the Big Dig (\$222 M) falling in the middle and different from each other by only 3.6%.

Bridge Projects. The studies include a mix of floating, suspension, and truss bridges with different cost profiles. Bridge type likely drives a lot of the variance in per mile bridge cost.

- Estimates per lane mile for the bridge projects range from \$32 M to \$115 M.
- The 520 floating bridge is at the high end of the range, while the Tacoma Narrows suspension bridge falls in the middle.
- The WSDOT and Eager studies present very different costs for the 520 bridge. While some of this is likely due to the different estimates available at the different points in time the analyses were completed, **the Eager study focused on the most expensive part of the project – the floating bridge from I-5 in Seattle to Medina while the WSDOT Study included the full project, from I-5 to Bellevue.**

HOV/HOT Projects. Cost ranges are wide for these projects, as some switch existing lanes into HOT or HOV lanes, while others build new lanes, and some projects are a mixture of both.

- Projects range from \$6 M per lane mile up to \$41 M per lane mile, reflecting a wide range of project specifications.
- WSDOT's projects, I-405 HOT lanes (\$16 M) and I-5 HOV lanes near Everett (\$41M), fall near the middle and top of the range, respectively.
- The updated estimate for I-405 NE 6th to I-5 HOT is significantly lower than the Eager Study estimate. Our researched cost is based on information currently available on the WSDOT website. Since the Eager Study did not provide project details, we cannot confirm which data were used to support the cost per lane mile in that study (\$41 million/lane mile).
- Variation in these projects likely stems from the number of interchanges that align with other major freeways, the number of new lanes that need to be built, and the amount and price of right of way purchases.

PROJECT DEFINITIONS

Big Dig: includes much more than just a tunnel – the project also included two new bridges, an extension of an existing surface highway, and rebuilding surface streets and open space through downtown Boston.

SR 99 Tunnel: includes the effort to build the tunnel, as well as replacing Alaskan Way with a surface street, demolishing the existing viaduct, building an overpass at the Port of Seattle, and linking the tunnel to existing streets north and south of downtown.

ANALYSIS OF KEY PROJECT COMPONENTS

A second approach to understanding WSDOT project costs relative to projects in other states is to analyze how components of project costs vary among states. The biggest opportunities for savings exist in the biggest areas of expenditures, namely labor and materials.

Labor Costs

Based on industry averages, about 40% of contract costs (\$2.8 B over the study period, or 26% of project costs) are comprised of labor, which includes labor subject to prevailing wage (30% of contract costs) and labor not subject to prevailing wage (10% of contract costs). A large portion of the \$2.4 B spent on permitting, environmental review, predesign, engineering, design, and in-house construction-related costs also includes labor, which is not subject to prevailing wage.

To understand if Washington's labor costs are higher than in other states, we used US Bureau of Labor Statistics data for average wages by state for the construction and engineering industries. Overall average wages for construction and engineering service jobs in Washington State are close to the national average.

- Construction Wages: Washington State average of **\$53,688** in 2012 and a national average of **\$52,929** (includes all construction sectors).
- Engineering Services: Washington State average of **\$85,304** in 2012 and a national average of **\$89,084**.

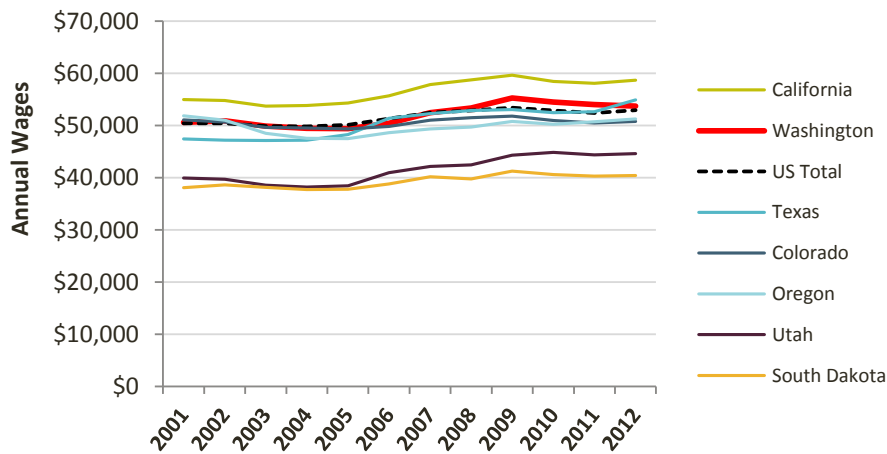
Washington's construction and engineering labor costs are consistent with the national average. However, there can be wide variation among states.

- Nationally, 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).

While not as wide as the national perspective, there is still a significant labor cost range for selected peer and neighbor states shown in Exhibits 21 and 22.

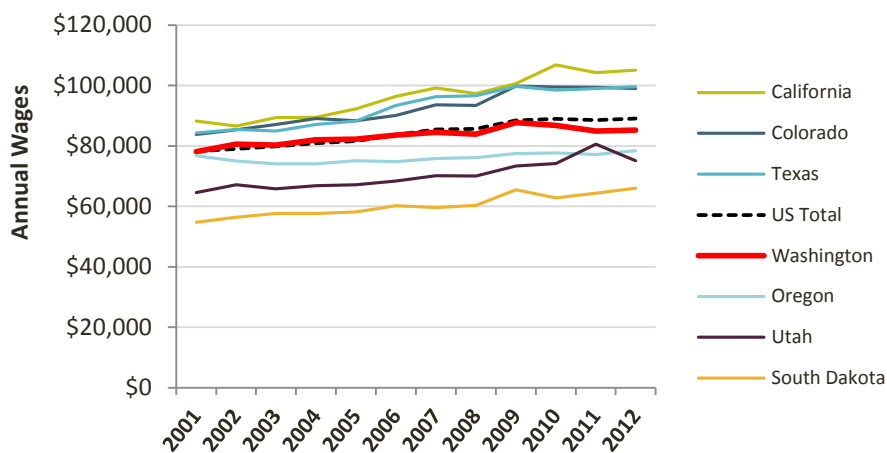
For construction labor, Washington is closer to the high end of this range, while for engineering services it is closer to the mid-point. In both cases the trend over time has generally matched the national average and that of selected peer states.

Exhibit 21
Construction Wages, 2001-2012 (2013 \$)



Source: US Bureau of Labor Statistics, 2013; and BERK, 2013.

Exhibit 22
Engineering Services Wages, 2001-2012 (2013 \$)



Source: US Bureau of Labor Statistics, 2013; and BERK, 2013.

WASHINGTON WAGES

Adjusted for inflation, Washington wages have been consistent with national trends from 2001-2012.

Cost of Materials

Materials make up an average of about 50% of contract costs (\$3.5 billion over the study period, or 33% of project costs). While there is no database of specific material prices by state, some states maintain a Construction Cost Index (CCI) that tracks selected standard bid items over time. The CCI provides a point of comparison for construction cost growth; however, there are limitations:

CCI bid items comprise a portion of total costs. In Washington, CCI bid items account for approximately 18% of contract costs. Washington tracks the following seven of potentially hundreds of bid items: 1) Roadway Excavation; 2) Crushed Surfacing; 3) Hot Mix Asphalt; 4) Concrete Pavement; 5) Structural Concrete; 6) Steel Reinforcing Bar; and 7) Structural Steel.

Exhibit 23
Washington State CCI Bid Items as Portion of All Project Costs, 2009-2013

Bid Item Costs	2009*	2010	2011	2012	2013**	5-Yr Total
CCI Bid Items	\$63,779,439	\$137,534,045	\$137,319,842	\$65,564,357	\$48,446,689	\$452,644,371
Other Std. Bid Items	\$202,735,347	\$379,905,022	\$704,049,371	\$262,189,051	\$162,272,587	\$1,711,151,379
Non-Std. Items	\$1,164,117,540	\$82,848,203	\$124,777,875	\$67,074,799	\$35,816,667	\$1,474,635,083
Total Costs	\$1,430,632,327	\$600,287,270	\$966,147,089	\$394,828,207	\$246,535,942	\$3,638,430,834
CCI Bid Item Percent	4%	23%	14%	17%	20%	12%

Excluding the SR 99 Tunnel Contract

Total Costs	\$373,337,119	\$600,287,270	\$966,147,089	\$394,828,207	\$246,535,942	\$2,581,135,627
CCI Bid Item Percent	17%	23%	14%	17%	20%	18%

* Six months: July through December

**9 months: January to October

Source: WSDOT, 2013; and BERK, 2013.

- CCI bid items account for 18% of contract costs (excluding SR 99 Tunnel).
- Data includes standard and non-standard bid items used in WSDOT projects for the last five years (July 2009 to October 2013).
- Data includes the low, second, and third bid. The analysis used the average of the three bids' unit price multiplied by the quantity to estimate the average cost.

Difference in CCI definition across states. Each state's index includes a similar set of items, but definitions for items and methodologies for calculating the index vary by state.

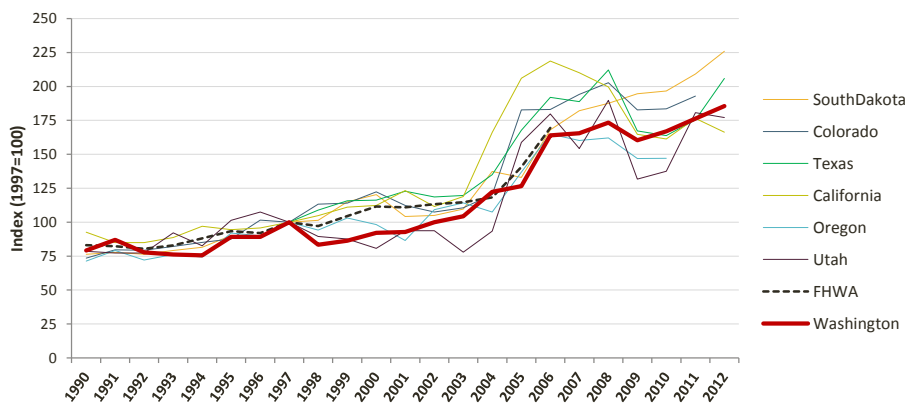
Questions about data reliability. FHWA stopped creating a composite index after 2006 due to its limited use and value and questions about data reliability.

Commodity transport costs as an underlying driver. A 2007 FHWA report noted that costs of commodities used in highway construction primarily varied across states due to the difference in the cost of transporting commodities.

Acknowledging those limitations, the CCI analysis does imply that WSDOT's bid item costs have trended similarly to a selection of peer states since 1990. Exhibit 24 shows how the indices have trended over time in Washington and a selection of other states. Bid item costs include materials, labor, equipment, overhead, and profit. Items are weighted based on the value in contracts awarded.

WSDOT's materials costs have increased at approximately the same rate as national averages and with other states since 1990 (Texas started its series in 1997). Notwithstanding the fact that there is considerable variation among the states and all states exhibited significant market-driven shocks, **construction costs on standard bid items in Washington follow the overall trend line and tend to be on the low to mid-point in the range.**

Exhibit 24
Construction Cost Index History by State, 1990-2012



Source: WSDOT, 2013; FHWA, 2013; Oregon DOT, 2013; Colorado DOT, 2013; California DOT, 2013; Utah DOT, 2013; South Dakota, DOT, 2013; Texas DOT, 2013; and BERK, 2013.

While materials are a large share of project costs, WSDOT does not have significant control over the price of materials. Material costs are set by the market, and interstate purchases of materials to achieve lower prices are typically negated by the costs of transporting the materials. However, when purchasing fabricated materials created off-site, there may be enough of a cost advantage through the combination of cheaper materials and lower wage rates out of state to offset transportation costs, for example, in border communities.

Summary of State Comparisons

Overall, our analysis suggests that the highway construction picture in Washington doesn't look much different than other states. Project costs vary widely, but are primarily driven by individual project specifications. Project-level comparisons do not provide many answers because comparable projects are nearly impossible to find.

The answer, on any given project, is that cost depends on where it is built. It could be more expensive to build in Washington if you compare it to a state with (1) no sales tax on construction activity, (2) general labor rates that are 25% below Washington's, and (3) materials that are less expensive. However, this type of comparison ignores the realities of WSDOT's inability to affect the labor and materials market in which it operates, and the policies it must follow.

There are some factors that could be addressed by the State, such as tax policies and contracting authority. However some costs, such as labor and materials, are driven by statewide market factors and prevailing wage determinations that are outside the control of WSDOT.

COST DRIVERS

The previous chapter focused on historical spending patterns for WSDOT's construction program and compared this to experience in other states. This chapter focuses on quantitative and qualitative analysis of individual major cost components.

Introduction to Key Cost Drivers

Cost drivers fall into one of five categories identified as factors that drive project costs and *could* add costs to WSDOT projects relative to similar projects in other states.

1. **Project Scale.** Both required and optional decisions around project design impact how WSDOT builds an individual project.
2. **State-specific Regulations.** WSDOT must comply with federal and state-specific regulations, including state sales tax requirements, prevailing wage laws, and environmental laws, which can add costs to a project.
3. **Labor Costs.** Labor comprises a significant portion of construction costs and accounts for the vast majority of non-construction costs, including engineering, design, construction management, etc.
 - As discussed in the comparative cost section, labor costs can vary widely by state. WSDOT's labor costs are primarily driven by overall wage levels in the Pacific Northwest, but may also be affected by state-specific regulations such as the prevailing wage law.
 - Quantity of labor (time and/or efficiency in delivery of services) can vary based on practices, differential design, and regulatory requirements. As a result, quantity issues are likely to be related to decisions about project scale.
4. **Cost of Materials.** Materials account for 50% of contract costs (or about 33% of project costs), so variations here can have a substantial impact. The ability of WSDOT to effectively manage materials costs is likely to be limited

CHAPTER OVERVIEW

This chapter discusses key findings from the individual cost driver assessments and is organized as follows:

Introduction

Project scale

- Design standards
- Design choices

State-specific regulatory factors

- Sales tax
- Prevailing wage
- Environmental review & permitting

Risk assignment

- Project delivery methods

Other cost drivers

- Right of Way
- Cost of Materials

due the significant advantages of local suppliers with respect to transportation costs.

- 5. **Risk Assignment.** Different project delivery methods allocate risk differently between the project owner and contractor. 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.

The following table summarizes the eight key cost drivers analyzed below. The labor cost issues are addressed primarily as part of the prevailing wage discussion, and to a lesser degree in the project scale, materials cost and project delivery sections.

Key Cost Drivers Included in Analysis	
Project Scale	Design Standards
	Design Choices
State-specific Regulations	Sales Tax
	Prevailing Wage
	Environmental Review & Mitigation
Risk Assignment	Project Delivery Methods
Other Drivers	Right of Way
	Cost of Materials

Project Scale

Project scale decisions affect project costs by governing *what* is built and how *much* is built. Project scale decisions fall into two main categories: design standards and design choices.

Design Standards

Background

Design Standards are industry guidelines used when building, maintaining, or retrofitting roads and bridges. WSDOT's design work is based on the WSDOT Design Manual, which integrates industry best practices and design standards and provide guidance on the geometry and load-bearing ability of roads, and help ensure safe transportation infrastructure.

The American Association of State Highway and Transportation Officials (AASHTO) provides national guidance on design standards for interstate, highway, and road construction. AASHTO's mission is to advocate for transportation-related policies and provide technical assistance to states in their efforts to efficiently and safely move people and goods. AASHTO's publications provide recommended ranges of values for given elements in the roadway or roadside environment and the expected safety impact of using one value over another.

AASHTO provides recommended standards in the following broad categories:

- **Design speeds** for different types of roadways (e.g. interstate, major arterial) in rural and urban environments.
- **Lane width** of each road lane by road type and geography, differentiating between rural and urban lanes, as well as truck and car lanes.
- **Shoulder width** by road type and geography, adjusting for each side of the road and taking into consideration whether it is a truck lane or not.
- **Bridge width** including lanes on bridges.
- **Structural capacity**, the load capacity a road is able to undertake.
- **Horizontal alignment** of a road, such as curves, transitions, and alignments.
- **Vertical alignment** of a road, including factors such as angles and crests.
- **Grade of the road** (percentage grade).
- **Stopping sight distance**, the sum of the distance traveled during perception time (time to realize that braking is needed) and the reaction time and the distance necessary to stop the vehicle for intersections and road stops.

AASHTO's design standards serve as national guidelines. According to FHWA, at least 30 other states and Washington publish their own design standards that build on AASHTO standards and incorporate state-specific regulations.

KEY FINDINGS: PROJECT SCALE

Design Standards. WSDOT and AASHTO standards are similar.

- There are no variations that would likely result in significant differences in cost for WSDOT project construction.
- WSDOT is continually adjusting its standards to align with AASHTO and to provide flexibility to project designers.

Design Choices. Project scoping decisions determine the size of a road, alignments, and aesthetics. These decisions fall under the discretion of the project team, and can have significant impacts on project cost and effectiveness.

WSDOT is implementing tenets of **Practical Design** into its processes.

- **Changing Frameworks for Design and Delivery:** how and where to apply flexibility in design standards.
- **Combining Similar Projects:** to streamline methods and learn from past experiences.
- **Designing Incremental Improvements with Long-term Benefit:** spending less money in the short term in a way that represents an investment toward future needs and achieves the same goals.

WSDOT CHANGES TO STANDARDS

Object Height. Governs the vertical alignment of roads (e.g., when a road changes from an uphill to a downhill slope) by designating how gentle the curve needs to be. WSDOT relaxed the standard so that alignments can be slightly steeper if necessary.

Intersection Angle. Governs the angle at which a street can intersect with a highway. Relaxing this standard from 75 degrees to 60 degrees gives designers more flexibility and reduces the need to realign existing intersections when making road improvements.

Intersection Lane Alignment. Governs how a single lane must line up across an intersection. WSDOT relaxed this standard in low speed environments to allow shifts of up to six feet. This provides more leeway at intersections where right or left turn lanes are needed on only one side as through lanes may be slightly offset to accommodate additional lanes.

Deceleration Lanes at Intersections. WSDOT reduced the required length of deceleration lanes at intersections.

WSDOT Design Standards

In an effort to determine whether WSDOT is “overdesigning” projects we assessed how WSDOT's Design Manual compares to AASHTO's national guidance. Through a comparison undertaken by WSDOT and the consultant team, it appears that WSDOT standards and AASHTO standards today are very similar. **While there are small variations throughout the many details included in the design standards document, there are no variations that would likely result in significant differences in cost for WSDOT project construction.**

Over the past three years, WSDOT compared its standards to AASHTO's standards and made some changes to bring the two closer into alignment. During the 2000s, when projects were delivered through the WSDOT Nickel and TPA programs, WSDOT chose to relax certain design standards and align more with AASHTO standards. The biggest changes to WSDOT standards are listed in the text box and were primarily made to give designers more flexibility.

In addition, WSDOT has changed its design standards process to improve efficiency and increase flexibility in design decisions. One of the major changes was defining more project types and allowing additional criteria to be used when choosing which standards apply. This creates a finer tool for WSDOT to use for each project, and avoids overdesigning projects that would be on the cusp under a system with fewer project classifications. Some other DOTs use a more rigid system that only allows three to four project types and therefore three to four sets of design standards.

Other Standards and Guidelines

In addition to project design standards, WSDOT's Design Manual, Environmental Procedures Manual, and Highway Runoff Manual all include specific guidance on regulations pertaining to mitigation, such as wetlands, stormwater drainage and treatment, and noise walls. These manuals represent years of research and collaboration between WSDOT and subject matter experts, as well as other state agencies, consultants, and outside reviewers. Guidelines receive periodic updates to reflect changing regulatory landscapes, advancements in practice, and other identified improvements.

Design Choices

Design standards aim to put boundaries around how a road should be built to provide a safe and effective means of transportation. Design choices made during project scoping go beyond basic design and determine the size of a road, alignments, and aesthetics. DOTs make other design choices that impact project scope and fall under the discretion of the department, such as project objective, alignment, or aesthetics. These decisions can have significant impacts on project cost and effectiveness.

Types of Project Scoping Decisions

The design of a project is a combination of thousands of individual variables. At the most basic level, these variables include:

Project Size. How much traffic should the road be designed to accommodate? How many lanes should it have? Should there be HOV lanes or bike lanes? How many miles of the road should be built or improved?

Project Alignment. Where should the road be built? Should it go around or through significant geographic features? How sharp or gentle should the curves and grades be? How will the project align with intersecting roadways?

Project Type. What type of road should be built to address capacity? Should it be a major arterial or a highway? Should it be a tunnel, bridge, or surface road? Should it include tolling? What type of materials should be used?

Project Aesthetics. What aesthetic aspects can be incorporated to make the project more visually appealing? If noise walls are required should they include aesthetic designs? Should bridges be designed for aesthetic appeal?

This is a small sample of the types of questions that project designers must answer to get to a final design. The following section on Practical Design explores how WSDOT approaches these design questions.

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 by:

- Building good projects that together achieve the goal of building a great transportation system.
- Build projects to only those standards needed to meet state goals.

Practical Design is an overarching idea or theory about project approach and should not be confused with value engineering, which happens at 60-90% design. Each state that has begun to implement Practical Design has interpreted it independently to align with what their DOT values. In conversations with WSDOT project development staff, WSDOT has approached Practical Design as a holistic approach to project development and delivery.

PRACTICAL DESIGN IN OTHER STATES

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 evident in the historical data.

The TRB report highlights several case studies that illustrate potential cost savings.

Missouri adopted a formal Practical Design policy in 2005 and claims approximately \$400M in saving for projects included in its 2005-2009 STIP that were invested in additional transportation projects.

Example: Missouri's I-64/I-70 Interchange project was originally designed as a \$69M, three-level structure. The design team reduced complexity by lowering design speeds and shoulder widths, building two levels instead of three, and providing simpler access to local roads. Total savings: \$37 M (54%).

PRACTICAL DESIGN FRAMEWORK

The framework for Practical Design includes identifying:

- **A goal.** Appropriately allocate limited resources in order to maximize statewide improvements. The idea is to develop the broadest benefits by utilizing existing resources.
- **Project-specific purpose and need statement.** Focus on unambiguous and specific performance targets.
- **State-specific factors.** Factors each state deems important to a project.

About two years ago, WSDOT started to examine their approach to projects from a Practical Design standpoint to look for ways to be more efficient.

WSDOT's Approach to Practical Design

Due to the post-recession fiscal realities and changing priorities of WSDOT leadership, WSDOT has recently increased its focus on Practical Design implementation. Overall, WSDOT's approach to Practical Design is to look at project delivery more programmatically and more incrementally. They plan to make these changes in three ways.

Changing Frameworks for Design and Delivery. WSDOT is analyzing how the tenets of Practical Design could influence aspects of its project design and delivery. It is not an overhaul of the design system, but represents WSDOT's dedication to continuous improvement in all areas. Examples of how WSDOT is incorporating Practical Design to refine and improve its practices include:

- Identifying how and where to apply flexibility in design standards.
- Continuing to add nuance to its design standard road classifications to make sure the right standards apply to the right projects.
- Focusing on goals and outcomes from the project beginning and bringing designers into those conversations to understand those goals.

Combining Similar Projects. By approaching projects more programmatically, regardless of project location, WSDOT can group similar projects around the state to streamline its methods and learn from past experiences.

The Fish Passage Barrier program is an example. WSDOT has grouped all of its fish passage barrier projects under the responsibility of three teams. These three teams work together to identify best practices and potential economies of scale. WSDOT plans to continue efforts to strategically identify similar projects where combining efforts would create efficiencies or improve project delivery.

Designing Incremental Improvements with Long-term Benefit. WSDOT is also attempting a more incremental approach to improving and preserving roadways. For example, limiting the initial scope of a project in the short term (reducing costs) to achieve the same higher priority goals and make an incremental investment toward longer-term needs. The plan is to start with lower cost projects utilizing available money. The incremental projects can become part of a larger solution. For example, if WSDOT identifies an unsafe stretch of highway, instead of immediately widening the road to create a larger median or shoulder it will assess the cause of the problem and try targeted smaller improvements. If rumble strips are added and safety is improved, WSDOT will have achieved its goal and spent less money. If the problem still exists, WSDOT could move forward with widening and still gain the additional safety benefit from the rumble strips on a wider highway.

State-Specific Regulations

Sales & Use Tax

Sales tax paid on construction accounted for approximately 5% of 2003-2012 preservation and improvement project costs (\$534 million). The sales tax, along with property and business and occupation taxes, is the foundation of Washington State's tax structure. The State relies on sales tax for 60% of its revenue, the highest in the nation.¹

Policy Overview

Washington State has a sales and use tax of 6.5% and local option sales taxes that can bring the effective tax rate up to 9.5% in some areas. One of the more important components of the tax base is tax applied to construction labor and materials. This tax treatment extends to public and private construction activities including WSDOT. Revenues from the sales and use tax collected from construction contracts support the State General Fund and local government activities (see Appendix A for more detail on Sales & Use Tax in Washington).

In accordance with RCWs 82.08 Sales Tax and 82.12 Use Tax, Washington State retail sales and use tax is applied to contractors² working on WSDOT projects on state-owned highways in two ways:

1. **Contractor gross receipts.** Sales and use tax is applied to the contractor's total billing, including charges for labor, services, sub-contractor costs, and materials.
2. **Contractor-purchased materials consumed during construction.** When WSDOT contractors purchase materials that will be consumed by the contractor during construction (i.e. temporary striping, barricades), the contractor is charged sales tax. Materials installed as part of construction are not subject to sales tax when purchased by the contractor.

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. In 1971, state-owned highways were removed from the Public Road Construction exemption in the sales tax statute that limits sales tax to materials, which are taxed at purchase by the contractor. Without this exemption, sales tax is charged based on the full contract price as with private construction activity. In addition, for materials that are consumed

KEY FINDINGS: SALES & USE TAX

Sales & Use Tax accounted for 5% of project costs. Sales tax is a more significant cost in Washington than in other states.

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. As a result of this differential treatment, the state sales tax cost is approximately 82% higher on these WSDOT projects than on local or federal projects.

Based on the analysis of the 10 years of sample contract data, changes to sales & use tax treatment of highway construction projects could have a high impact on cost savings.

¹ [A 50-State Review of State Legislatures and Departments of Transportation](#). The National Conference of State Legislatures and the AASHTO Center for Excellence in Project Finance, 2011.

² Applicable to all contractors working in the state unless specifically exempted.

during construction there is a double tax with sales tax paid at the point of purchase and again when those costs are included in the total contract billing. The different treatment and cost implications of the higher tax burden for state-owned highways are presented in the table below.

State Tax	State-owned Highways	City, County, Political Subdivision, & Federal-owned Highways
Sales & Use Tax	<ul style="list-style-type: none"> Applied to full contract price Materials that become part of the structure not taxed at purchase Materials used by contractor during construction (not part of structure) taxed at purchase 	<ul style="list-style-type: none"> Not applied to full contract price All materials taxed at purchase
B&O Tax	<ul style="list-style-type: none"> Retailing classification Both prime and subcontractors: 0.00471 	<ul style="list-style-type: none"> Public road classification Both prime and subcontractors: 0.00484
Example: State tax cost for \$1 M contract	Sales tax: \$71,100 Prime B&O tax: \$4,710 TOTAL: \$75,810	Sales tax: \$39,000 Prime B&O tax: \$4,840 TOTAL: \$43,840
Notes	State sales tax rate of 6.5% only. Contract assumptions: 10% consumed materials, 40% installed materials; 50% other costs.	

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

Comparison to Other States

Compared to other states, sales tax is a much more significant cost 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. States with sales and use taxes³ vary in how these taxes are applied to state highway construction labor services, gross receipts, and materials incorporated in the project or consumed during construction. Some states have special taxes that are applied to state highway construction and one state, West Virginia, returns state sales and use taxes collected on state highway project to the state highway fund. (See Appendix B for a summary of other states)

Policy Considerations

Impact on State General Fund. As noted earlier, Washington relies on sales and use taxes to fund government to a much greater degree than other states. Sales and use tax is deposited in the state General Fund. Any reduction in sales and use tax that benefits WSDOT construction costs would correspondingly reduce General Fund revenues.

Impact on Local Governments. A change in sales and use tax on construction services on state-owned highways would reduce local government revenues.

The Streamlined Sales and Use Tax Agreement (SSUTA), a multi-state agreement, governs the application of sales and use tax in the state. SSUTA Section 302 states that "the tax base for local jurisdictions shall be identical to the state tax base unless otherwise prohibited by federal law." This means that the state does not have the option to exempt construction services from only state sales and use tax and maintain the local option.

Potential Impact on Ability to Tax Federal Construction Contracts. Under the Supremacy Clause of the United States Constitution, the State cannot directly tax the federal government. On construction projects, the State imposes sales and use tax on the materials the federal contractors incorporate into projects.

The Department of Revenue (DOR) has expressed concern that creating new exemptions and deferrals for construction projects present "a significant legal risk that the federal government or federal contractors will seek to re-litigate *Washington v. United States*. Sales/use tax exemptions pose the greatest legal risk because they plainly treat the beneficiaries of the exemption more favorably than federal contractors."⁴

WASHINGTON V. UNITED STATES, 460 U.S. 536 (1983)

The US Supreme Court, in a 5-4 decision, upheld Washington's taxation of federal contractors in *Washington v. United States*, 460 U.S. 536 (1983).

According to the Supreme Court, "The important consideration is not whether the State differentiates in determining what entity shall bear the legal incidence of the tax, but whether the tax is discriminatory with regard to the economic burdens that result. The State does not discriminate against the Federal Government and those with whom it deals unless it treats someone else better than it treats them. Here, Washington has not singled out contractors who work for the United States for discriminatory treatment. It has merely accommodated for the fact that it may not impose a tax directly on the United States as the project owner."

³ Some states have an excise tax which has the same cost affect as sales and use tax.

⁴ Department of Revenue, Federal Contractor Concern, August 2013 p.1-2.

DOR also noted that including state-owned highways in the Public Road Construction exemption would likely NOT raise the risk of federal lawsuit, as this policy would treat state and federal contractors similarly. DOR has identified a potential impact at \$89 million per fiscal year if the State could not impose sales and use tax on federal contractors.

Impact on Existing Tax Code. The DOR has expressed a reservation about eliminating the double taxation of materials that are consumed during construction, which are currently taxed at the point of purchase and again when included in the total contract billing. This would add complexity to the tax code by adding a third scenario under which contractors pay tax on materials (sales and use tax on contractors, public road construction exemption, and a new WSDOT project on state-owned roads exemption) each of which is different. "Providing this type of exemption only for state transportation projects would add significant complexity for administration and contractors buying materials on a project."⁵

Potential Cost Impacts

Based on the analysis of the ten years of contract data, changes to sales tax treatment of highway construction projects could have a high impact on cost savings. Looking backward, WSDOT could have saved the following if different policies were in place:

- Up to \$227 M, if projects on state-owned land were taxed similarly to projects on local and federal land (Potential Action 2).
- Up to \$336 M, if state sales & use tax was directed back to transportation funding (Potential Action 3).
- Up to \$42 M, if contractors were exempt from paying sales tax on consumed materials for projects on state-owned land (Potential Action 4).

⁵ Email to consultants on January 13, 2014 from Beau Perschbacher, Department of Revenue.

Prevailing Wage

WSDOT construction contractors are subject to RCW 39.12 - Washington State's Prevailing Wages on Public Works Act. Contractors working on projects that receive federal funding are also subject to the federal Davis-Bacon and Related Acts (DBRA) 40 USC section 3142.⁶ State law requires the payment of prevailing wages for workers, laborers, and mechanics on public works. On WSDOT projects with federal aid, the State requires contractors to pay the state prevailing wage rate if it is higher than the federal rate. State law defines the prevailing wage as the hourly rate of wage, usual benefits, and overtime paid in a locality to the majority of workers, laborers, or mechanics, in the same trade or occupation. (RCW 39.12)

The purpose of state prevailing wage law is to "protect workers from substandard earnings and to preserve local wage standards" (Everett Concrete Products, Inc. v. Department of Labor and Industries. State Supreme Court, 1988). The law is administered by the Washington State Department of Labor and Industries (L&I). L&I's responsibilities are establishing prevailing wages, determining labor classifications and associated scopes of work, processing and certifying contractor intent to pay prevailing wage and affidavit forms, investigating complaints, and receiving and distributing certified payroll records.

- The prevailing wage rate is set via survey, based on the methodology in WAC 296-127-019. (See Appendix C for a sample survey)
- Surveys are completed by occupation. The goal is to update each occupation via survey every three years with a 15-25% response rate. In actuality, surveys are conducted much less frequently.
- If a survey shows that the majority of a wage is the same as a collective bargaining agreement (CBA), then it is a CBA-derived rate and biannual increases are based on the adopted CBA. If not, there are no increases until the occupation is re-surveyed.

State and federal prevailing wages are difficult to compare due to differences in job classifications and how prevailing wages are set. The prevailing wage is expressed as a total wage (which includes hourly wage and usual benefits), holiday, overtime, and special pay requirements. Given the diversity of industries that work on public works projects, there are between 300 - 500 separate wage rates in each of the 39 counties in the state.

⁶ "Many federal laws that authorize federal assistance for construction through grants, loans, loan guarantees, and insurance are Davis-Bacon "related Acts." The "related Acts" include provisions that require Davis-Bacon labor standards apply to most federally assisted construction. Examples of "related Acts" include the Federal-Aid Highway Acts." U.S. Department of Labor, Fact Sheet 6 The Davis-Bacon and Related Acts

KEY FINDINGS: PREVAILING WAGE

Application of Rates

- State and federal prevailing wages are difficult to compare due to differences in job classifications and how prevailing wages are set.
- 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.

Other States

- 18 states have no prevailing wage laws: 10 used to have laws that have since been repealed, while 8 never had prevailing wage laws.

Cost Impacts

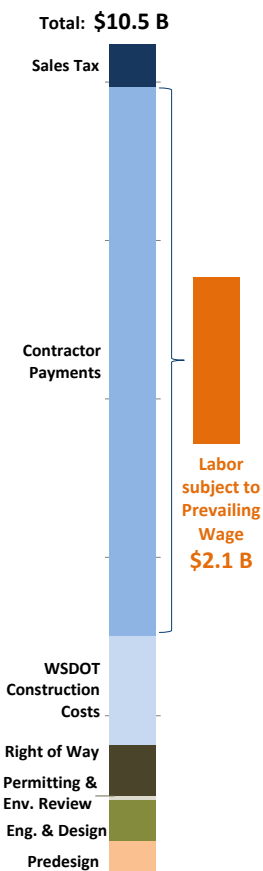
- The prevailing wage law acts as a floor on wage rates and may increase costs in some circumstances, though market factors likely play a greater role.
- State law applies to a broader range of activities than federal law.
- On a programmatic level, it is not possible to estimate the impact from labor rate floor and broader base.
- Research studies are split on whether or not prevailing wage laws make projects more expensive.

LABOR COSTS SUBJECT TO PREVAILING WAGE

Due to data limitations it was not possible in the course of this study to specifically identify the labor portion of the \$10.5 B in project costs that was subject to prevailing wage. These challenges are described on page 50.

Based on discussions with contractors working with WSDOT, a "typical" contract may be composed of 30% labor subject to prevailing wage, 10% labor not subject to prevailing wage, 50% materials/equipment and 10% overhead and profit.

Using these metrics, labor subject to prevailing wage is estimated at \$2.1 billion (or 20%) of the \$10.5 B in project costs.



At the federal level, prevailing wages are set via the rules in DBRA. The wage is expressed as the hourly wage and usual benefits. Wages are set in four categories (residential, highway, heavy, building), within which there are multiple occupations and associated wages. In the last ten years, federal aid projects accounted for 82% of contracts and would have paid the federal prevailing wage, even if there was no state prevailing wage.

Prevailing Wage Administration

Contractors and subcontractors are required to submit the following to L&I to conform with prevailing wage requirements:

- Statement of Intent to Pay Prevailing Wage form
- Affidavit of wages paid
- Certified copy of accurate work and pay records upon request

The federal prevailing wage law has additional requirements:

- Certified payroll records – submitted weekly to project manager
- Employee interviews – allow for interviews during working hours

Prevailing Wage Cost Impacts

The state prevailing wage law does two things that could impact the labor costs of WSDOT projects. First, the law places a floor under labor rates to be paid on WSDOT projects. The floor is the state rate for state-funded projects and the higher of the state or federal rate for federal-aid projects. Second, the wording of the state law has led the courts to conclude that the application of the state law is broader than the application of the federal prevailing wage law.

We approached the question of whether prevailing wage increases costs through a literature review and a salary review. The research literature is 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.
- There are no specific studies on the impact of prevailing wage vs. no prevailing wage for WSDOT projects.
- Nationally, studies vary on the 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 (See sidebar and Appendix D for a summary).
- Aspects of the state program add administrative burden, such as the use of a paper based survey and determining the higher of the two wages (federal or state).

- As a result of a series of court decisions, the state prevailing wage applies to a broader range of activities than the federal law. There have been nine rule changes since 1993, five of which amended scope of work definitions for specific work activities (See Appendix E for a summary).

To delve deeper into the relationship between overall construction wages and prevailing wages, two additional analyses were conducted: (1) a review of construction industry salaries across states using Bureau of Labor Statistics (BLS) data; and (2) analysis of detailed L&I affidavits.

Based on prevailing wage affidavits submitted to L&I, the average reported salary for all labor positions reported for WSDOT contracts was \$64,400 per year. This is an estimate of wages only and is adjusted to 2013 dollars.

The L&I average is higher than the \$53,688 average for the entire construction sector discussed in the cost analysis chapter. While this differential could be related to prevailing wage, there are also significant differences in types of labor employed in highway construction versus other construction sectors.

To better align the L&I data with a narrower industry sector, average wages were collected for the highway, street, and bridge construction sub-sector. The U.S. BLS tracks average annual salary by state by industry code.

- 2012 annual average wage for highway, street, and bridge construction in Washington State was \$65,722, which is 2% higher than the wages included in the data from L&I for WSDOT construction.
- Washington's average wage is approximately 8.5% higher than the same average wage for the nation.
- By state, the average wage for highway, street, and bridge construction ranges from approximately \$41,610 in Alabama to \$85,966 in New York (excluding Alaska, which has the highest rates in the U.S.).

While this BLS industry average is still broader than WSDOT, it does primarily include public works transportation projects, of which state DOTs are a likely major contributor. Looking at averages and trends for the peer and neighbor states shows a similar pattern as the overall construction sector, though Washington is now higher than the national average.

PREVAILING WAGE STUDIES

Studies are mixed on whether prevailing wage adds to project costs: five of the studies reviewed found prevailing wage to be a benefit in terms of productivity that either balanced out additional cost or did not produce higher costs and five found that prevailing wage increased costs.

Pro Prevailing Wage Studies:

- The Adverse Economic Impact from Repeal of the Prevailing Wage Law in Missouri
- An Analysis of Davis-Bacon Prevailing Wage Requirements: Evidence from Highway Resurfacing Projects
- The Benefits of State Prevailing Wage Law
- Kentucky's Prevailing Wage Law: Its History, Purpose and Effect
- The Economic Development Benefits of Prevailing Wage

Con Prevailing Wage Studies:

- An Economic Examination of West Virginia's Prevailing Wage Law
- Prevailing Wage Laws: Public Interest of Special Interest Legislation
- Prevailing Wage Laws in NY State: The Impact on Project Cost and Competitiveness
- The Effects of the Exemption of School Construction Project from Ohio's Prevailing Wage Law
- Prevailing Wage Laws: Greed Disguised as Public Policy

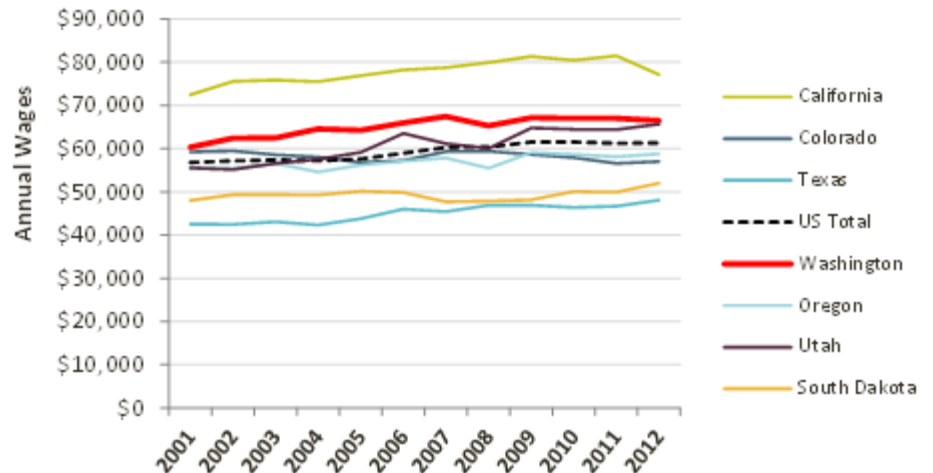
APPLICABLE INDUSTRIES

“Public works” labor is defined as all work, construction, alteration, repair or improvement, other than ordinary maintenance, executed at the cost of the state or any municipality or political subdivision of the state. Maintenance, when performed by contract, is considered public work that is subject to prevailing wage requirements. (RCW 39.04.0104)

State prevailing wage laws (RCW 39.12.020) prescribe the payment of prevailing wages “upon all public works”: which applies to:

- **Offsite prefabrication.** Offsite fabrication of *nonstandard* items specifically produced for a public works project is considered public work for which prevailing wages are required. Offsite fabrication of *standard items* is not considered public work and is not subject to prevailing wage requirements.
- **Gravel and asphalt production and delivery.** Workers involved in the production and delivery of gravel, concrete, asphalt, or similar materials, unless delivering to a stockpile, are subject to prevailing wage rules. (WAC 296-127-010(5)(b) and WAC 296-127-018)
- **Employees other than workers, laborers, or mechanics.** The prevailing wage requirements do not apply to employees whose work is clerical, executive, administrative or professional in nature.

Exhibit 25
National and State-specific Highway, Streets and Bridges Construction Wages, 2001-2012 (2013 \$)



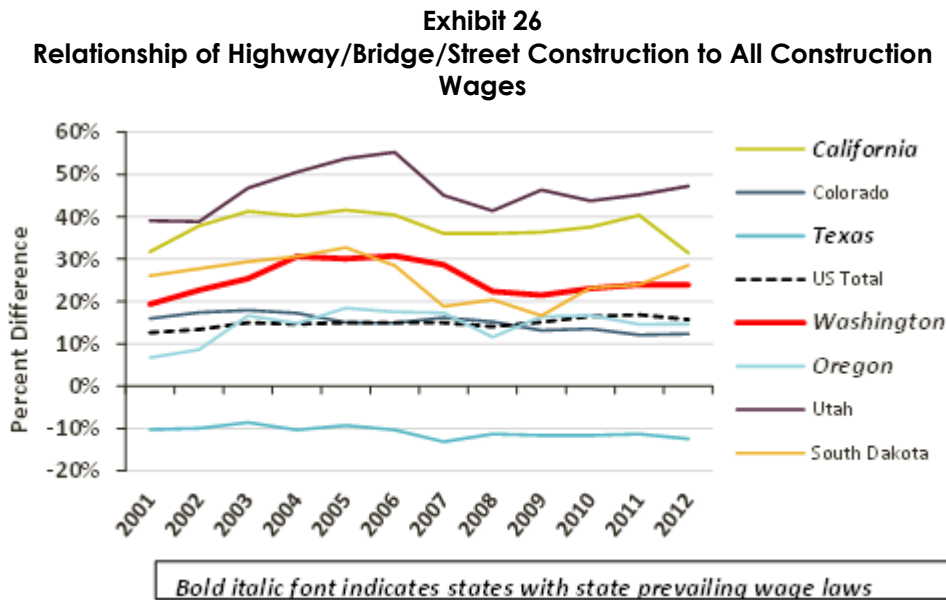
Source: US Bureau of Labor Statistics, 2013; and BERK, 2013.

The previous analysis suggests that the overall average wage paid to the portion of labor on WSDOT contracts subject to the prevailing wage is closely aligned with overall statewide average wages for the highway, streets and bridges sub-sector.

Another noteworthy finding is that the average sub-sector wage was higher than the national average, while the overall construction average wage was much closer to the national average, suggesting that there is a relative premium in Washington for highway sector wages.

To explore this question further and to see to what degree this premium might be related to prevailing wage law, the wages in the highway sector were compared with the average wage for all construction sectors for the peer and neighbor states.

Exhibit 26 shows that all of the selected states except Texas show a similar pattern where highway sector wages are at a premium over the full sector average. Further, the premium varies widely among the selected states and can vary widely over time within each state. The overall national averages suggest an industry premium of between 10% and 15% and Washington fluctuating between 20% and 30%. The states with the greatest premium appear to be Utah followed by California.



Source: US Bureau of Labor Statistics, 2013; and BERK, 2013.

What is particularly noteworthy is that the highway construction wage premium does not seem to correlate with states that have a prevailing wage. For example California and Texas both have prevailing wage laws, while Utah, Colorado, and South Dakota do not. **This tends to support the overall conclusion from the review of other studies that it is unclear to what extent prevailing wage laws drive overall wage levels.**

Prevailing Wage in Other States

While 31 states, including Washington, set a state prevailing wage rate, 18 states have no prevailing wage laws, but use the federal prevailing wage on all federal aid projects.

Ten of these states once had laws that have since been repealed, while eight never had prevailing wage requirements. One state has a prevailing wage law, but does not set a prevailing wage rate. (See Appendix F for a summary of other states)

Prevailing Wage Data Challenges

L&I provided us with their prevailing wage affidavit database for the last 10 years. The goal was to quantify the wages subject to prevailing wage on WSDOT projects. However, through cleaning and analyzing the database, multiple significant data challenges arose that prevented a reliable calculation of this wage amount.

The first step was to match the affidavit database to the WSDOT project database. Given expected variation and errors in any dataset, it was important to match as many projects as possible so overall findings would be meaningful. However, the prevalence of multiple types of data errors led to a decision that this database could not produce reasonable numbers for this study. These data issues included:

- **Data Entry Errors.** Contractors must enter three numbers to enable calculation of total wages: an hourly salary rate, hourly fringe rate, and hours worked quantity. Many lines include data errors that significantly alter calculations, such as missing periods. For example, one project listed hours worked as 193291 instead of 1932.91. This resulted in total payments listed at \$8.4 million instead of \$84,000. While we found some of these errors and fixed them, there are hundreds in the dataset and no consistent way to screen for them.
- **Missing or Incorrect Contract Numbers.** The only way to match the affidavit database to the project database was through a Contract Number field on the affidavit form. This field was inconsistently filled out, especially for subcontractors, which meant we could not pull in all of the wages associated with a given project.

For example, on the Tacoma Narrows Bridge, only four affidavits (one for the prime contractor and three for subcontractors) listed the correct contract numbers for the project. However, the project included the use of more than 90 subcontractors, so we know that these affidavits only represent a subset of all labor on the project. This issue came up for many projects, and without a systematic way to identify where these issues are and to find the associated affidavits, we were not able to include a large portion of wages in the analysis.

- **Prevailing Wages versus Actual Wages.** While affidavit instructions ask contractors to report actual wages paid, the certification statement that the contractor must sign at the end of the affidavit asks them to certify that, "...all workers I employed on this Public Works Project were paid no less than the Prevailing Wage Rate(s)..." This may result in the contractor listing the prevailing wage rates rather than actual rates for some positions, which would result in an understating of wages paid for some projects. Since the information provided becomes public, there are competitive reasons why some contractors may prefer to report the prevailing wage in lieu of actual wages paid, though it is not possible to know how frequently this might be done in practice.

Given these challenges, it was not possible in the course of this study to come to a meaningful conclusion about prevailing wage costs over the 10-year study period.

KEY FINDINGS:
ENVIRONMENTAL REVIEW,
PERMITTING, & MITIGATION

Environmental Review & Permitting.

Environmental review is a small portion of overall project costs. Projects are subject to regulations from federal, state, and local agencies. For environmental review, NEPA and SEPA are the primary regulations that impact project design decisions.

The 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% had a Categorical Exemption from SEPA.

Approximately 3% of WSDOT's projects underwent an Environmental Impact Statement (EIS) or Environmental Assessment (EA) due to NEPA, and about 1% included an EIS due to SEPA.

Mitigation. Mitigation costs cannot be easily split out within the 84% of costs that are construction. Analysis suggests the majority of mitigation is based on required elements, for example, stormwater and wetlands. WSDOT currently uses its design process to avoid and minimize impacts; however, it is not clear the degree to which WSDOT could programmatically reduce compensatory mitigation required by state and federal regulations.

Environmental Review, Permitting, & Mitigation

Costs associated with environmental review, permitting, and mitigation are frequently mentioned as a significant contributor to project costs. Our cost analysis identified relatively small shares of expenditures related to the environmental review and permitting process. That said, decisions made during these processes affect mitigation costs, which were found to be a significant share of project costs. The following were reviewed together because they are interrelated:

- **Environmental review** is a process 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 the State Environmental Policy Act (SEPA) and National Environmental Policy Act (NEPA) goals and policies.
- **Permitting** is a 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.

Environmental Review & Permitting

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.

The **National Environmental Policy Act (NEPA)** [42 U.S.C. 4321 et seq.] was signed into law on January 1, 1970. The Act establishes national environmental policy and goals for the protection, maintenance, and enhancement of the environment and provides a process for implementing these goals within the federal agencies. NEPA Review and documentation are required for all Federal agency "actions" that are not categorically excluded, including:

- Federal Projects
- Issuance of Federal Permits
- Projects with Federal Funding
- Projects on Federal Land

Seventeen states, including Washington, have implemented **state environmental policy acts (SEPA)**. In Washington, SEPA Review is required for all state or local agency "actions" that are not categorically exempt (WAC 197-11-704), including:

- **Project Actions:** Construction of roads, public buildings, utilities; private construction projects that require a state or local permit.

- **Non-project Actions:** Rules, ordinances or regulations; Comprehensive Plans or zoning codes; Road, street and highway plans.

Some transportation 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. NEPA and SEPA lead agencies can agree to be co-lead agencies and issue joint NEPA/SEPA documents. SEPA rules (WAC 197-11-610) allow the use of NEPA documents to meet SEPA requirements.

- A NEPA Environmental Assessment (EA) may be adopted to satisfy requirements of a SEPA DNS or an EIS.
- A NEPA Environmental Impact Statement (EIS) may be adopted as a substitute for a SEPA EIS.
- Federal documents may also be incorporated by reference as support for issuance of a SEPA document (WAC 97-11-635).

Generally, NEPA requirements are equal to or more stringent than SEPA and NEPA review is typically longer. Large, complex projects are likely to require an EA or EIS, which requires additional or expanded evaluations of:

- Environmental Justice
- Social, Economic, and Relocation
- Public Lands (Section 4(f), 6(f) and Forests)
- Farmland and Agriculture
- Historic, Cultural, and Archeological Resources

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). NEPA CEs have been updated many times in the past few years, whereas SEPA has not. SEPA adds process requirements on projects that require SEPA checklists and Determinations of Non-Significance that do not exist with NEPA CE projects (e.g., public notice, circulation, and 14-day comment period).

WSDOT has three typical review scenarios:

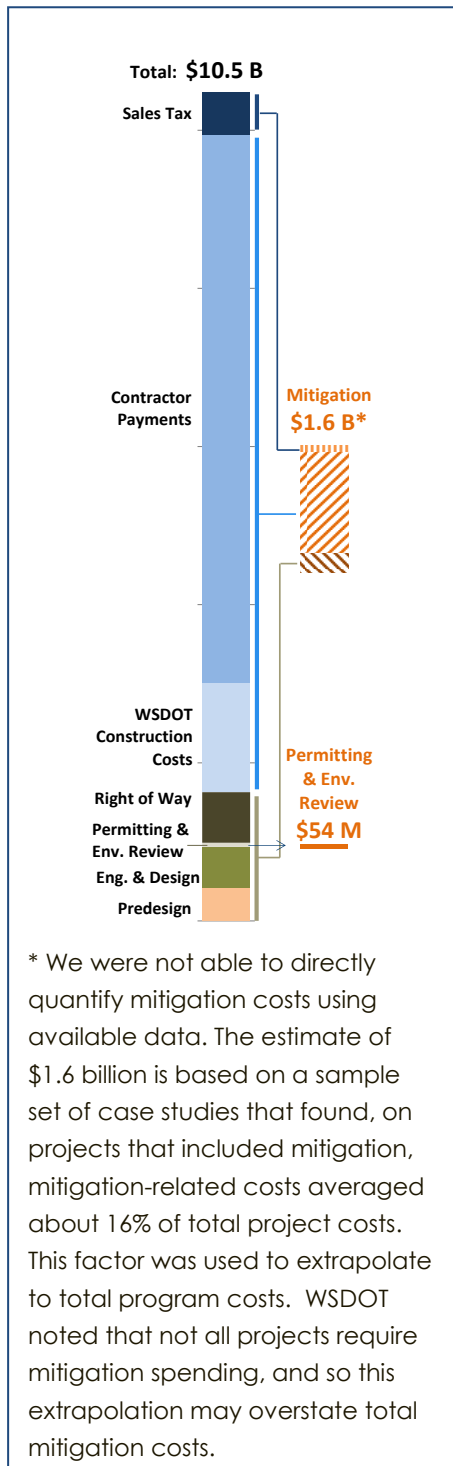
1. Large projects that use combined NEPA/SEPA documents. In this case, NEPA requirements are used by WSDOT;
2. Projects that are categorically exempt by SEPA and don't require any further SEPA review; and
3. Smaller projects that qualify for a NEPA categorical exclusion but not a SEPA categorical exemption. These require both NEPA categorical exclusion documentation and a SEPA checklist with comment period.

**PREVIOUS ENVIRONMENTAL
REVIEW PROCESS STUDIES
THE GRAY NOTEBOOK, EDITION
33, MARCH 2009 (PAGE 59):**

In 2005, JLARC completed two reviews of the environmental review process as it relates to transportation projects. This review concluded that the NEPA documentation process was not the cause of delay; the major contributing causes were funding uncertainties, design changes, lack of adequate federal and state resource agency staffing, and changes to or new regulation.

In 2008, the Washington division of FHWA reviewed WSDOT's performance on the simplest project-level environmental reviews. These projects are categorically exempt under NEPA when federal actions are involved, and excluded under SEPA when state actions are involved. Since 1999, Washington State has very effectively applied an administrative delegation of authority from FHWA that allows WSDOT to administer NEPA.

Upon examining 944 projects classified as categorical exclusions under NEPA during the 2005-2007 biennium, FHWA was pleased with WSDOT's performance. Of those 944, 566 were signed by FHWA and 388 were completed by WSDOT without FHWA signature under our joint agreement. Following their review, FHWA reiterated their support for the agreement that allows WSDOT to expedite NEPA approval for the simplest projects.



Frequency of Application. WSDOT provided the data shown in Exhibit 27 that summarize environmental review activity for 317 projects that were advertised for construction during the 2011-13 biennium.

Exhibit 27
Frequency of Environmental Review for 2011-12 Biennium Projects

NEPA				SEPA		
EIS	EA	CE	No NEPA	EIS	DNS	CE
4 (1%)	7 (2%)	297 (94%)	9 (3%)	4 (1%)	47 (15%)	266 (84%)

Notes

EIS – Environmental Impact Statement
 EA – Environmental Assessment
 NEPA CE – Categorical Exclusion
 DNS – SEPA Checklist/Determination of Non-Significance
 SEPA CE – Categorical Exemption

The 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% had a Categorical Exemption from SEPA. Three percent of WSDOT's projects underwent an Environmental Impact Statement (EIS) or Environmental Assessment (EA) due to NEPA, and about 1% included an EIS due to SEPA.

The environmental review process can increase public acceptance and lead to improvements/efficiencies in overall project design. However, it is worth noting that views are mixed. There are those that perceive that environmental regulations are overly burdensome and those that believe SEPA is not stringent enough and that some impacts are not being mitigated under current law.

Many efforts to streamline the permitting process have been implemented over the past decade (see Appendix G).

Mitigation

Mitigation activities fall into the following categories:

Temporary. Temporary embankments, water quality monitoring, stream by-passes, dust prevention, erosion control, etc.

Stormwater. Conveyance to treatment facility, pipes, inlets, manholes, flow control structures, fencing, property acquisition, etc.

Wetland. Retaining walls, altered alignment, bridges, property acquisition, wetland construction, fencing.

Stream. Long bridge spans, retaining walls, riparian area enhancements, etc.

Noise. Property acquisition, concrete foundations and walls, other barriers, clearing and grubbing, wall aesthetic treatments.

Context Sensitive Solutions. Community gateways, concrete stamping and coloring, unique railing or fencing, special landscaping, shared-use paths.

Mitigation Type	% of Estimated Mitigation Cost	Required By	Administered Through	Technical Requirements
Stormwater Facilities	51.3%	Federal Clean Water Act (CWA)	Ecology NPDES Permit	HRM*, SMMWW [^] , SWMMEW ⁺
Wetland Restoration	20.9%	CWA; GMA; Fed and State No Net Loss Policy	ACOE 404 permitting & Local CAOs	Wetland Mitigation in Washington State
Noise Walls	14.6%	Federal Rule 23 CFR 772; FHWA Guidance	WSDOT	WSDOT: Noise Policy and Procedures
Stream Protection	10.3%	CWA; GMA; ESA	ACOE 404 permitting & WDFW HPA	Washington Department of Fish & Wildlife (WDFW)
Context Sensitive Solutions	1.9%	NEPA, ISTE, National Highway System Designation Act of 1995, and RCW 47.04.330	WSDOT in collaboration with local partners	
Temporary Mitigation	0.7%	NEPA, SEPA, local governments	Permit conditions from Ecology and local governments	WSDOT Best Management Practices (BMP)
Dust Control	0.3%	Federal Clean Air Act, National Ambient Air Quality Standards, Washington Ambient Air Quality Standards	Permit conditions from Ecology	WSDOT BMP

Stormwater

Stormwater mitigation makes up the largest share of mitigation costs. Costs come primarily from requirements for flow control and treatment facilities. WSDOT must comply with federal and state water quality laws for the 40,000 acres of impervious surfaces it operates and maintains. WSDOT follows the stormwater permit process, including the Highway Runoff Manual (HRM).

The HRM includes minimum requirements and best management practices equal to those found in the state Department of Ecology's Stormwater Management Manuals for Western and Eastern Washington. The two manuals reflect the significant differences in climate, hydrology, and geology in eastern Washington compared to western Washington.

Notes:

* WSDOT Highway Runoff Manual

[^] Stormwater Management Manual for Western Washington

⁺ Stormwater Management Manual for Eastern Washington

WHY MITIGATION RATIOS?

Source: Wetland Mitigation in Washington State Part 1: Agency Policies and Guidance (2006)

Risk of Failure. Some wetland mitigation projects do not successfully compensate for wetland function loss and degradation.

Temporal Loss. It may take many years for a compensation site to achieve the “ecological equivalency” to replace lost wetland function.

Some Types of Compensation Result in a Net Loss. Some types of compensation result in a net loss of wetland acreage and/or function (e.g., enhancement or preservation). One way to minimize this loss is to require larger amounts of compensation.

Type of Wetlands and their Functions. Loss of a wetland with high functions carries a higher risk of failing to replace the functions.

The Location and Kind of Compensation. Out-of-Kind or distant replacement have a higher likelihood of degrading overall wetland functions.

Permanence or Degree of Impact or Alteration. In some cases a wetland may only be temporarily disturbed. Impacts that are relatively short in duration generally require lower mitigation ratios than permanent impacts.

Wetlands

Twenty-two projects (7% of projects) required wetland mitigation. **Our general finding is that we are doing what the federal government requires in terms of wetlands mitigation, similar to other states. Although our specific geography and climate may trigger the need for mitigation more frequently than in other locations (e.g., we have more wetlands than other states), the overall standards are not significantly different.**

The following policies and laws impact wetland mitigation activity.

US Army Corps of Engineers. Section 404 of the Federal Clean Water Act regulates discharge of dredge or fill materials to waters of the US. Waters of the US include lakes, rivers, streams, and wetlands.

Governor’s Executive Order 98-10 states “Achieve no overall net loss in acreage and function of Washington’s remaining wetlands base”.

State Growth Management Act (GMA) requires that all cities and counties in the state designate and protect the functions and values of critical areas using best available science. Critical areas are defined as:

- Wetlands
- Areas with a critical recharging effect on aquifers used for potable water
- Fish and wildlife habitat conservation areas
- Frequently flooded areas, and
- Geologically hazardous areas

Critical Areas Ordinances (CAOs) require mitigation for impacts to critical area AND buffers (NEPA only requires critical areas). “The buffer for a wetland created, restored, or enhanced as compensation for approved wetland alterations shall be the same as the buffer required for the category of the created, restored, or enhanced wetland.”⁷

- Mitigation ratios for buffers are typically 1:1⁸
- Mitigation ratios for wetlands are consistent with the Wetland Mitigation Manual in Washington State (2006)

⁷ Department of Commerce: [Example Code Provisions For Designating and Protecting Critical Areas](#).

⁸ See for example, King County (21A.24.340) and Clark County (40.450.040.D.6 & Table 40.450.030-2)

Wetland Mitigation in Washington State. This manual provides compensatory mitigation guidelines and ratios. Joint guidance is provided by the Washington State Department of Ecology; U.S. Army Corps of Engineers Seattle District; and U.S. Environmental Protection Agency Region 10. This guidance helps insure that mitigation decisions are consistent across federal and state agency wetland mitigation requirements.

Mitigation type and cost are based on the size and function of the impacted wetland. In all cases, WSDOT takes the following steps in mitigation decisions:

1. **Avoid.** Adverse impacts to aquatic resources are to be avoided and no discharge shall be permitted if there is a practicable alternative with less adverse impact.
2. **Minimize.** If impacts cannot be avoided, appropriate and practicable steps to minimize adverse impacts must be taken.
3. **Compensate.** Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts which remain. The amount and quality of compensatory mitigation may not substitute for avoiding and minimizing impacts.

Compensatory mitigation only comes in after all impacts have been avoided and minimized to the greatest extent practicable. To determine the compensatory mitigation needed, the project applicants must answer the following questions to the satisfaction of the permitting agency:

- What are the types and extent of wetlands (area and function) affected by the project?
- How will proposed mitigation compensate for impacts (i.e., how will the project contribute to the goal of no net loss of wetland area, functions, or both)?
- Will the proposed mitigation be successful and sustainable?

In 2008, Ecology convened a multi-agency, multi-stakeholder forum to explore the state of mitigation and how to improve outcomes. The forum recommended use of mitigation banks and In Lieu Fee (ILF) programs. Instead of being responsible for monitoring the site for 10 years and managing the mitigation, the applicant purchases credits and is relieved of any further responsibilities for the mitigation. There are currently 13 mitigation banks and two ILF programs in operation that cover much of the Puget Sound area and I-5 corridor. WSDOT has three certified mitigation banks. Where these programs exist, they are often preferred over individual mitigation sites.

Ratios are a coarse tool based on area, wetland category, and work performed to determine anticipated gains in functions from the mitigation. Ratios are not hard line requirements but are used to provide predictability. Actual mitigation requirements are determined on a case by case basis.

Mitigation banking can be thought of as a type of "savings account" for mitigation. The bank owner creates, restores, enhances and preserves functioning wetlands prior to environmental impacts. These acres are then converted to "bank credits" that can be used later as compensation for unavoidable wetland impacts within the bank's specified service area.

In-Lieu Fee mitigation is an option where project proponents pay a third party to provide mitigation instead of building a project-specific mitigation site.

WSDOT NOISE POLICY PROCEDURES DEFINITIONS

Feasibility is a combination of acoustic and engineering considerations that asks - "Can abatement be constructed that achieves a meaningful reduction in sound levels?"

Reasonableness is evaluated after abatement is found to be feasible and assesses the practicality of the abatement based on a number of factors. Required factors are cost effectiveness, consideration of the viewpoints of the property owners and residents of benefited receptors, and noise abatement performance (noise reduction design goal).

Based on noise wall costs from 2007-2010, the current average costs for Washington State are:

- Type I Noise Walls: \$51.61/ft²
- Type II Noise Walls: \$75.10/ft²

Oregon has a completely different system to regulate wetlands. Oregon has Statewide Removal-Fill Law, which requires a wetland fill permit separate from the federal Corps of Engineers permit.⁹ Oregon compensatory mitigation ratios are as follows:

- Restored: 1:1
- Created: 1.5:1
- Enhanced 3:1

However, Oregon has a host of other requirements and policies including in-kind replacement generally being required; an allowance to increase ratio for temporal losses; and more established system of mitigation banks and fee-in-lieu options. Utah appears to have no regulatory role in wetlands protection relying solely on the Corps for permitting.

Noise

Noise walls accounted for 15% of the mitigation costs in the case studies. Federal rules require that state DOTs develop noise policies that are approved by FHWA. WSDOT's [Noise Policy Procedures](#) are based on the federal rule, and noise analysis occurs within the NEPA/SEPA process. Mitigation or abatement, which usually consists of noise walls, is required if:

- Feasible (sound level reductions, constructability)
- Reasonable (within allowable cost with design goal achieved)
- Acceptable to the public (eligible residents want abatement)

FHWA approves all final mitigation/abatement design.

Fish Passage

While we could not analyze the cost of fish passage barriers in the historical data used for this study, barrier correction is an emerging issue that could be a significant driver of future mitigation costs.

A U.S. District Court injunction (part of the U.S. v. WA culverts case) requires the state to correct 847 WSDOT culverts in western Washington by 2030. This case has been appealed to the Ninth Circuit. Statewide, WSDOT has 3,204 crossings on fish bearing streams, of which 1,519 have the potential for significant habitat gain – at least 200 linear meters of habitat without a natural barrier. Of these barriers, 1,013 are within the court case area, of which 847 have significant habitat gain and are subject to the court order. Up to 10% of the 847 culverts subject to the order can be deferred.

⁹ Environmental Law Institute, [State Wetland Protection: Status, Trends & Models](#), March 2008.

Fish passage barrier corrections are funded in one of three ways:

- Stand-alone project
- Part of a larger highway project – barrier culverts that are within the geographic limits of the highway project
- Maintenance program – limited to cleaning out and not always a complete barrier correction

Funding for the 2013-15 biennium includes \$36 million in stand-alone projects. Twenty-six are funded for construction: 16 of which are in regions subject to the court order while the other 10 are not.

WSDOT has estimated the costs to comply with the Court Order at \$310 million per biennium or \$2.4 billion from 2015-2030. This estimate assumes that all are constructed as stand-alone projects.

KEY FINDINGS: RISK ASSIGNMENT

WSDOT is currently authorized to deliver projects using three project delivery methods:

- Design-Bid-Build Contracting
- Design-Build Contracting
- State Force Work

Other states use a method known as General

Contractor/Construction Manager (GC/CM), which can provide additional risk sharing with contractors.

WSDOT should choose its delivery methods appropriately based on:

- Size and complexity of the project
- Project schedule and cost

The Legislature should consider allowing more flexibility for WSDOT to use Design-Build on more projects and to allow GC/CM contracting so project managers can choose the method most appropriate to their project needs.

Risk Assignment

One of our major analytic findings is that some of the biggest differences between construction contract award amounts and final contract payments are due to non-trivial errors on large projects. Design-Bid-Build contracting results in the highest owner risk assumption and is the method that WSDOT uses most often. Risk should be allocated to the party (WSDOT or contractor) best suited to manage the risk with the correct mix of core competencies. WSDOT should consider adjusting how it shares risk with its contractors to minimize unexpected expenditures in the future.

Should GC/CM contracting be authorized?

- 17 states authorize GC/CM contracting for transportation departments.

Could Design-Build contracting be used more to reduce WSDOT's share of project risk?

- 27 of 45 states using Design-Build have no threshold or limit on Design-Build projects. (State law limits Design-Build to projects over \$10 M plus an additional five projects between \$2 M and \$10 M that have already been undertaken).

It is important to note that risk transfer opportunities do not come without cost. Since the design is much less developed when a Design-Build contract is procured, contractors must make judgments about the uncertainties at that stage and their ability to mitigate these potential risks. They account for these factors in their bids.

Project Delivery Methods

Project delivery is defined as the method for assigning responsibility to an organization or an individual for providing design and construction services. The decision to use a particular project delivery method is made during the pre-design phase and depends on:

- Size and complexity of the project
- Project schedule and cost
- Whether the delivery method is authorized

While no single project delivery method is right for every project, there are characteristics of the methods, in particular risk allocation, that should be considered. This section discusses four project delivery methods. The first three are used by WSDOT while the fourth is not, though it is used by other state DOTs.

- State force labor
- Design-Bid-Build
- Design-Build
- General Contractor/Construction Manager (GC/CM)

State Force Work

State Force Work is construction work conducted by WSDOT maintenance and traffic staff, contracted through the highway construction program. It does not include inspections, environmental work, or mitigation work. RCW 47.28.030 allows state force work where the labor costs are less than \$60,000 or less than \$100,000 if delaying the work would jeopardize a state highway or constitute a danger to the traveling public.

WSDOT Implementation. WSDOT used state force construction workers on approximately 42% of projects in the project database. Expenditures on state force construction work totaled \$90.7 million over the ten-year period (when adjusted to 2012 dollars). Consistent with the statutory limitations on using state force work, the majority of effort was spread over very small projects and small tasks on larger projects, such as traffic control.

Design-Bid-Build

Design-Bid-Build is the most commonly used transportation contracting method with the least amount of risk allocated to the contractor. Under this method, the owner (WSDOT) is responsible for design of the project using their own staff or consultant services. Plans, specifications and estimates are prepared by the owner's engineer. The owner advertises the project and awards the contract to the lowest responsible bidder. A separate construction contract is issued based on the completed construction document. The owner is responsible for the design and warrants the quality of the construction documents to the contractor.

WSDOT Implementation. RCW 47.28 establishes Design-Bid-Build requirements. Currently, it appears that Design-Bid-Build is the default contracting method and Design-Build (or other methods) is treated as an exception, where a project manager needs to make a case for its use. Analysis of the project database (projects completed between 2003-12) showed that over the past ten years WSDOT completed 99% of its contracts using Design-Bid-Build, which comprised 76% of all contract dollars.

Design-Build (DB)

With Design-Build, the design and construction phases are combined into one contract and awarded to a contractor (or team of contractors). This method shifts more risk to the contractor as they are responsible for the design work. Hand-off from WSDOT to the contractor takes place at 20-30% design. Construction can begin immediately after designs are completed.

WSDOT Implementation. RCWs 47.20.780 and 47.20.785 authorize Design-Build for projects greater than \$10 M and for five pilot projects greater than \$2 M where Design-Build is critical to construction methodology; there is an opportunity for greater innovation and efficiencies between designer and builder; or there are likely to be significant savings in delivery time. Analysis of the project database

2006 FHWA DESIGN-BUILD EFFECTIVENESS STUDY

This study included results from other studies, including one from Washington and a survey on state Design-Build programs. High-level findings: 14% reduction in project schedule, 3% reduction in project cost compared to Design-Bid-Build no change in project quality:

Advantages

- Time savings: early involvement of contractor, overlapping design and construction, no separate contractor bidding
- Cost savings: communication efficiencies, few change orders, reduces inspections by DOT
- Quality improvement: focus on quality control and quality assurance, project innovations

Disadvantages

- Favors large national engineering and construction firms
- Reduces competition by excluding smaller firms
- Increases cost by eliminating low bid requirement for contracting
- Modifies traditional checks & balances between design and construction

CONSTRUCTION MANAGER AT RISK (aka GC/CM) PROJECT DELIVERY FOR HIGHWAY PROGRAMS

[This Transportation Research Board study](#) synthesizes several studies and original research on GC/CM. The four most frequently cited advantages and disadvantages were as follows:

Advantages

- Contractor input into design
- Ability to accelerate schedule
- Cost certainty at an earlier point than with Design-Bid-Build
- Ability to bid early work packages to mitigate risk of construction price volatility and accelerate schedule

Disadvantages

- Reconciling motivations of construction manager and designer – cost control versus conservative design to reduce design liability
- Owner must administer both a design and construction contract
- Final actual cost is unknown until the GMP is established

showed that over the past ten years, WSDOT completed only 1% of its contracts using Design-Build, which comprised 24% of all contract dollars. WSDOT has undertaken five projects between \$2 M and \$10 M, which means that its current authority is for projects over \$10 M.

General Contractor/Construction Manager (GC/CM)

Description. A general contractor is selected during the design phase to increase collaboration between owner and contractor and provide more input into constructability, cost, and schedule. GC/CM involves two contracts with a contractor: one for preconstruction services with a provision for a guaranteed maximum price (GMP) and another for construction. The owner is not liable for costs in excess of the GMP unless the scope changes. However, the owner is responsible for design, which is typically done with consultant services.

WSDOT Implementation. The Alternative Public Works Contracting chapter of Washington State law (RCW 39.10) governs agency use of GC/CM via an oversight board called the Capital Projects Advisory Review Board (CPARB). While WSDOT is eligible to use this process the department has not done so. The CPARB process is most often used for vertical construction and not highway projects. Unlike for Design-Build and Design-Bid-Build, WSDOT is not separately specifically authorized to use GC/CM. CPARB evaluates projects using the following criteria:

- Project implementation involves complex scheduling, phasing, or coordination.
- The project involves construction at an occupied facility which must continue to operate during construction.
- Involvement of the GC/CM during the design stage is critical to the success of the project.
- Project encompasses a complex or technical work environment or the project requires specialized work on a building that has historic significance. (RCW 39.19.340).
- No threshold dollar amount for projects.
- Public bodies may seek a three-year GC/CM certification from CPARB, instead of project-by project approval. WSDOT would have to demonstrate successful management of at least one GC/CM project in the last five years, which means that they would have to have had at least one project approved by CPARB before seeking the three-year certification (RCW 39.10.270).

The CPARB process requires that sub-contracts be bid, which would reduce the time and cost savings of this approach for highway projects and is one of the primary reasons that the CPARB process is less suited to highway projects than to vertical construction projects. The CPARB statutes prohibit the GC/CM from

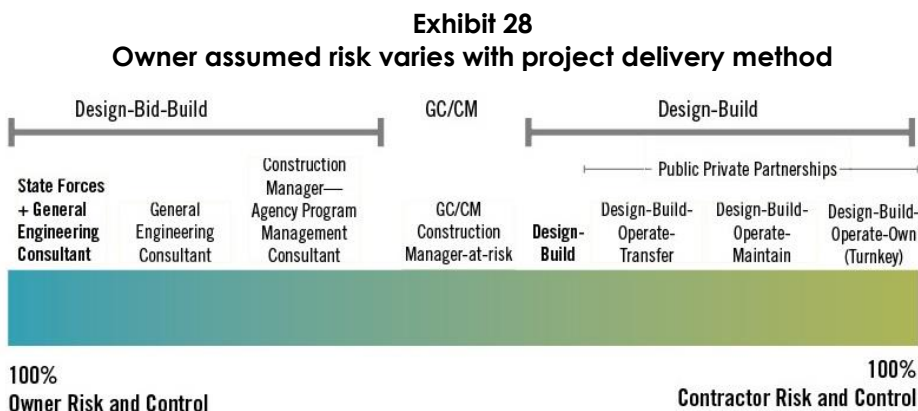
bidding on sub-contract work or on supplying materials and equipment (RCW 39.10.380-390).

Other States: Seventeen other state legislatures have authorized GC/CM for state DOTs. Ten of the 17 have no threshold or limit on GC/CM projects while seven have set a threshold or limit. As noted in the textbox, FHWA encourages GC/CM and it is gaining wider acceptance among DOTs.

RISK ASSIGNMENT

The critical policy and program management question is how best to use contracting methods to align appetite for risk, owner core competencies, overall cost of project delivery, and budget certainty.

Exhibit 28 below shows the risk allocation and control between project owner and contractor across various project delivery methods.



Source: BERK, 2013.

- **Design-Bid-Build.** Owner keeps the majority of the risk, accepts financial responsibility for project unknowns and potential errors. This may result in lower bids, but also greater budget uncertainty.
- **General Contractor/Construction Manager.** Owner keeps the majority of the risk and accepts financial responsibility for project unknowns. Mitigates some of that risk by introducing the contractor perspective into the design process, which may lower risk and/or reduce schedule.
- **Design-Build.** Owner passes greater share of risk to contractor, contractor accepts financial responsibility for more project unknowns; risk transfer will affect bids and may increase overall project costs, but should result in greater budget certainty.

DESIGN MILESTONES

- Project development at **30% design** = Basic information on design parameters, public concerns, and environmental impacts.
- **60% design** = Preliminary information in more detailed design plans and specifications such as pavement and drainage design. Beginning of permitting process.
- **90%** = Finalizing construction documents, right of way acquisition, construction plans, specifications, estimates, utility agreements and traffic management plans.
- **100%** = bid documents.

WSDOT PROJECT DELIVERY METHOD SELECTION

When selecting Design-Build as the delivery method, WSDOT relies on its *Design-Build Project Delivery Guidance Statement* (2006), which outlines procedures to follow when proposing Design-Build as the project delivery method. Recent studies have commented on project delivery method selection. The 2013 [Mega Project Assessment](#) included the following finding and recommendation:

At WSDOT, there appears to be less structure in terms of how decisions are made regarding delivery methods. Thoughtful consideration of the risk profile of specific mega projects will lead to a delivery method tailored to the project. We recommend that 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. (pages 3-4)

In addition, the 2013 WSDOT [SR 520 Pontoon Construction Project, Internal Review Report](#) noted the following about use of Design-Build on this project¹⁰

Schedule was a driver:

"The group concluded that using a Design-Build contracting method was the only way to meet the schedule." (page 5)

"The schedule to deliver pontoons and to have the bridge open by 2014 drove decision-making in this project, and overshadowed effective balancing of other considerations such as risk and cost." (page 5)

Decision had risk implications:

b. WSDOT made the choice to use Design-Build contracting for a very good reason, had used it successfully before, but, in this case included the option for the Design-Builder to use a highly developed design by WSDOT for the major element of the contract (the pontoons). This decision put the responsibility for any and all design-related problems with the pontoons on WSDOT and caused confusion regarding the appropriate contract administration process. When that decision was made, there was then:

- i. Limited follow through regarding documentation of that decision and its implications*
- ii. Limited consideration of the risks associated with that decision, their implication and a risk management strategy to avoid or minimize those risks (pages 9-10)*

¹⁰ : This project is not a typical Design-Build project as WSDOT provided a more complete design to the Design-Builder than the typical preliminary design used in this process.

OTHER CONSIDERATIONS

Pavement Warranties

A topic that came up during contractor interviews was the use of pavement warranty programs to reduce WSDOT staffing requirements for inspection and testing. Warranties shift the performance risk to the contractor and have been implemented in 24 states.¹¹

According to a [NCHRP Report](#) on the topic, “The DOTs that have shifted greater responsibility for inspection and quality management to the contractor have reported significant savings in resources. This reallocation appears more likely to occur when warranties are used in conjunction with Design-Build or other alternative contracting systems that shift greater control to the contractor for design and construction.”¹²

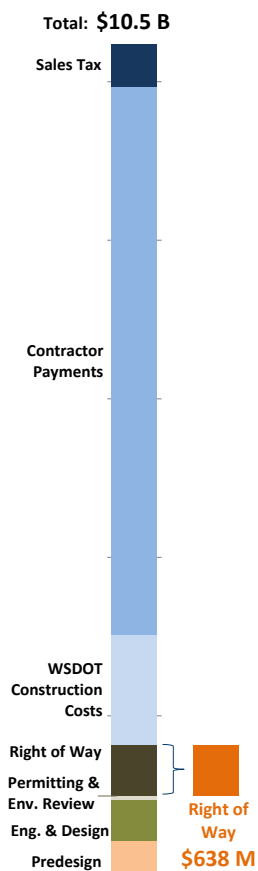
¹¹ NCHRP Report 699. Guidelines for the Use of Pavement Warranties on Highway Construction Projects, 2011, p. 5.

¹² Ibid., p 46.

KEY FINDINGS: OTHER COST DRIVERS

With **Right of Way**, opportunities for saving money are likely around how much property needs to be purchased, rather than how much WSDOT is paying for specific pieces of land.

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.



Other Cost Drivers

This section covers additional cost components that were analyzed but not determined to be Key Cost Drivers. It is important to understand the foundation of these components because they may account for a significant share of project costs. However, actions related to these areas likely would not result in significant or meaningful changes to efficiency or cost savings.

Right of Way

Right of Way processes for state DOTs are regulated by numerous federal and state laws. According to WSDOT's Right of Way Manual, the intent of right of way regulations is to assure "fair and equitable treatment of displaced persons, to encourage and expedite acquisitions by negotiations, and provide direction on properly managing properties once acquired by the department." To operationalize these laws and provide additional guidance around best practices, WSDOT publishes an annually updated Right of Way Manual.

A key component of Right of Way laws is regulating how much WSDOT pays for property. State laws provide strict guidance on appraisals and specifically on how fair market value should be determined. Fair Market Value is defined in the Right of Way Manual as the amount which a well-informed, voluntary buyer and a well-informed, voluntary seller would pay and accept for the property. WAC 468-100-102 outlines minimum appraisal standards that include approaches to appraisal, adequate property descriptions, and what can and cannot be included in determination of fair market value.

WSDOT's Real Estate Services division uses the Fair Market Value, as determined by the appraiser, to establish the just compensation for a property. When WSDOT's highway project plans necessitate that WSDOT acquire an entire ownership, just compensation is equal to the Fair Market Value of the property. If only partial acquisition is necessary, just compensation is set as the difference between Fair Market Value of the entire property and the Fair Market Value of any portion not required to be purchased.

While the Manual provides much more detail on how to specifically calculate values, benefits, damages, and relocation compensation, the price of parcel acquisition drives about 74% of WSDOT's right of way costs (or about 4.5% of project costs). Given the restrictions around independent appraisals and purchasing property for Fair Market Value, **opportunities for saving money when it comes to right of way likely lie around how much property needs to be purchased, rather than how much WSDOT is paying for specific pieces of land.**

Cost of Materials

Materials comprise approximately \$3.5 billion over the study period (50% of construction contracts, or about 33% of project costs). 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.**
- While materials are a large share of project costs, WSDOT does not have significant control over the price. Materials 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 that are not subject to state prevailing 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.

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 seven of potentially hundreds of bid items for a project. CCI bid items account for approximately 18% of contract 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.

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POTENTIAL ACTIONS

What can be done to increase efficiency and reduce cost in WSDOT's construction program? For each of the cost elements described above, we identified potential actions to save costs. This section starts by summarizing the main findings that correspond to the 22 potential actions. These actions have been identified as alternatives for consideration by the Legislature.

PROJECT SCALE

Project Design (Potential Action 1)

The Practical Design experience of Missouri suggests the potential for significant costs savings through "good projects for a great system."

STATE-SPECIFIC REGULATIONS

Sales & Use Tax (Potential Actions 2 through 4)

Sales & Use Tax accounted for approximately 5% of project costs (or \$534 million over ten years). Sales & use tax expenditures occur in the construction phase and are generated from sales tax paid by contractors.

As a result of 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 \$1 million of construction versus \$39,000 per \$1 million of construction.

In addition, for materials that are consumed during construction, there is a double tax with sales tax paid at the point of purchase and again when those costs are included in the total contract billing. A special exemption could be made for WSDOT only and would have saved \$42 million over 10 years.

Prevailing Wage (Potential Actions 5 through 9)

As a result of a series of court decisions, the state prevailing wage applies to a broader range of activities than the federal law. While we could not find clear evidence that prevailing wage laws do or do not add to labor costs, they do provide a floor below which rates cannot be paid.

MAGNITUDE OF IMPACT

For each alternative, we attempted to calculate the magnitude of the potential cost savings. Our starting point was to estimate the dollars involved (to the extent possible with available data) and then assess the likely influence of the potential action to reduce that dollar amount.

For example, with sales tax, reinstating the public exemption would have reduced the tax paid by WSDOT over the 10 year period by \$227 million. We deem this potential saving to be high because the dollars involved are high and the action would have a significant influence on potential savings.

With prevailing wage, while the dollars involved are significant (estimated at \$2.1 billion) the potential actions outlined would not produce significant savings overall. A 1% reduction in costs would only equal about \$21 million. Based on the JLARC study, a 1% reduction seems optimistic.

Prevailing wage rates do create some administrative burden as currently implemented due to determining the higher of the state or federal rate, completion of a paper survey, and different applications of the law between state and federal requirements.

Environmental Review & Permitting (Potential Actions 10 + 11)

Limitations in the data affected the extent to which we could single out expenditures on environmental review & permitting.

NEPA and SEPA compliance activities are the largest single expenditure category within environmental review, totaling about \$19 million over ten years. For smaller, routine WSDOT 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). NEPA CEs have been updated many times in the past few years, whereas SEPA has not.

RISK ASSIGNMENT

Project Delivery Methods (Potential Actions 12 through 19)

The greatest share of WSDOT project costs is contractor payments. Given this fact, the effectiveness of WSDOT's approach to contracting may be the most significant area in which to explore potential cost efficiencies.

Some of the biggest differences between construction contract award amounts and final contract payments are due to non-trivial errors on large projects. Design-Bid-Build contracting results in the highest owner risk assumption and is the method that WSDOT uses most often.

The current GC/CM process, including the Capital Projects Advisory Review Board, was designed primarily for vertical construction.

OTHER ACTIONS

Data (Potential Action 20)

As we conducted the in-depth analysis, limitations in the data affected the extent to which we could single out expenditures in certain areas, for example environmental review & permitting, mitigation, and change orders.

Federal Funding (Potential Action 21)

In the last ten years, federal aid projects accounted for 82% of contracts awarded. These projects are subject to additional requirements, such as federal prevailing wage laws and Buy American requirements.

Fish Passage Barrier Removals (Potential Action 22)

To comply with the court order, it has been estimated that fish passage barrier removal costs would be \$2 billion for 2015-2030. This is clearly an emerging issue, but there is little information about the plan to address the court order or how the estimates were determined.

Potential Action	Administrative or Statutory	Potential Impact
PROJECT DESIGN		
1 Adopt Practical Design methods to guide project scoping and design decisions. <ul style="list-style-type: none"> Incorporate Practical Design into project prioritization and selection process. On projects greater than \$10 million, include a Practical Design review to determine the cost effectiveness of the preliminary design and identify alternatives considered. 	Administrative	High
SALES & USE TAX		
2 Reinstate Public Road Construction exemption on state-owned highways. <ul style="list-style-type: none"> Exempt WSDOT projects on state-owned highways from tax on total contract amount. Contractor would pay tax on all materials at point of purchase. Lowers tax paid; no risk with respect to federal projects. Reduces general fund and local government sales tax revenue. 	Statutory	High
3 Direct receipts from state sales and use tax collected from contractors on state-owned highways to transportation fund. <ul style="list-style-type: none"> Legislature could direct receipts to the Motor Vehicle or Multi-Model Account. Tax paid is the same, but is returned to transportation. Does not impact local government sales tax revenue. Reduces state general fund revenue. 	Statutory	High
4 Exempt WSDOT projects on state owned roads from the requirement for contractors to pay sales and use tax at the point of purchase on materials that are consumed during construction. <ul style="list-style-type: none"> Legislature could create an exemption for WSDOT projects on state owned highways that would allow contractors to treat these purchases as re-sales that are not subject to sales and use tax at the point of purchase. The effect would be to eliminate the double taxation of these purchases, which are currently taxed at the point of purchase and taxed again when included in the total contract billing. 	Statutory	Medium

Potential Action	Administrative or Statutory	Potential Impact
PREVAILING WAGE		
5 Exempt WSDOT projects from the state prevailing wage act. <ul style="list-style-type: none"> Retain the federal prevailing wage on federal-aid projects. 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 them on fewer projects. 	Statutory	Low
6 Exempt WSDOT federal-aid projects from the state prevailing wage act. <ul style="list-style-type: none"> Use federal wage rates only on federal-aid projects. Potential wage savings; reduction in administrative burden related to determining the higher of the two wages; eliminate costs related to off-site construction where state prevailing wage applies but not federal prevailing wage - could lead WSDOT to program federal funds differently and use them on fewer projects. 	Statutory	Low
7 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"> Potential wage savings due to narrowing the range of activities covered by prevailing wage – would no longer apply to off-site activities. 	Statutory	Low
8 Establish a threshold below which WSDOT projects are not subject to the prevailing wage act. <ul style="list-style-type: none"> Potential wage savings; reduction in administrative burden; could produce more bids in some areas of the state if prevailing wage is a barrier. 	Statutory	Low
9 Modify how Labor & Industries sets the state rate. <ul style="list-style-type: none"> Options: (a) Use federal rate as state rate, (b) Use collective bargaining agreements as basis for state rate, or (c) Require annual survey. Savings are in more efficient determination of prevailing wage; eliminate large jumps for those wages where the prevailing wage is not the same as the rate established by collective bargaining agreements. In these cases, the wage rate is not modified until a new survey is conducted. This means there can be very large jumps in the prevailing wage rate, which is disruptive. 	Statutory and Administrative (L&I)	Low

Potential Action	Administrative or Statutory	Potential Impact
ENVIRONMENTAL REVIEW & PERMITTING		
10 Allow smaller projects that qualify for a NEPA categorical exclusion (CE) but not a SEPA categorical exemption to submit NEPA documentation only (and not the SEPA checklist). <ul style="list-style-type: none"> This would require a change to the SEPA rules. Currently, under SEPA WSDOT can only use NEPA Environmental Impact Statement (EIS) and environmental assessments. This would allow WSDOT to supply their documentation in support of a NEPA CE to satisfy SEPA checklist requirements. This would affect smaller projects. 	Administrative	Low
11 Expand SEPA exemptions to match the NEPA categorical exclusions. <ul style="list-style-type: none"> NEPA categorical exclusions have been updated several times over recent years, whereas SEPA categorical exemptions have not. This would allow small, routine transportation projects to be exempt from SEPA as they are currently under NEPA. 	Statutory	Low
PROJECT DELIVERY METHODS		
12 Grant broad authority to WSDOT to determine project delivery methods. <ul style="list-style-type: none"> Potential wage savings due to narrowing the range of activities covered by prevailing wage – would no longer apply to off-site activities. 	Statutory	See note
13 For mega-projects, the highest-level executives within WSDOT should consider all possible scenarios before selecting the contracting approach, and then consider how authority should be aligned for the specific projects. (Mega-Project Assessment)	Administrative	See note
14 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. (Mega-Project Assessment)	Administrative	See note
15 Modify existing WSDOT authority for Design-Build. <ul style="list-style-type: none"> Complete analysis of five pilot projects and potentially lower the threshold from \$10M million to \$2M. Allow for projects of any size that meet the statutory criteria. 	Statutory	See note
16 Specifically authorize GC/CM project delivery for WSDOT projects and authorize a separate review process from the Capital Projects Advisory Review Board. <ul style="list-style-type: none"> Clarify process and availability of GC/CM for highway projects. 	Statutory	See note

Potential Action		Administrative or Statutory	Potential Impact
PROJECT DELIVERY METHODS			
17	<p>Apply the same rigorous risk assessment process used in the original project delivery method selection to decisions about possible changes or modifications in the selection of a contracting method.</p> <ul style="list-style-type: none"> On complex projects with multiple components and contracts, any change in contracting method or contract modification 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. 	Administrative	See note
18	Explore implementing a pavement warranty program and consider other opportunities to use contractor warranties (performance and/or materials and workmanship) in lieu of inspections.	Administrative	See note
19	Give Design-Build contractors additional design flexibility to support innovation and cost containment by not restricting them to the Design Manual.		
OTHER POTENTIAL ACTIONS			
20	<p>Improve data collection to better inform management and policy choices.</p> <ul style="list-style-type: none"> Finding: There were many questions posed in this study that were difficult or not possible to reasonably address due to a lack of data or incomplete information. Some of these questions inform important policy and management issues. This was particularly relevant to mitigation costs, change order documentation, right of way acquisition, environmental review and permitting and prevailing wage. 	Statutory & Administrative	
21	<p>Focus federal funds in fewer projects to limit the impact of federal aid conditions on WSDOT project costs.</p> <ul style="list-style-type: none"> Finding: WSDOT spreads its federal funds throughout its program which added federal aid project conditions to 82% of its projects completed in 2003-2012. 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. 	Legislature & WSDOT	
22	WSDOT should prepare a report to the legislature on fish passage barrier removals that outlines what the plan is, the methodology and amount of the cost estimates, and how performance on the fish passage barrier removals that were part of the court order will be tracked.	Legislature & WSDOT	

Contract Magnitude Notes

- Magnitude of Impact (12-17): 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 (18): Potential savings to contractors with respect to time and to WSDOT with respect to staff.
- Magnitude of Impact (19): Could potentially lead to more cost effective solutions based on current conditions in materials prices or state of the practice.

Appendix A: Sales & Use Tax in Washington State

Sales Tax

Washington State – Sales Use Tax on WSDOT Projects on State-Owned Highways

In accordance with RCWs 82.08 Sales Tax and 82.12, Use Tax, Washington State retail sales and use tax is applied to contractors¹ working on WSDOT projects on state-owned highways in two ways:

1. *Contractor gross receipts.* Sales and use tax is applied to the contractor's total billing, including charges for labor, services, sub-contractor costs, and materials.
2. *Contractor purchased materials consumed during construction.* When WSDOT contractors purchase materials that will be consumed by the contractor during construction (i.e. temporary striping, barricades), the contractor is charged sales tax at the point of purchase. Materials installed as part of the construction are not subject to sales tax when purchased by the contractor.

Public Road Construction Exemption

RCW 82.04.050(10) exempts construction labor and services from sales and use tax when construction occurs on highways owned by cities, counties, special districts or the federal government.² When first adopted in 1943, the exemption applied to construction on highways owned by the state. In 1971, the RCW was amended to remove construction on highways owned by the state from the exemption.

Under the Public Road Construction Exemption, sales and use tax is not paid on the full contract price. It is paid by contractors on all materials and services purchased or used for the work whether they are installed as part of the construction or consumed during construction. The Public Road Construction Exemption increases the Business and Occupation (B&O) tax paid by public contractors to 0.00484 from 0.00471.

The Washington Department of Revenue 2012 Tax Exemption Study identifies the purpose of the exemption as: 1) taxing contractors who do work for the federal government on the value of the materials they incorporate into the project³; and 2) reducing costs for local jurisdictions. The study's estimated savings to taxpayers from the exemption in the 2013-15 biennium is \$95.5 million in state tax and \$35.0 million in local taxes.⁴

As summarized in the exhibit below, sales and use tax on construction on state owned highways is applied to the full contract price, including labor, services and materials. When purchasing materials for the work, contractors do not pay sales or use tax on materials that are installed as part of the construction.

¹ This provision is applicable to all contractors working in the state unless specifically exempted.

² The RCW eliminates from the term retail sales to which sales and use tax is applied "the sale of or charge made for labor and services rendered in respect to the building, repairing, or improving of any street, place, road, highway, easement, right-of-way, mass public transportation terminal or parking facility, bridge, tunnel, or trestle which is owned by a municipal corporation or political subdivision of the state or by the United States and which is used or to be used primarily for foot or vehicular traffic including mass transportation vehicles of any kind."

³ The state cannot directly tax the federal government.

⁴ Department of Revenue, 2012 Tax Exemption Study, p. 193.

Washington State Sales & Use Tax and B&O Tax on Highway Construction Services

	WSDOT Owned Highways WAC 458-20-179	City, County, Political Subdivision, Federal Owned Highways WAC 458-20-171
Retail Sales Tax Use Tax	<ul style="list-style-type: none"> Applied to full contract price Materials that become part of the structure being built are treated as re-sales and are not subject to tax Materials used by the contractor in the course of work (i.e. are not part of the structure) are subject to tax at purchase 	<ul style="list-style-type: none"> Not applied to contractor charges Materials that are used or consumed in the construction are subject to tax
B&O Tax	<ul style="list-style-type: none"> Prime contractor – retail classification on gross contract price (State rate 0.00471) Sub-contractor – wholesale on gross contract price (State rate 0.00484) 	<ul style="list-style-type: none"> Public road classification on total contract price applies to prime and subs (State rate 0.00484)

Implementation by WSDOT

Project Management

Consistent with state law, WSDOT pays sales tax based on the jurisdiction of the project and the ownership of the highway. This can become complicated. “How retail sales tax is handled on the overall project depends on the ownership of the property upon which it rests. Keep in mind that a project may span more than one type of ownership.” (WSDOT Construction Manual 2013, p. 1-82)

WSDOT’s project management, cost estimating and standard specifications for bidders reflect the division in sales tax collection based on whether the work is done on state/private or local/federal land.

- *Work on state and privately owned lands.* Work performed on state or privately owned land falls under Standard Specifications Section 1-07.2(2) and Department of Revenue Rule 170.
 - *Tax on total contract amount.* Retail sales tax is required on the total contract amount.
 - *No tax on materials incorporated into the final work.* Materials incorporated into the final work (such as concrete, signs, aggregates) are an integral part of the completed improvement. These materials are purchased for “resale.” No tax is required when purchasing these materials, therefore, no tax is paid as part of force account payments or as part of pricing change order work.
 - *Tax on consumables.* Supplies consumed (such as concrete forms, fuel or tools, equipment purchased or rented) during the performance of the contract are “consumables,” a part of the overall cost of doing business. The contractor is required to pay retail sales tax at the point of purchase/rental for these items. These costs are bid as a part of the associated bid items. When

calculating or estimating the cost of force account or change order work, sales tax should be included in the individual invoices for “consumable” items. “It’s a fine line; for example, permanent striping is considered “resale” (tax exempt), temporary striping is a “consumable” (taxed). The fact that taxes are shown or not shown on invoices is not a reliable indication of what the contractor is obligated to pay. Note that, in some cases, it is possible and necessary to pay a tax on a tax.” (WSDOT Construction Manual 2013, p. 1-83).

- *Work on city, county, special district and federally owned land.* Work performed on city, county, special district or federally owned lands falls under Standard Specifications Section 1-07.2(1) and Department of Revenue rule 171.
 - *Tax on total contract amount.* Retail sales tax is not required on the total contract amount.
 - *Tax on materials and consumables.* The Contractor is required to pay retail sales tax on all purchases regardless of use (“consumable” or not). This expense is included in the individual contract items as a part of the bid amount. When calculating or estimating the cost of force account or change order work, sales tax should be included on all invoices.

Standard Specification for Bidders

Standard specification 1-07.2 deals with state taxes. This specification was updated in 2011.

- *Work on state and privately owned lands.* The Contractor shall collect from the Contracting Agency, retail sales tax on the full contract price. The Contracting Agency will automatically add this sales tax to each payment to the Contractor. The Contractor shall not include the retail sales tax in the unit bid item prices except for bid prices for a payment the Contractor or a subcontractor makes on the purchase or rental of tools, machinery, equipment, or consumable supplies not integrated into the project. Such sales taxes shall be included in the unit bid item prices or in any other contract amount. (Specification 1-07.2(2))
- *Work on city, county, special district and federally owned land.* The contractor is to include the Washington State Retail Sales Taxes in the various unit bid item prices, or other contract amounts, including those that the Contractor pays on the purchase of the materials, equipment, or supplies used or consumed in doing the work. (Specification 1-07.2(1))

Other States – Tax on State Highway Construction

States with sales and use taxes⁵ vary in how these taxes are applied to state highway construction labor services, gross receipts, and materials incorporated in the project or consumed during construction. Some states have special taxes that are applied to state highway construction and one state, West Virginia, returns states sales and use taxes collected on state highway projects to the state highway fund.

States with Statewide Sales and Use Taxes

Forty-four (44) states in addition to Washington impose a statewide sales tax. Five (5) states do not impose a statewide sales and use tax.

⁵ Some states have an excise tax which has the same cost effect as sales and use tax.

Sales and Use Tax on Contractor Gross Receipts or on Labor and Services

Forty (40) states either exempt all contractors from paying sales and use tax on their gross receipts or on labor and services (35 states) or exempt public works projects from paying the taxes (5 states). Four (4) states have a tax on the full contract amount, although two of these states exclude sub-contractor payments and one has a tax base of 65 percent of the contract value. Only one other state (South Dakota) taxes on the full contractor gross receipts the way Washington does.

Sales and Use Tax on Contractor Materials

- *No tax on materials.* Eight (8) states do not impose sales or use tax on materials consumed or incorporated into the construction of public works.
- *Tax on all materials.* Twenty-two (22) states impose sales and use tax on all contractor purchased materials, supplies, and equipment at the point of purchase by the contractor.
- *Tax on materials consumed in a project, no tax on materials incorporated in the project.* Twelve (12) states impose sales and use tax when a contractor purchases materials to be consumed in a project, but not when the contractor purchases materials incorporated in the project.

Other taxes

- *Alabama.* Alabama has a statewide sales tax, but does not charge tax on contractor gross receipts. The state has a 5 percent tax on gross receipts derived from performance of state contracts to construct, reconstruct or build any public highway, road, bridge or street. The tax does not apply to city or county projects.
- *Delaware.* Delaware has no statewide sales tax, but does have a 0.006537 tax on contractor gross receipts over \$100,000 per month.
- *Mississippi.* Mississippi has a statewide sales tax, but does not charge tax on contractor gross receipts. Instead the state has a 3.5 percent contractor's tax on non-residential contracts over \$10,000. The tax is not applicable to sub-contractors.
- *Montana.* Montana, which has no statewide sales tax, imposes a 1 percent license fee on gross receipts of publically funded projects.

Sales and Use Tax Cost

Sales Tax Rates

Washington State statewide sales and use tax rate is 6.5 percent. The State has authorized additional local and special district sales and use taxes, which can bring the tax rate up to 9.5 percent if all local option taxes are adopted.

Sales Tax Deferrals

Sales and use tax totaling \$197.6 million has been deferred until projects are complete and toll revenue can be used to pay the tax.

- *SR 520*. RCW 47.01.412 defers state and local sales and use taxes on the SR 520 improvements until the fifth year after the date certified by the Department of Revenue as the date on which the project is operationally complete. The project is operationally complete under this RCW when the replacement bridge is constructed and opened to traffic. Interest is not charged on the deferred sales and use taxes. Total estimated deferred state and local sales and use taxes are \$140 million.
- *Tacoma Narrows Bridge SR 16*. RCW 47.46.060, as amended in 2012, defers state and local sales and use taxes on the Tacoma Narrows Bridge SR 16 corridor improvements until the 11th year of the project being operational. (Prior to the amendment, state and local sales and use tax were to be repaid on the 5th year of operation.) The deferred tax, which totals \$57.6 million, is to be repaid over 10 years. No interest is charged

Policy Considerations

Policy issues related to modifying the sales and use tax on state owned highway construction services include:

Impact on State General Fund

Sales and use tax is deposited in the state General Fund. Any reduction in sales and use tax that benefits WSDOT construction costs would correspondingly reduce the State's General Fund revenues.

Impact on Local Governments

A change in sales and use tax on construction services on state owned highways would also reduce local government revenues.

The Streamlined Sales and Use Tax Agreement (SSUTA), a multi-state agreement, governs the application of sales and use tax in the state. SSUTA Section 302 states that "the tax base for local jurisdictions shall be identical to the state tax base unless otherwise prohibited by federal law." This means that the state does not have the option to exempt construction services from only state sales and use tax and maintain the local option.

Potential Impact on Ability to Tax Federal Construction Contracts

Under the Supremacy Clause of the United States Constitution, the state cannot directly tax the federal government. On construction projects, the state only imposes sales and use tax on materials purchased by federal contractors.

The United States Supreme Court, in a 5-4 decision, upheld Washington's taxation of federal contractors in *Washington v. United States*, 460 U.S. 536 (1983). The important question, according to the Supreme Court, is whether the tax is discriminatory with regard to the economic burdens that result. "The important consideration is not whether the State differentiates in determining what entity shall bear the legal incidence of the tax, but whether the tax is discriminatory with regard to the economic burdens that result. The State does not discriminate against the Federal Government and those with whom it deals unless it treats someone else better than it treats them. Here, Washington has not singled out contractors who work for the United States for

discriminatory treatment. It has merely accommodated for the fact that it may not impose a tax directly on the United States as the project owner.”

The Department of Revenue has expressed concern that creating new exemptions and deferrals for construction projects present “a significant legal risk that the federal government or federal contractors will seek to re-litigate *Washington v. United States*. Sales/use tax exemptions pose the greatest legal risk because they plainly treat the beneficiaries of the exemption more favorably than federal contractors are treated. Sales/use tax deferrals also pose a significant legal risk.”⁶

The Department of Revenue has identified the potential impact at \$89 million per fiscal year if the state were unable to impose sales and use tax on federal contractors.

The Department of Revenue does not believe that reinstating the public road construction exemption to state-owned highways would raise any issues with regard to being able to tax materials purchased by federal contractors. This is because the state would be treating its contractors the same as federal contractors.⁷

Sales and Use Tax Application Alternatives

Two alternatives have been identified that do not run the risk of losing the ability to tax federal contractors.

- *Reinstate the Public Road Construction Exemption to state owned roads.* The legislature could amend RCW 82.04.050(10) to include state-owned highways.
- *Exempt WSDOT projects on state owned roads from the requirement for contractors to pay sales and use tax at the point of purchase on materials that are consumed during construction.* The legislature could create an exemption for WSDOT projects on state owned highways that would allow contractors to treat these purchases as re-sales that are not subject to sales and use tax at the point of purchase.
- *Direct state sales and use tax collected on WSDOT construction contracts to transportation.* The legislature could direct state sales and use tax on WSDOT construction contracts to the Motor Vehicle or Multi-Modal Account.

⁶ Department of Revenue, Federal Contractor Concern, August 2013 p.1-2.

⁷ Sept. 9, 2013 email from Department of Revenue Beau Perschbacher to the consultants.

Sales Tax

Washington State – Sales Use Tax on WSDOT Projects on State-Owned Highways

In accordance with RCWs 82.08 Sales Tax and 82.12, Use Tax, Washington State retail sales and use tax is applied to contractors¹ working on WSDOT projects on state-owned highways in two ways:

1. *Contractor gross receipts.* Sales and use tax is applied to the contractor's total billing, including charges for labor, services, sub-contractor costs, and materials.
2. *Contractor purchased materials consumed during construction.* When WSDOT contractors purchase materials that will be consumed by the contractor during construction (i.e. temporary striping, barricades), the contractor is charged sales tax at the point of purchase. Materials installed as part of the construction are not subject to sales tax when purchased by the contractor.

Public Road Construction Exemption

RCW 82.04.050(10) exempts construction labor and services from sales and use tax when construction occurs on highways owned by cities, counties, special districts or the federal government.² When first adopted in 1943, the exemption applied to construction on highways owned by the state. In 1971, the RCW was amended to remove construction on highways owned by the state from the exemption.

Under the Public Road Construction Exemption, sales and use tax is not paid on the full contract price. It is paid by contractors on all materials and services purchased or used for the work whether they are installed as part of the construction or consumed during construction. The Public Road Construction Exemption increases the Business and Occupation (B&O) tax paid by public contractors to 0.00484 from 0.00471.

The Washington Department of Revenue 2012 Tax Exemption Study identifies the purpose of the exemption as: 1) taxing contractors who do work for the federal government on the value of the materials they incorporate into the project³; and 2) reducing costs for local jurisdictions. The study's estimated savings to taxpayers from the exemption in the 2013-15 biennium is \$95.5 million in state tax and \$35.0 million in local taxes.⁴

As summarized in the exhibit below, sales and use tax on construction on state owned highways is applied to the full contract price, including labor, services and materials. When purchasing materials for the work, contractors do not pay sales or use tax on materials that are installed as part of the construction.

¹ This provision is applicable to all contractors working in the state unless specifically exempted.

² The RCW eliminates from the term retail sales to which sales and use tax is applied "the sale of or charge made for labor and services rendered in respect to the building, repairing, or improving of any street, place, road, highway, easement, right-of-way, mass public transportation terminal or parking facility, bridge, tunnel, or trestle which is owned by a municipal corporation or political subdivision of the state or by the United States and which is used or to be used primarily for foot or vehicular traffic including mass transportation vehicles of any kind."

³ The state cannot directly tax the federal government.

⁴ Department of Revenue, 2012 Tax Exemption Study, p. 193.

Appendix B: Sales & Use Tax in Other States

State	Tax on Contractor on Labor &/or Gross Receipts					States Sales Tax on Materials		
	Exempt from Sales or Excise Tax	Exempt Public Road Construction	Other Similar Tax or Fee	State tax rate	Notes	Taxable	Notes	State tax rate
Alabama	Exempt		5% of gross receipts derived from performance of contracts to construct, reconstruct or build any public highway, road, bridge or street subject to monthly discount of up to \$400.00	5%	Applies to state contracts only – not to cities or counties unless the state is also a contractor Proceeds of tax – pensions (15%) and mental health (85%)	Yes	Interview with State Department of Transportation	4% (tangible personal property rate)
Alaska	<i>No statewide sales tax</i>					<i>No state sales tax</i>		
Arizona	Not exempt	Not exempt		6.5%	Prime contractor only Tax base - 65% of the gross proceeds	No if incorporated Yes if consumed	Not if the materials are incorporated in the project nor for construction machinery & equipment sold or leased to the contractor for use on a construction job	6.5%
Arkansas	Exempt					Yes	Contractors are deemed to be the consumers of all tangible personal property or taxable services purchased by them in the performance of a contract and the sales of all such property to contractors are taxable sales.	6.5%

State	Tax on Contractor on Labor &/or Gross Receipts					States Sales Tax on Materials		
	Exempt from Sales or Excise Tax	Exempt Public Road Construction	Other Similar Tax or Fee	State tax rate	Notes	Taxable	Notes	State tax rate
California	Exempt					Yes	Construction contractors are generally consumers of materials furnished and retailers of fixtures and pay sales & use tax. Services are not taxable (except jobsite fabrication of fixtures).	7.5%
Colorado	Exempt					No if incorporated; Yes if consumed	Exemption for highways and other public works	2.9%
Connecticut	Taxable only if rendered in conjunction with existing commercial, industrial or income producing property; exempt if new construction or residential property	Exempt Public Right-of-Way is exempt - property such as a state or municipal street or road and adjacent area.				No if incorporated; Yes if consumed	When a construction contract is with an exempt entity, the contractor may purchase materials and supplies incorporated or placed in the project or placed in the project exempt from tax.	6.35% (no local rates allowed)
Delaware	No state sales tax					No state sales tax		
			Tax on contractor gross receipts over \$100,000 per month & a 6% bond fee for non-resident contractors	0.006537	Excludes gross receipts paid to sub-contractors			

State	Tax on Contractor on Labor &/or Gross Receipts					States Sales Tax on Materials		
	Exempt from Sales or Excise Tax	Exempt Public Road Construction	Other Similar Tax or Fee	State tax rate	Notes	Taxable	Notes	State tax rate
Florida	Exempt					Yes	Public works agencies use owner-direct purchase program and not pay sales tax	6%
Georgia	Exempt					Yes	All materials	4%
Hawaii	Not exempt (excise tax)	Not except		4.712% - Oahu 4.166% - other Islands	Deduction available for qualifying subcontracted work	Yes	Wholesale rate	0.5%
Idaho	Exempt					Yes	Contractor is the consumer of the goods used. Must pay sales tax on all his Purchases – even if working on exempt customer project	
Illinois	Exempt					Yes		6.25%
Indiana	Exempt					Yes – if consumed; No – if incorporated; No - if public safety equipment on public work	Purchase of public safety equipment required by contract to be used in the construction and repair of public roads, bridges, highways, and other public infrastructure for a governmental entity is exempt from sales and use tax.	7%

State	Tax on Contractor on Labor &/or Gross Receipts					States Sales Tax on Materials		
	Exempt from Sales or Excise Tax	Exempt Public Road Construction	Other Similar Tax or Fee	State tax rate	Notes	Taxable	Notes	State tax rate
Iowa	Exempt					No – if incorporated Yes – if consumed	Special Exemption Certificates Designated exempt entities awarding construction contracts may issue special exemption certificates to contractors and subcontractors, allowing them to purchase, or withdraw from inventory, building materials for the contract free from sales tax – includes Dept. of Transportation	6%
Kansas	Not exempt	Exempt Labor services to construct, reconstruct, restore, replace, or repair a bridge or highway				Yes	Project exemptions are not authorized for Dept. of Transportation	6.15%
Kentucky	Exempt					Yes	On all materials	6%
Louisiana	Exempt					No	Exemption certificate for materials purchased for public works	
Maine	Exempt					No – if incorporated Yes – if consumed	Materials that are incorporated into state projects are exempt. Materials used in the project are taxable	5%

State	Tax on Contractor on Labor &/or Gross Receipts					States Sales Tax on Materials		
	Exempt from Sales or Excise Tax	Exempt Public Road Construction	Other Similar Tax or Fee	State tax rate	Notes	Taxable	Notes	State tax rate
Maryland	Exempt					Yes	Materials incorporated into government owned real property are taxable when purchased.	6%
Massachusetts	Exempt					No	Exemption certificate for sales of materials for public works projects	
Michigan	Exempt					Yes	A contractor is required to pay sales or use tax on all items used to provide Service, including equipment, supplies, and materials. Revenue Administrative Bulletins (RAB) 1993-5 and 1999-2.	6.25%
Minnesota	Exempt					Yes	Contractors or subcontractors must pay sales or use tax on the cost of all materials, supplies and equipment to complete the construction contract. State agencies are not exempt from sales tax	6.875%
Mississippi	Exempt		3.5% contractor's tax in lieu of the sales tax if they are done in the performance of a non-residential contract exceeding \$10,000.	3.5%	No tax on sub-contractors.	No – if incorporated Yes – if consumed	No sales or use tax on purchases on component materials and services. Rentals and purchases of non-component materials and supplies to be used in the performance of construction work are subject to the regular retail rate of sales or use tax	7%

State	Tax on Contractor on Labor &/or Gross Receipts					States Sales Tax on Materials		
	Exempt from Sales or Excise Tax	Exempt Public Road Construction	Other Similar Tax or Fee	State tax rate	Notes	Taxable	Notes	State tax rate
Missouri	Exempt					No	Exemption Certificate for materials incorporated or consumed in construction	
Montana	No statewide sales tax		License fee on publically funded projects	1%		No statewide sales tax		
Nebraska	Not exempt	Exempt Any government entity is exempt from paying sales tax				No – if incorporated Yes – if consumed	Purchasing Agent Appointment and Delegation of Authority for Sales and Use Tax	5.5%
Nevada	Exempt					Yes	If a government contractor purchases building materials for use on a public works project, the government contractor must pay Sales/Use Tax on those materials	6.85%
New Hampshire	No statewide sales tax						No statewide sales tax	
New Jersey	Not Exempt	Exempt Labor is exempt as long as an exempt capital improvement	T			No	Exemption for state agencies – exemption certificate	
New Mexico	Not exempt	Not exempt		5.125%		No	Non-taxable transaction certificate – exempt materials, sub-contractors, equipment leases – pay on leases	

State	Tax on Contractor on Labor &/or Gross Receipts					States Sales Tax on Materials		
	Exempt from Sales or Excise Tax	Exempt Public Road Construction	Other Similar Tax or Fee	State tax rate	Notes	Taxable	Notes	State tax rate
New York	Exempt					No	Government purchase order serves for an exemption	
North Carolina	Exempt					No		
North Dakota	Exempt					Yes	Contractor regarded as end user Includes contracts with State agencies	5%
Ohio	Exempt					No – if incorporated Yes – if consumed	Agencies of the state not subject to tax for materials incorporated in real property	5.75%
Oklahoma	Exempt					Yes	Exemptions do not include state agencies	4.5%
Oregon	No state sales tax					No state sales tax		
Pennsylvania	Exempt					No	Exemption for exempt organizations – including state agencies	6%
Rhode Island	Exempt					No – if incorporated Yes – if consumed	Exemption for exempt organizations – including state agencies for materials and supplies which are essential to the construction of a project and which are to be utilized in the construction thereof	7%
South Carolina	Exempt					Yes	Purchases for state government agencies not exempt Tax on all construction materials	6%

State	Tax on Contractor on Labor &/or Gross Receipts					States Sales Tax on Materials		
	Exempt from Sales or Excise Tax	Exempt Public Road Construction	Other Similar Tax or Fee	State tax rate	Notes	Taxable	Notes	State tax rate
South Dakota	Not exempt	Not exempt		2%	Contractors for state agencies must pay Gross receipts tax applied to materials with sales tax	Yes	Prime contractor and sub-contractor due on materials furnished	4%
Tennessee	Exempt				If services performed on real property	Yes		7%
Texas	Not exempt	Exempt			State government is exempt from sales tax on contractors	No – if incorporated Yes – if consumed	State exemption – no tax if material entirely consumed in the project	6.25%
Utah	Exempt					Yes	Sales of construction materials to state agencies exempt if the agency pays the seller directly & the items are converted to real property by employees of the agency	4.7%
Vermont	Exempt					Consumed on project – no Tools etc. not consumed on a project yes	Applies to public works – exemption certificate	6%

State	Tax on Contractor on Labor &/or Gross Receipts					States Sales Tax on Materials		
	Exempt from Sales or Excise Tax	Exempt Public Road Construction	Other Similar Tax or Fee	State tax rate	Notes	Taxable	Notes	State tax rate
Virginia	Exempt					Yes	No exemption for public work	5.0% N. Virginia & Hampton Roads 4.3% elsewhere
West Virginia	Exempt				If work results in a capital improvement	Yes	The contractor is subject to tax on all purchases of goods and services used in the performance of a capital improvement contract.	6% Returned to the State Road Fund
Wisconsin	Exempt				Real property construction only	Yes	No exemption for government agencies	5%
Wyoming	Exempt					Yes	Purchases of materials, supplies, etc. by the contractor for real property improvement are taxable to the contractor No exemption for government entities	4%

Appendix C: Sample Letter & Survey



STATE OF WASHINGTON
DEPARTMENT OF LABOR AND INDUSTRIES
Prevailing Wage
PO Box 44540 • Olympia, Washington 98504-4540
360-902-5335

March 2012

Dear Survey Participant:

The Department of Labor & Industries (L&I) is conducting this survey to gather wage and hour information for work performed by Ready Mix Truck Drivers, so that we may calculate the prevailing wage that will be required to be paid to workers on public works projects governed by chapter 39.12 RCW, Prevailing Wages on Public Works.

Prevailing wage is the hourly wage, benefits and overtime paid in the largest city in each county to the majority of workers in each trade. The law (RCW 39.12) requires L&I to establish a prevailing wage rate for each trade employed in public work. On the reverse side of this letter is the section of the prevailing wage rule [WAC 296-127-019(6)] that describes how we calculate the wage rate based on the data we receive on survey forms.

Your participation in this survey is extremely important, even if you don't perform public work. This survey reflects the local area wage conditions for work performed from **January 1, 2010 through December 31, 2011**. The more complete and accurate the survey responses are that L&I receives, the more accurately the results will reflect the actual wages paid to Ready Mix Truck Drivers throughout the state. All identifying company information will be kept confidential.

Enclosed you will find:

- Instructions (beginning on the other side of this letter)
- Survey form
- "Description of Work" for Ready Mix Truck Drivers (on the back of the survey form)
- A postage-paid return envelope

We must receive your completed survey form **no later than June 30, 2012**, in order to include your wage and hour information in our calculations. You may return the survey form to us by mail, electronically as an email attachment, or by fax. Please see the instructions for further details.

Thank you very much for taking the time to complete this survey. If you have any questions, please contact Nathan Peppin in the Prevailing Wage Program at (360) 902-5304, or by e-mail to Pepn235@Lni.wa.gov.

Sincerely,

A handwritten signature in blue ink that reads "L. Ann Selover".

L. Ann Selover
Industrial Statistician

03/30/2012

How L&I Sets Prevailing Wage Rates Based on Survey Results

WAC 296-127-019(6)

(6) Valid data reported on wage surveys shall be calculated, as follows:

(a) If the majority of hours reported for a trade or occupation in the largest city in a county is paid at the same wage rate, then that rate shall be established as the prevailing wage rate.

(b) If the same wage rate is not reported to have been paid for the majority of hours reported in the largest city in a county for a trade or occupation, then the average wage rate shall be established as the prevailing wage rate, based on a weighted average of the hours, wages, and benefits reported in the largest city.

(c) If a statistically significant number of hours fails to be reported for the largest city in a county, then the average wage rate for the county is established as the prevailing wage, based on a weighted average.

(d) If there fails to be reported for an entire county, sufficient hours to validate the survey data, that county's hours shall be combined with those reported for other counties that are adjacent, until the established hours threshold for validation has been met.*

*Please note in 2003 the use of data from adjacent counties to set prevailing wage rates was prohibited. See RCW 39.12.026.

Wage and Hour Survey Instructions

Please read these general instructions before completing the survey.

EXCEPTIONS:

Please check the appropriate box on the survey form, complete the top portion, sign, and return the form if you:

- Did not employ any workers in this trade.
- Employ public employees, as a state or other public agency, who perform the work described for this trade.

If you choose to not participate in this survey, please tell us why, fill out the top portion, sign, and return the form to L&I.

- **Report all hours worked, for both public and private projects, from January 1, 2010 through December 31, 2011.** Remember as you complete the survey form that it is based on data for a two-year period. It is not uncommon for different employees to make different wages or the same employee to make different wages at various times during the survey period (for example, due to raises in their pay, decreases in their pay, differences based on the specific type or capacity of the vehicle driven, or private versus public works rates). For purposes of reporting wage and hour information for this survey each rate must be reported separately based on the location (inside or outside the largest city in the county). If you need additional assistance for determining how to list various wage rates please contact L&I at (360) 902-4626 or email us at PW1@Lni.wa.gov.

Example – Rate Changes – Public and Private Work

Employee A Private Work - Survey Time Period: January 1 - December 31, 2010

Earns a total package (wage + usual benefits) of \$35 per hour
(\$30/hr wages, \$3/hr medical/dental benefits, \$1/hr pension benefits, \$1/hr apprenticeship)
Private work included in this survey at \$35/hr: 25 hours work performed inside the largest city

Employee A Private Work - Survey Time Period January 1 - December 31, 2011

Earns a total package (wage + usual benefits) of \$37 per hour
(\$30/hr wages, \$4/hr medical/dental benefits, \$2/hr pension benefits, \$1/apprenticeship)
Private work included in this survey at \$37/hr: 20 hours worked inside the largest city and 10 hours worked outside the largest city

Employee A Public Work – For the two-year survey period, January 1, 2010 – December 31, 2011

Earns a total package (wage + usual benefits) of \$39 per hour
(\$32/hr wages, \$4/hr medical/dental benefits, \$2/hr pension benefits, \$1/apprenticeship)
Public work included in this survey at \$39/hr: 100 hours worked inside the largest city

Each of these rates must be reported separately on the survey form. At a minimum you will have three rows documenting the wage and usual benefit breakdown for \$35, \$37 and \$39. If the hours at a specific rate (for example, \$37) included work inside AND outside of the largest city or in various largest cities/counties additional rows would be required for each.

See the table below for how to report these various rates.

Note: Not all columns that are on the survey form are used for this example, and an extra “total” column that is not on the survey form is added here to help with the illustration.

Hours Worked Inside the Largest City	Hours Worked Outside the Largest City	Hourly Base Wage Rate	Hourly Rate* of Employer Contributions for Insurance (medical, dental, life, etc.)	Hourly Rate* of Employer Contributions to Pension or Retirement Plans	Hourly Contribution* Made to Apprenticeship Programs	Total Wage and Fringe Package [This column is not on the survey form.]
25		\$30.00	\$3.00	\$1.00	\$1.00	\$35.00
20		\$30.00	\$4.00	\$2.00	\$1.00	\$37.00
	10	\$30.00	\$4.00	\$2.00	\$1.00	\$37.00
100		\$32.00	\$4.00	\$2.00	\$1.00	\$39.00

- **Include hours for journey-level workers only.** Do not report hours of work, wages, or benefits paid to trainees, helpers, supervisors, or owner/operators.
 - “Owner/operators” includes (1) sole owners and their spouses, (2) any partner who owns 30% or more interest in the partnership, and (3) a president, vice-president or treasurer of a corporation who owns at least 30% of the corporation.
 - See [WAC 296-127-015](#) regarding “supervisors.”

WAC 296-127-015 Applicability of prevailing wages for supervisors. Determinations as to whether individuals are workers, laborers, or mechanics are based on the scope of work actually performed by the individuals, rather than the title of their occupations.

(1) Where additional supervisory duties are required of workers, laborers, or mechanics by statute or regulation, the industrial statistician shall establish a rate of pay for a work classification to be called “journey level in charge.” These rates shall be published in the semiannual prevailing wage publication.

(2) Supervisors (e.g., foremen, general foremen, superintendents, etc.,) are entitled to receive at least the journey level prevailing rate of wage for performing manual or physical labor:

(a) For each hour spent in the performance of manual or physical labor if it is for more than twenty percent but less than fifty percent of their hours worked on a public works project during any given week.

(b) For all hours worked in any given week if they perform manual or physical labor for fifty percent or more of their hours worked on a public works project during such week.

(3) If supervisors subject to the journey level prevailing wage rate are paid a salary, the compensation (salary divided by number of hours worked) must be equal to or greater than the prevailing wage rate for the type of work performed.

[Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270. 92-01-104, §296-127-015, filed 12/18/91, effective 1/31/92; 88-22-046 (Order 88-22), § 296-127-015, filed 10/31/88.]

- **You may report hours for apprentices separately.** Report hours worked by apprentices only if they are enrolled in an apprenticeship program which has been registered and approved by the Washington State Apprenticeship and Training Council (WSATC), and you are a WSATC registered training agent. If you report hours for apprentices, write the word “Apprentice” in Column A.
- **State all wages in hourly terms.** Do not list annual or monthly salaries or piece-rate earnings. All wages and benefits must be reported as hourly rates. If you paid workers on a salary, or other non-hourly basis, you will need to mathematically determine the hourly rate based on actual payments made for the hours worked.
- **Report wage and hour information by county. Separate the hours worked Outside the Largest City from the hours worked Inside the Largest City for each county where the work was performed.** The counties and largest cities are listed in a table on the back of the survey form. The law requires L&I to calculate a separate prevailing wage for each county in the state.
- You may complete the survey form by filling out the information on the enclosed paper form or by downloading and completing the fillable form from our web site at www.PrevailingWage.Lni.wa.gov.
- **Sign the form. Whether you complete the survey by filling in the paper form or by filling in and printing out the downloaded form, be sure to sign the survey form before returning it to us.** If it is not signed, we cannot include it in the survey results.
- **We must receive your completed survey no later than June 30, 2012, to include your information in our calculations. You have several choices for returning it:**
 - **You may return it by mail using the postage-paid return envelope** we enclosed with the survey form.
 - You may fax it to us at 360-902-5300. If you fax your survey to us, please be sure all the information is entered in a clearly legible format. If we cannot read your form, we cannot process it.
 - You may e-mail a completed form to us. To do this, sign the form, produce an image of it (scan the document) and send the electronic image of the completed, signed survey as an email attachment to Nathan Peppin at Peppn235@Lni.wa.gov.
- **Be sure to keep a copy of the completed survey form for your records.**
- **If you have questions or need assistance with how to complete and send the form to us, please call (360) 902-4626 or email us at PW1@Lni.wa.gov.**
- **The trade that L&I is surveying throughout this period is Ready Mix Truck Drivers.**

Instructions for Filling Out Columns A–I on the Survey Form

**The survey period is a two-year period, from
January 1, 2010 through December 31, 2011.**

- A. Trade:** Use “Ready Mix Truck Driver” based on the “Work Description” on the back of the survey form to identify whether your employees worked in this trade during the survey period. **If you are reporting hours worked by apprentices,** list apprentices separately in another row and write “Apprentice” for the name of the trade. Do not report hours for apprentices unless they are enrolled in an apprenticeship program registered and approved by the Washington State Apprenticeship and Training Council (WSATC), and you are a WSATC registered training agent. If some of your workers are “trainees” but don’t qualify as “apprentices” do not include their hours and their wage rates.
- B. County where the work was performed:** Report and name the county where the work was performed. If you report work performed in more than one county, list each county separately.
- C. Hours worked inside the county’s largest city:** Separate the hours worked Outside the Largest City from the hours worked Inside the Largest City for each county where the work was performed. Report in column “C” the total number of hours worked by all workers at each individual hourly rate within the largest city. This information is needed because L&I is required to calculate the rate of hourly wages, benefits and overtime paid to the majority of workers in the same trade working in the largest city of each county.
- D. Hours worked outside the county’s largest city:** Separate the hours worked Outside the Largest City from the hours worked Inside the Largest City for each county where the work was performed. Report in column “D” the total number of hours worked by all workers at each individual hourly rate outside the largest city within each county where the work was performed.
- E. Hourly base wage rate:** Report in column “E” the hourly wage rate paid to the worker(s). If workers were paid different rates, list those rates separately by county and/or the largest city. Do not include benefits in this entry. Do not include overtime or premium pay in this entry. If some hours were worked at a premium rate (overtime or double time) report those hours at their base wage rate, not the premium wage rate.
- F. Hourly rate paid for insurance (medical, dental, life, etc.):** The insurance rate includes medical, dental, vision, life insurance, etc. Report in column “F” the insurance rate in per-hour terms. If you do not know the hourly rate, determine it by dividing the total insurance benefits paid **for the two-year survey period** by the hours worked by that



employee for the two-year survey period. See the Usual (fringe) Benefits example below. Do not include insurance benefits that the worker pays through payroll deductions, or any other benefits or fees that are required to be paid by employers, such as workers' compensation premiums, unemployment insurance or any other federally or state-mandated payroll deductions.

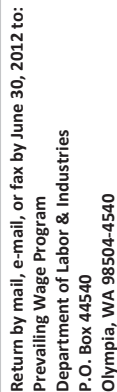
- G. Hourly rate contribution to pension or retirement plans:** Report in column "G" pension or retirement plan employer contributions in per-hour terms. If you do not know the hourly rate, determine it by taking the total dollar amount paid by the employer into a bona fide pension fund or retirement account **for the two-year survey period**, and dividing that amount by the total hours worked by that employee during the two-year survey period. See the Usual (fringe) Benefits example below. Do not include any pension or retirement benefits or contributions that are employee paid through payroll deductions, or that are required to be paid by employers, such as social security.
- H. Hourly rate paid for vacation and/or holiday:** Report in column "H" vacation or holiday benefits paid or accrued per hours worked during the **two-year survey period**. If you do not know this hourly rate, determine it by taking the total dollar amount paid by the employer to the employee (or accrued if not paid) for vacation time during the two-year survey period, and dividing that amount by the number of hours worked by that employee during the two-year survey period. See the Usual (fringe) Benefits example below.
- I. Hourly rate paid to apprenticeship programs:** Report in column "I" the hourly contribution amounts paid to apprenticeship programs certified by the Washington State Apprenticeship and Training Council for the trade being surveyed. This should be a pre-established hourly contribution rate that is paid by the employer in addition to worker wages and benefits. This does not include funds that an employee pays. If you do not know the hourly rate, determine it by dividing the total payments made **for the two-year survey period** by the number of hours worked by that employee during the two-year survey period. See the Usual (fringe) Benefits example below.

Example - Usual (fringe) Benefits Calculation
Two-Year Survey Period – January 1, 2010 through December 31, 2011

An employee worked a total of 3,500 hours **for the two-year survey period** (both private and public jobs) and received 4 weeks (160 hours) of vacation from January 1, 2010, to December 31, 2011. The employer paid the worker \$20.00 per hour for vacation time off. In that case, the hourly amount the employer put into the employee's vacation fund for the survey period is:

- 160 (hours vacation time) x \$20.00 paid per hour = \$3,200
- Divide this amount (\$3,200) by 3,500 (actual hours worked during the survey period)
 - \$3,200/3,500 hours = \$0.91 per hour

The hourly rate paid for vacation in this example is \$0.91 per hour.
This amount would be recorded in column "H" of the survey form.



Wage and Hour Survey Form

- Please read the instruction sheet before you complete this form.
- All identifying company information will be kept confidential.

Company Name _____ UBI No. _____ Contractor Registration No. _____
Mailing Address _____ Company Contact Person _____
City, State, Zip _____ Title _____
Telephone _____ E-mail _____

For wages paid from January 1, 2010 through December 31, 2011, on private and public work

Please check the box below, complete the top portion, sign, and return the form if you:

Did not employ any workers in the trade or occupation included in this survey.

☐ Employ public employees, as a state or other public agency, who perform the work described for this trade.

☐[illegible]

☐ Check box if you are a third party (CPA, Union, etc.) filling out this form.

Third Party Organization/Company:

Third Party Telephone: _____

Third Party E-mail: _____

By my signature below, I attest that to the best of my knowledge the information provided on this survey is accurate and true and the data reported is for only employees who are ready mix truck drivers and not for drivers of other types of trucks.

Signature _____

Print Name _____

Title _____

Date _____

3/30/2012

Work Description

Ready Mix Truck Drivers

For the purpose of the Washington state public works law, chapter 39.12 RCW, ready mix truck drivers drive transit mixer type trucks used for the transportation of wet concrete products and related supplies to, from, and on construction projects.

The work includes all types of construction projects that are covered under chapter 39.12 RCW and WAC 296-127-018.

The work includes the use of any transit mixer type truck designed to deliver wet concrete including, but not limited to: roller or barrel trucks, semi-mixer trucks, and roll-off mixer bodies.

Ready mix truck drivers deliver wet concrete to forms, trenches, pumps, pumpers, pumper trucks, conveyors, curb machines, buckets, wheel barrows, buggies, screeds, and slip-form machines, etc.

Washington Counties and Largest Cities					
County	Largest City	County	Largest City	County	Largest City
Adams	Othello	Grays Harbor	Aberdeen	Pierce	Tacoma
Asotin	Clarkston	Island	Oak Harbor	San Juan	Friday Harbor
Benton	Kennewick	Jefferson	Port Townsend	Skagit	Mount Vernon
Chelan	Wenatchee	King	Seattle	Skamania	Stevenson
Clallam	Port Angeles	Kitsap	Bremerton	Snohomish	Everett
Clark	Vancouver	Kittitas	Ellensburg	Spokane	Spokane
Columbia	Dayton	Klickitat	Goldendale	Stevens	Colville
Cowlitz	Longview	Lewis	Centralia	Thurston	Olympia
Douglas	East Wenatchee	Lincoln	Davenport	Wahkiakum	Cathlamet
Ferry	Republic	Mason	Shelton	Walla Walla	Walla Walla
Franklin	Pasco	Okanogan	Omak	Whatcom	Bellingham
Garfield	Pomeroy	Pacific	Raymond	Whitman	Pullman
Grant	Moses Lake	Pend Oreille	Newport	Yakima	Yakima

3/30/2012

Appendix D: Prevailing Wage Studies

What follows is a summary of 10 studies related to the costs of prevailing wage. It is worth noting that no study appeared to be unbiased in its method.

We reviewed five studies that found prevailing wage to be a benefit in terms of productivity that either balanced out additional cost or did not produce higher costs. These studies generally found 0% increase in project costs due to prevailing wage laws combined with general economic benefits.

The other five studies concluded that prevailing wage increased costs. These studies typically compared prevailing wages to market rates, as if both state and federal prevailing wage laws would be repealed.

Study	Pro/Con	Key Findings
The Adverse Economic Impact from Repeal of the Prevailing Wage Law in Missouri	Pro	Total economic impact of repeal would be between \$324.1 and \$488.2 million annually in lost income and tax collections Claims of savings of 15-30% total cost savings are not possible.
An Analysis of Davis-Bacon Prevailing Wage Requirements: Evidence from Highway Resurfacing Projects	Pro	Compared federal projects with prevailing wage with state projects without and found no statistical cost differences that could be attributed to prevailing wage. Productivity increases with higher wages balance out costs.
The Benefits of State Prevailing Wage Laws	Pro	Repeal of prevailing wage laws lead to less training, younger and less experienced workforce, higher injury rates and lower wages. Unemployment rate is biggest driver of costs. Prevailing wage does not lead to cost increases due to higher productivity.
Kentucky's Prevailing Wage Law: Its History, Purpose and Effect	Pro	Claims that 4 schools could be built for price of 3 are not possible because labor is only 30% of total cost. Found costs stabilized after prevailing wage re-applied in 1996 Unemployment and weather are cost drivers, not prevailing wage
The Economic Development Benefits of Prevailing Wage	Pro	Higher productivity, better technology, and other employer savings offset higher wages. Prevailing wage raises health and pension coverage, worker skills, wages and opportunities for less-educated workers and minimizes race to the bottom. Research shows skilled workers 20% more productive.
An Economic Examination of West Virginia's Prevailing Wage Law	Con	Biggest problem with prevailing wage laws is there is no standard method of collection to determine wages. Statistical surveys by US DOL and others should be used. Data from WORKFORCE West Virginia over a three-year cycle showed difference between true market wage and prevailing wage to be 49-74% Prevailing wages compress wages across occupations and do most harm to least-skilled and least-paying positions. Unemployment in 2007 was 4.6%. Without prevailing wage, would have been 4.4% Should have exemptions for small contractors and schools. Could save 30% or more.

Study	Pro/Con	Key Findings
Prevailing Wage Laws: Public Interest or Special Interest Legislation	Con	Prevailing wage laws raise costs, interfere with efficient labor mobilization, impose additional admin and compliance costs. 2007 Kersey study showed prevailing wages 39% higher in construction. 2000 CBO study found estimated savings of Davis-Bacon repeal to be \$10.5 billion between 2000 and 2010 California study found 9-37% increase in construction costs when law amended to apply prevailing wage to subsidized housing construction.
Prevailing Wage Laws in New York State: The Impact on Project Cost and Competitiveness	Con	Used hypothetical project prototype to compare costs. Found prevailing wage increases costs by 28-76% assuming same productivity levels vs. comparison communities across the country compared to costs that are 4-16% higher than others with market wages.
The Effects of the Exemption of School Construction Projects from Ohio's Prevailing Wage Law	Con	Analysis by Ohio Legislative Service Commission that showed overall savings on school construction projects to be 10.7% after exemption created in law. No statistical difference in quality of construction according to surveys.
Prevailing Wage Laws: Greed Disguised as Public Policy	Con	Prevailing wage laws make union wage rates the "prevailing" rate even though only 14.5% of construction workers are unionized. Oregon study showed prevailing wages 25% higher than market. Davis-Bacon wages are not accurate. Estimates that only 30% of costs of construction are labor are not accurate across project types. For repairs/renovations, can be 60-70%. Government estimates that Davis-Bacon only increases costs by 3.7% are not accurate.

Appendix E: Labor & Industries Responses to Advisory Panel Questions on Prevailing Wage



STATE OF WASHINGTON
DEPARTMENT OF LABOR AND INDUSTRIES
Government Affairs and Policy Division • Office PO Box 44001 • Olympia, Washington 98504-4001

November 25, 2013

Kathy Scanlan
Scanlan Consulting

Kathy –

Thank you for clarifying the questions asked by members of the Joint Transportation Committee during their meeting on October 29. The questions we were asked to respond to were:

- How many changes to prevailing wage rules have been made in the past few years that would affect transportation projects?
- Please identify the numbers of surveys we send, how many go to business interests and how many go to labor interests, the numbers of each that respond, and the percent of hours or wages that are included in these responses.
- Please provide a description of how a person would respond to our survey and a copy of that survey.

To help illustrate the prevailing wage survey process, attached are the survey form and instructions from a recent survey of Ready Mix Truck Drivers.

How many changes to prevailing wage rules have been made in the past few years that would affect transportation projects?

Below is a list of prevailing wage rule-making activities over the past two decades, beginning in 1993. Prior to the beginning of each rule-making effort (the filing of the CR-101), the department sought and received substantial stakeholder input and shared that input with various groups including and especially the Prevailing Wage Advisory Committee which is composed of business, labor and public agency stakeholders. In some cases, stakeholder discussions took place over many years.

Of the nine rule changes during that period of time, five amended scope of work definitions for specific work activities. As provided for in the law, any interested party had the opportunity to challenge these determinations, which include:

- September 2009 – Amendment of the scope of work definition for Electronic Technician.
- November 2008 – Adoption of the scope of work definitions for Construction Site Surveyor, Diver and Diver Tender, and Industrial Power Vacuum Cleaner scope of work definitions.

- December 2006 – Adoption of scope of work descriptions for Stage Rigging Mechanics, Street Sweepers and Tinting and Coating Installers.
- August 2004 - Amendment of an existing rule to clarify the scope of work description for Outside Telephone Line Construction.
- July 2000 – Adoption of scope of work definitions for approximately sixty trades and occupations.

Other rule changes during this period included:

- December 1993 – Rulemaking to ‘modernize’ Chapter 296-127 WAC in a number of areas. The amount of the fees for processing of Intent and Affidavit forms was changed. Terms such as “contract” and “ordinary maintenance” were defined. Application of prevailing wage to “turnkey” projects was clarified due to a change in RCW 39.04.260.
- May 2004 – Amendment of an existing rule, necessitated by a change in law, to clarify which prevailing wage rates apply to purchase orders that are issued under job order contracts.
- August 2008 – Amendment of an existing rule to change the fees required for the processing of “Intent” and “Affidavit” forms. This was necessitated by a change in law.
- December 2008 – Amendment of the “Material Supplier” rule, initially adopted in 1992 covering deliveries of concrete, crushed rock and similar materials. The amendment clarified the conditions under which prevailing wages are required for delivery of those materials and was necessary due to guidance provided by the Court in *Silverstreak*.

Please identify the numbers of surveys we send, how many go to business interests and how many go to labor interests, the numbers of each that respond, and the percent of hours or wages that are included in these responses.

As you know, the department surveys by “groups” of trades. As indicated in our correspondence of September 27, each group includes several trades. Below is information for groups 2 through 5, indicating the total number of surveys mailed to the group and to each trade within the group, the number returned and the response rate. Unfortunately, the department is not able to break out the number of surveys returned from business or labor interests. Nor is information related to the percent of hours or wages reported from those interests recorded in a method to allow data to be attributed to either.

The group 5 survey, which included Carpenters, Electricians, Insulation Applicators, Millwrights, Lathers, Drywall Applicators, Construction Site Surveyors, Cabinet Makers (In Shop) and Pile Drivers, was published on August 2, 2010, except for survey results for construction site surveyors, which was published on October 15, 2012. During the initial Group 5 survey mailing, more than 27,300 surveys were mailed (not including six surveys mailed to Prevailing Wage Advisory Committee members). Of those, more than 27,300, or 99 percent, were mailed to businesses and 18, or less than 1 percent were mailed to union organizations. Though the data is not available for the other survey groups, this distribution of survey recipients is likely indicative of all groups, as union interests often represent a statewide organization and therefore make up a small number of the surveys mailed.

It should also be understood that a response may not include hours or wages. You'll note on the attached form that respondents who did not employ workers in the trades being surveyed, or who employ public employees, are asked simply to check the appropriate box on the survey, provide identifying company information and sign. In addition, those wishing not to participate in the survey may also indicate that and return it. Such responses are included in the number of surveys returned, below, though wage and hour information is not provided.

Finally, if a survey was returned as "undeliverable" it is considered in the total mailed, but not included in the number returned, below. Other common reasons for a survey not being returned may include: simply declining to participate, businesses ceasing operation, businesses reporting under incorrect Insurance Services risk classifications and businesses not performing the specific work being surveyed.

Group 5 Survey – 2009

Group 5 survey was published on August 2, 2010, except for survey results for construction site surveyors, which was published on October 15, 2012 and became effective November 14, 2010. For this group, more than 27,300¹ surveys were mailed to nine different trades. The survey period covered January 1, 2008 through December 31, 2008.

<u>Trade/Occupation</u>	<u>Mailed</u>	<u>Returned</u>	<u>Response Rate (%)</u>
Inside Wireman Electrician	2337	500	21
Carpenter	20779	4178	20
Drywall Applicator	1308	253	19
Insulation Applicator	723	183	25
Lather	299	84	28
Millwright	549	176	32
Pile Driver	95	60	63
Construction Site Surveyor	487	168	34
Cabinet Makers	769	212	28

Group 4 Survey – 2008

Group 4 survey was also published also on February 1, 2010. For this survey, just over 31,000 surveys were mailed to eight different trades. The survey period covered January 1, 2007 through December 31, 2007.

<u>Trade/Occupation</u>	<u>Mailed</u>	<u>Returned</u>	<u>Response Rate (%)</u>
Laborer	20664	4048	20
Carpenter Tender		Included in "Laborers" above	
Clean-up Laborer		Included in "Laborers" above	
Flagger	5021	1580	31
Utilities Laborer	2261	675	30
Fence Erector and Laborer	1352	364	27
Hod Carrier	1319	292	22
Asbestos Abatement	428	162	38

¹ This number differs from the "nearly 30,400" figure given in September. The difference is based on a subsequent re-surveying of one of the Group 5 trades due to an error identified in the original survey mailing list for that trade.

Group 3 Survey - 2007²

Group 3 survey was also published on February 1, 2010. Just over 28,500 surveys were mailed to ten different trades. The survey period covered July 1, 2006 through June 30, 2007.

<u>Trade/Occupation</u>	<u>Mailed</u>	<u>Returned</u>	<u>Response Rate (%)</u>
Boilermaker	136	40	29
Asbestos Worker	1014	242	24
Heating Equip. Mechanic	959	176	18
Metal Fabricator	3728	1345	36
Painter	6253	1036	17
Plumber/Pipefitter	3139	773	25
Refrigeration Mechanic	1426	645	45
Roofer	5275	1307	25
Sheet Metal Worker	6132	1357	22
Sprinkler Fitter	462	143	31

Group 2 Survey – 2007

Group 2 survey was published on February 1, 2010. Just over 18,300 surveys were mailed to thirteen different trades. The survey period covered January 1, 2006 through December 31, 2006.

<u>Trade/Occupation</u>	<u>Mailed</u>	<u>Returned</u>	<u>Response Rate (%)</u>
Brick Mason	1088	179	16
Carpet Layer	2075	362	17
Drywall Taper	1089	196	18
Electrical Fixture Worker	2134	281	13
Electrician – Inside	2205 (see footnote)		
Glazier	878	213	24
Iron Worker	1840	544	30
Marble Setter	699	141	20
Stone Mason	1088	150	14
Terrazzo Worker	836	302	36
Tile Setter	2081	336	16
Mason Finisher	2080	328	16
Traffic Control Stripper	210	60	29

² The total of surveys mailed for these Groups 2 and 3 does not match those given in September. The difference is based on a re-surveying of Electricians, which had originally been included in Group 2 and was re-surveyed with Group 5. The reason for the re-surveying related to confusion stemming from the Electrician survey form and instructions.

Please provide a description of how a person would respond to our survey and a copy of that survey.

The survey form and instructions are attached for your information. This survey process is manual, using paper forms. The survey forms are mailed to all interested parties, who are asked to report what hours were worked, and what wages and benefits were paid, both inside and outside of the largest city of each county. They are then asked to mail completed paper forms to the department. Respondents can photocopy the survey form, if more room for data is needed. Respondents can also attach a printout of a spreadsheet as long as the printout is in the format shown on the survey form and includes all the data requested. The department does not currently provide a web-based method for contractors to submit the data electronically.

Please let me know if you have questions. I can be reached at (360) 902-6805 or tammy.fellin@lni.wa.gov.

Sincerely,

Tammy Fellin

Tammy Fellin
Legislative Director

Attachments

Appendix F: Prevailing Wage in Other States

States with State Prevailing Wage Laws

State	Threshold Amount (Transportation Projects)	Federal Funded Project Prevailing Wage Requirements	State Basis for Determining Rates	Separate Highway Rate (categories excluding residential)
Alaska	\$25,000	Federal rate	N/A	Single rate
California	\$25,000 construction ¹ \$15,000 alteration, demolition, repair or maintenance work	Higher rate	CBA Modal rate (Majority paid at a single rate or if no majority paid a single rate, then use the rate being paid to the greatest number of workers) May also consider federal rate US DOL rate (option by statute to survey)	Commercial Building Heavy Highway Dredging
Connecticut	\$400,000 new construction \$100,00 remodeling	Uses federal rate to determine state rate		US DOL rate
Delaware	\$100,000 new construction \$15,000 alteration, repair, renovation, rehabilitation, demolition, reconstruction	Higher rate	Annual survey and shall encourage the voluntary submission of wage data by contractors, contractors' associations, labor organizations, public officials and other interested parties, reflecting wage rates paid to laborers and mechanics on various types of construction in the area. Employers in SIC codes identified by unemployment compensation records If majority paid at the same rate, that rate is prevailing wage, otherwise mean rate US DOL rate	Building Heavy Highway
Hawaii	\$2,000	Higher rate		Single rate
Illinois	None	Federal rate	Survey – try to do annually	Building Highway Floating Oil & Chip Rivers
Kentucky	\$250,000	Uses federal rate to determine state rate	US DOL rate (can also conduct hearings)	US DOL rate

¹ Threshold is \$1,000 unless an awarding body elects to initiate and enforce a labor compliance program that has been approved by the Director of the Department of Industrial Relations. Caltrans has done this and their projects have the threshold noted in the table.

State	Threshold Amount (Transportation Projects)	Federal Funded Project Prevailing Wage Requirements	State Basis for Determining Rates	Separate Highway Rate (categories excluding residential)
Maine	\$50,000	Federal – if more than 20% federal funding. Can use both rates on the same project (i.e. a bridge project had a federal component and a state sub-project – used different prevailing wage rates)	Annual survey of contractors (can impose fine of \$50 if not filed) – median wage Can consider CBA	Highway & Earthwork Heavy & Bridge
Maryland	\$500,000	x	Annual surveys – contractors, contractor’s associations, labor organizations, public officials & other interest parties to submit data voluntarily CBA – but not less than amount paid municipal employees in the locality & not less than private	Building Highway
Massachusetts	None	Higher rate	CBA	Single rate for construction
Michigan	None	Federal rate	CBA	Parking lot, road, highway, bridge & airport construction General
Minnesota	\$25,000 – more than one trade involved \$2,500 – single trade involved	Higher rate	Survey – of construction projects in the preceding 12 months with a total cost of \$25,000 or more	Highway/heavy Commercial
Missouri	None	Higher rate	Annual survey – of commercial contractors	Building Heavy
Montana	\$25,000	Federal rate	New law 2013 – for highway and heavy rates (HB0464 Laws of 2013) a) conduct a survey of construction contractors registered for heavy construction services or highway construction services, electrical and plumbing contractors who perform commercial work or b) Adopt federal rates or c) A combination	Building Heavy Highway Non-construction
Nebraska	None	N/A	No state rate	N/A
Nevada	\$100,000	Higher rate	Annual survey of contractors who do work in a county	Single rate
New Jersey	\$2,000 - construction \$50,000 – aggregate cost for maintenance & repair	Higher rate	CBA – for a particular craft or trade in the locality	Single rate

State	Threshold Amount (Transportation Projects)	Federal Funded Project Prevailing Wage Requirements	State Basis for Determining Rates	Separate Highway Rate (categories excluding residential)
New Mexico	\$60,000	Higher rate	CBA Others with workers not subject to CBA can submit additional data Can consider survey data	Street, highway, utility, light engineering General building Heavy
New York	None	Federal rate	CBA – with private sector employers provided those employers employ at least 30% of workers in the same trade or occupation in the locality CBA	Building Heavy & highway
Ohio	For work related to bridge and road construction \$78,258 – new construction \$23,447 – remodeling Thresholds adjusted with inflation	Higher rate		Single rate
Oregon	\$50,000	Federal rate	Most rates reflect CBAs (Oregon Prevailing Wage Booklet July 2013) Annual construction industry wage survey of occupations and crafts performing commercial building and heavy and highway construction in 14 geographic regions of the state May consider CBA, federal rates, other independent wage surveys Oregon goal – move closer to federal rates Many occupations use CBA rates	Single rate
Pennsylvania	\$25,000	Uses federal rate to determine state rate	CBA May also consider information from federal agencies, workforce availability & certified statements of previous wages paid on public projects in the locality, survey if insufficient information	Heavy & highway laborers Heavy & highway operators Building operators Truck drivers & painters – heavy, highway, & building
Rhode Island	\$1,000	Higher rate	US DOL rate	US DOL rate
Tennessee	\$50,000 (on highway construction projects only)	Higher rate	Annual survey of highway contractors	Building Highway
Texas	None	Uses federal rate to determine state rate	US DOL rate (option by statute to survey)	US DOL rate

State	Threshold Amount (Transportation Projects)	Federal Funded Project Prevailing Wage Requirements	State Basis for Determining Rates	Separate Highway Rate (categories excluding residential)
Vermont	\$100,000	Higher rate	Annual Based on Occupational and Wage Survey – based on wage earners covered by unemployment insurance	Single rate
Washington	None	Higher rate	Survey – every 3 years – average wage in largest city in the county CBA – receive copies – used in semi-annual update	Single rate
West Virginia	None	Higher rate	Annual by locality CBA – may obtain & consider	Building & construction Heavy & highway
Wisconsin	None	Federal rate	Annual survey of employers <ul style="list-style-type: none"> Wage paid to majority of workers by area If no wage is a majority – then average of the highest 51% of workers Future contractual increases – CBA where the CBA rates equals the prevailing wage	Airport pavement & state highway Building & heavy
Wyoming	\$25,000	Federal rate	Annual survey For Heavy and Highway Construction rates shall be sent to employers and employee organizations engaged in construction, reconstruction, improvement, enlargement, alteration or repair of major heavy and/or highway projects <ol style="list-style-type: none"> 1) Average – 50% or more have same salary 2) Significant minority – two with 30% or more with same salary – weighted average of those two 3) Weighted average – where not two with 30% with same salary – weighted average of all 4) Moving average – CBA inflation adjustments 	Building & construction Heavy & highway

States without Prevailing Wage Laws that Apply to State Funded Transportation Projects

State	Repealed or Invalidated by Court Decision
States Without Prevailing Wage Laws	
Alabama	Repealed - 1980
Arizona	Invalidated - 1980 & repealed - 1984
Colorado	Repealed - 1985
Florida	Repealed - 1979
Georgia	
Idaho	Repealed - 1985
Iowa	
Kansas	Repealed - 1987
Louisiana	Repealed - 1988
Mississippi	
New Hampshire	Repealed - 1985
North Carolina	
North Dakota	
Oklahoma	Invalidated - 1995
South Carolina	
South Dakota	
Utah	Repealed - 1981
Virginia	
States with Prevailing Wage Laws – Exempt State Transportation Projects	
Arkansas	Exempts highway, road, street, or bridge construction and maintenance or related work contracted for or performed by incorporated towns, cities, counties, or the Arkansas State Highway and Transportation Department
Indiana	The Common Construction Wage Act does not apply to contracts let (awarded) by the Indiana Dept. of Transportation for the construction of highways, streets, and bridges. (IC 5-16-7-1(g))

Appendix G: Environmental Review & Permitting Streamlining Efforts

RESULTS

WHAT

WHEN

