



Oregon

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File Code:

TO: Matt Garrett, Director
Oregon Department of Transportation

FROM: Robert G. Pappé, PE, PLS
ODOT Advance Contracting Unit Manager

SUBJECT: Final Findings of Fact Exemption Evaluation
US20: Central Oregon Highway Bridges
Design-Build Project

The post-construction evaluation for the Central Oregon Highway Bridges design-build project is enclosed for your review as required by ORS 279C.355.

Use of the design-build project delivery method requires an exemption from letting the construction contract through competitive low bid (ORS 279C.335). The exemption process includes the development and adoption of findings prior to awarding the design-build contract, and a post-construction evaluation of the project. The evaluations compare the expected benefits of using design-build described in the adopted findings with the project results.

The Central Oregon Highway Bridges project was granted an exemption (#2003-51) by the Director of the Department of Transportation, under the statute in force at that time (ORS 279.015). The statute was revised in 2005 (ORS 279C.335). Both the current and previous statutes required that the post-construction evaluation be submitted to the Director of ODOT and made available for public review.

No formal action by the Director of Transportation is required. The final evaluation report will be posted on the ODOT Design-Build website within 10 business days at:

http://www.oregon.gov/ODOT/HWY/OPD/DB_Home.shtml

Enclosure: COHB - Final Evaluation Report



**Final Evaluation
For The
Central Oregon Highway Bridges
Design-Build Project**
(as required by ORS 279C.355)

Project Name: US20: Central Oregon Highway Bridges

Exemption Number: 2003-51

Contract Number: C12979

Key Number: 13208

FAP: NH-OTIA-F007(035)

Design-Builder: Wildish Standard Paving

Designer: David Evans & Associates (DEA)

Project Description

The US 20: Central Oregon Highway Bridge Replacement Design-Build Project, Bundle 102, replaced twelve (12) bridges in Malheur County, four (4) bridges in Harney County, as well as approximately one-half (½) mile of new alignment of US 20 in Malheur County.

I. Introduction.

On August 4, 2003 the Oregon Department of Transportation's (ODOT) US20: Central Oregon Highway Bridge Replacement Design-Build Project (the "Central Oregon Highway Bridges") received an order from the Director of the Oregon Department of Transportation granting an exemption from competitive bidding to allow the use of the Design-Build project delivery method. ORS 279C.335(2) permits the Director of Transportation to grant exemptions to the Oregon Department of Transportation (ODOT) from the requirement for competitive bidding on approval of specific findings. Under ORS 279C.335(4) a public hearing must be held before the findings are adopted, allowing an opportunity for interested parties to comment on the draft findings.

ORS 279.103 (now ORS 279C.355) requires an evaluation of the public improvement project upon its completion. The evaluation must include the following:

1. The actual project cost as compared with original project estimates.
2. The amount of any guaranteed maximum price.
3. The number of project change orders issued by the public agency.
4. A narrative description of successes and failures during the design, engineering, and construction of the project.

5. An objective assessment of the use of the alternative contracting process as compared to the findings required by ORS 279.015 (now ORS 279C.335).

In the following sections, two types of comparisons are made. The first evaluation, reported in Section II, compares data taken from the Central Oregon Highway Bridges project actual experience, with results that would be expected on a typical hard bid (design-bid-build) project. The second evaluation, reported in Section III, compares data taken from the Central Oregon Highway Bridges project actual experience, with what the project was originally expected to yield under the terms of the Design-Build contract. Construction commenced on March 10, 2004 and was completed on October 30, 2006.

II. Comparison of the Central Oregon Highway Bridges Project Actual Results vs. a Typical Hard Bid (Design-Bid-Build) Project

A. Schedule and Project Duration

Under the traditional hard bid (design-bid-build) model ODOT obtains all environmental clearances and permits, and completes biddable final plans and specifications prior to initiating procurement of the construction contract. Under the Design-Build contracting model, design, permitting, and construction are performed by the Design-Builder under one contract. Because the Design-Builder is responsible for both design and construction, it can begin construction before plans and specifications are finalized, and construction activities can be phased in a manner that is most efficient for the particular project.

A project equivalent to the Central Oregon Highway Bridges project completed under the hard bid (design-bid-build) method of delivery would typically take approximately 18 months for design and 24 months for construction, rendering a total project length 42 months, or more than three and one half (3 ½) years. The Central Oregon Highway Bridges project, utilizing the Design-Build method of project delivery, took only 25 months, saving an estimated 17 months. Additionally the construction method allowed for highway use by overweight and overwidth restricted loads, seven (7) months earlier than anticipated in the design-bid-build arena. This acceleration was important to allow for work on I-84 by providing an alternate route for overweight and oversize loads. The acceleration of almost two (2) years to completion on the Central Oregon Highway Bridges project is principally attributable to concurrent design and construction activities.

B. Costs

The following table compares actual Central Oregon Highway Bridges project figures realized utilizing the Design-Build contracting model with what would have been expected under the traditional hard bid (design-bid-build) method of project delivery, based upon ODOT historical experience. The actual total construction cost for the project was \$27,767,253.54, inclusive of change orders, as enumerated below.

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Base contract amount: **\$26,710,878.48**

Change Order Item	Change Order Amount
Repair of A & Water St Post Detour	\$103,000.00
Rebuild Vale bridge approaches	\$155,000.00
Widen Detour bridges	\$122,000.00
Additional winter traffic control	\$44,500.00
Monitoring support	\$12,103.60
Overweight load analysis	\$10,357.79
Remove and reset temporary signals	\$25,212.00
Additional construction work for Miller Cr	\$254,400.00
Mitigation & Permitting Miller Cr	\$63,300.00
Redesign Miller Cr	\$57,800.00
Remove abandon railroad bridge	\$28,500.00
F Retaining wall	\$10,500.00
Rebuild chainup area	\$7,189.66
Replace Non-Standard guard rail at Gold Cr	\$24,700.00
Type 2 fence at Horseshoe Bend/Diversion	\$2,160.00
Tribal monitoring by the hour	\$5,560.00
Retroactive steel escalation	\$176,040.73
Interest	\$9,931.16
VE Proposal-Horseshoe Bend Bridge	-\$50,000.00
Remove Material from South Riley Source	-\$5,879.90
Total Change Order Amount	\$1,056,375.04

Base contract plus change orders: **\$27,767,253.52**

For the cost comparison below we add the change order cost increase to the hard bid (design-bid-build) estimate and use the following assumptions:

- Fifteen percent (15%) of the change order cost is related to design/engineering, a common percentage in the industry, and the remainder to construction.
- The change orders would have been issued in a hard bid (design-bid-build) project.

Actual Costs under Design-Build Model vs. Estimated Cost under Hard Bid (Design-Bid-Build) Model

Estimated Cost for Hard Bid (Design-Bid-Build) Delivery:	
Design	\$ 3,639,911

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Environmental/Permitting	\$ 258,252
Construction	\$ 21,075,407
ODOT Construction Engineering/Construction Management	\$ 2,728,587
Change order costs	\$ 1,056,375.04
Total Estimated Cost:	\$ 28,758,532.04
Actual Cost for Central Oregon Highway Bridges Design-Build Delivery:	
ODOT Preliminary Design and partial Permitting	\$ 733,776.00
Final Design and partial Permitting (Design-Builder)	\$ 2,855,000.00
Construction	\$ 22,771,431.18
ODOT Project Management	\$ 1,407,046.34
Total Actual Cost :	\$ 27,767,253.52
Difference between Hard Bid (Design-Bid-Build) and Design-Build in Total Cost (Savings:	\$ 991,278.52

The construction value assigned to the hypothetical hard bid (design-bid-build) project utilized the actual construction costs incurred on the Central Oregon Highway Bridges project. It does not include adjustments for inflation. If inflation is factored in, at a nominal 3%, and attributed to the time period difference between actual completion of the Design-Build project versus the time the hypothetical hard bid (design-bid-build project) would have concluded, the difference in cost grows wider. The numbers used in arriving at the hypothetical hard bid (design-bid-build) design and construction management values were developed, consistent with ODOT experience, as percentages of engineering and other developmental costs being assigned a value, 75% to preliminary design and 25% environmental and permitting. Project Management values were estimated at 6% of construction value.

C. Conclusion

The use of Design-Build contracting resulted in the Central Oregon Highway Bridges replacement bridges being opened for public use up to 17 months earlier than it would have been anticipated under a typical hard bid (design-bid-build) contracting model. Also of note, due to the contractor's overall project design, the weight restrictions on the four restricted bridges were removed seven (7) months earlier in the project than would have been anticipated in a hard bid (design-bid-build) project sequencing, further accelerating full use of the highway. This was vital to ODOT planning for freight mobility, as I-84 was scheduled to be placed in weight/width restrictions by the interim completion date. The adjusted figures in the above table indicate a cost savings of approximately three percent (3%). This does not take into account the efficiencies and savings of the actual construction time period, approximately 25 months, which was substantially shorter than, and occurs earlier in the process than, would have occurred in a hard bid (design-bid-build) project.

III. Central Oregon Highway Bridges Actual Results vs. Contract Requirements

The comparisons made in this section are between the original Central Oregon Highway Bridges project contract requirements and the actual results.

A. Project Successes.

Among the successes experienced on the Central Oregon Highway Bridges project were early bridge completion, cost containment, environmental excellence, and avoidance of contract claims/disputes.

1. **Early Completion.** The contract was completed ahead of schedule, with the bridges opened to unrestricted truck traffic at completion of construction. Completion was one (1) year earlier than anticipated in the contract and two (2) years sooner than would be expected under hard bid (design-bid-build). Prior to the project four (4) bridges had weight or width restrictions, requiring freight to divert around the bridges.
2. Based upon original contract requirements this project had an estimated cost savings in excess of \$198,807.12 over hard bid (design-bid-build). Utilization of Design-Build method resulted in an actual projects savings of \$991,278.52.
3. **Safety.** No injuries to highway workers.
4. **Claims Avoidance.** There were no claims on this project.

B. Project Failures.

One fatality to a passenger in a freight tractor-trailer rig that drove off the road to avoid stopped traffic.

While not considered failures, there were numerous change orders issued on the project. This indicates the need for better scoping and project review early in the procurement processes. Change orders and price escalation totaled over one million dollars. However, when these issues are removed from the project the actual costs came in well below estimate.

C. Comparison to Original ORS 279.103 Findings. The comparisons made in this section are between the original findings presented in support of an exemption for the Central Oregon Highway Bridges project and actual design-build contract performance.

1. **Impact on Competition.** In the original findings ODOT suggested that there would be no impairment of competition under a solicitation process utilizing technical and price-based evaluation and selection factors, as many firms had expressed interest in the Central Oregon Highway Bridges project. In fact, three Design-Build teams proposed on this project, resulting in a competitive procurement.

2. Net Cost Savings. In the original exemption findings, ODOT presented data from national studies that indicated cost savings could be expected in several areas through utilization of the Design-Build project delivery model when compared to the traditional hard bid (design-bid-build) model. ODOT concluded that if Oregon experienced similar results, it could expect to realize a total savings of approximately \$667,521. Actual experience exceeded the original estimated savings.
 - a. Change Orders. ODOT anticipated that in keeping with industry experience, cost growth associated with change orders would be reduced by up to 4.5% under the Design-Build model compared to what would be expected under the hard bid (design-bid-build) model, yielding a potential savings on the Central Oregon Highway Bridges project of up to \$650,000. In fact, the Central Oregon Highway Bridges project incurred \$1,056,375.04 in change order cost, for a total of 1.45% of the contract value.
 - b. Bid Documents. ODOT projected that by eliminating the separation between the design and build phases in the solicitation process using the Design-Build method, ODOT could reduce preliminary engineering costs by approximately \$45,000 on the Central Oregon Highway Bridges project, as compared to the hard bid (design-bid-build) model. Data on preliminary engineering indicates actual savings of \$124,000.
 - c. Maintenance. ODOT projected a savings of over \$300,000 in maintenance and repair expenditures in the event the project was completed 12 months earlier than could be expected under the typical hard bid (design-bid-build) model. Since the project exceeded the early completion goal, completing more than 12 months early, the projected savings is presumed to have been achieved. The construction of MSE walls (4, 4-A) at three (3) locations raises concerns of increased maintenance costs in the future, this is not enumerable. To address the issue the local maintenance office is preparing to do a study to evaluate their concerns. The current estimate for the study is \$30,000.
 - d. Inflation. In ODOT's initial exemption findings calculated a savings of approximately \$217,698 due to avoidance of costs resulting from inflation at 3% when comparing the Central Oregon Highway Bridges project against the design-bid-build model. The completion of the work ahead of schedule by 12 months demonstrates that even greater savings were achieved.
 - e. Commercial Traffic/Industry Savings. ODOT records show that prior to the project four (4) bridges had weight or width restrictions requiring freight to divert around the bridges. This limitation required some heavier trucks to take a detour route through John Day. The out-of-direction travel for these trucks is 72 miles. Approximately 20 trucks per week are known to be taking this detour route. The estimated additional cost is \$150 per truck, excluding the cost of pilot cars. Using this information we determine that this results in savings to the trucking industry of over \$90,000.00.

IV. Summary.

In conclusion, the Central Oregon Highway Bridges project met nearly every expectation ODOT included in its original findings, supporting the granting of an exemption from competitive bidding. With the exception of change order work, the project achieved or exceeded all savings predicted in comparing it against the traditional had bid (design-bid-build) contracting model. The project was completed ahead of schedule. There are no claims pending. Whether evaluating the project on the basis of comparisons to comparable design-bid-build projects or expectations in the contract, the Design-Build delivery model implemented on the Central Oregon Highway Bridges project saved the Oregon Department of Transportation significant dollar amounts. Further, the trucking industry and the traveling public gained through increased mobility and reduced travel times and distances.

SUMMARY COMPARISON		
Evaluation Factor	Central Oregon Highway Bridges Project	Typical Hard Bid (Design-Bid-Build)
Project Cost	\$27,767,353.52	\$28,758,532.04
Project Duration	25 months	42 months