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DATE: September 10, 2007

TO: Matthew Garrett
Director, Department of Transportation

FROM: Jane Lee
ODOT Advanced Contracting Unit Manager

SUBJECT: Findings of Fact Exemption #2002-51 Evaluation Report
Interstate-84 (I-84) Quarry Bridges (LaGrande) Section
Design-Build Project
Key No. 13052

The post-construction evaluation for the Interstate-84 (I-84) Quarry Bridges (LaGrande) Section 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 evaluation compares the expected benefits of using Design-Build described in the adoption findings with the project results.

The I-84 Quarry Bridges (LaGrande) Section project was granted an exemption (#2002-51) by the Director of the Department of Transportation (ODOT), under the statute in force at that time (ORS 279.015). The statute was revised by 2005 (IRS 279C.335). Both current and previous statutes require 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 ODOT is required. The final evaluation report will be posted on the ODOT Design-Build website within ten (10) business days at:

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

Enclosure: I-84 Quarry Bridges (LaGrande) Section Final Evaluation Report

Final Evaluation
For The
I-84 Quarry Bridges Design-Build Project

(as required by ORS 279C.355)

Project Name: Interstate-84 (I-84) Quarry Bridges (LaGrande) Section

Exemption Number: 2002-51

Contract Number: C12819

Key Number: 13052

FAP: NH-OTIA-S006(39)

Design-Builder: Max J. Kuney Company

Designer: HDR Engineering, Inc

Project Description

The I-84 Quarry Bridges (LaGrande Section) Design-Build project replaced the two (2) eastbound bridges at MP 258.89 and the two (2) westbound Upper and Lower Quarry bridges at MP 291.13, over the Grande Ronde River and reconstruction of eastbound and westbound mainline roadways between Upper Quarry and Lower Quarry bridges and associated approaches on the Old Oregon Trail Highway (I-84) near LaGrande, Oregon. This was the second design-build project on Interstate 84.

I. Introduction.

On October 18, 2002 the Oregon Department of Transportation's (ODOT) I-84 Quarry Bridges (LaGrande Section) Design-Build Project (the "Quarry 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 I-84 Quarry Bridges (LaGrande Section) 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 I-84 Quarry Bridges (LaGrande Section) project actual experience, with what the project was originally expected to yield under the terms of the Design-Build contract. Construction commenced on February 9, 2003 and was completed on November 11, 2004.

II. Comparison of the I-84 Quarry Bridges (LaGrande Section) Project Actual Results vs. a Typical Hard Bid (Design-Bid-Build) Project

A. Schedule and Project Duration

Under the traditional hard bid 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 I-84 Quarry Bridges (LaGrande Section) project completed under the hard bid method of delivery would typically take approximately 36 months (3 years). The I-84 Quarry Bridges (LaGrande Section) project, utilizing the Design-Build method of project delivery, took only nineteen months, saving an estimated seventeen months. Additionally the construction method allowed for highway use by overweight and overwidth restricted loads, seventeen months earlier than anticipated in the hard bid arena. This acceleration was accomplished by temporary widening of several bridge structures to accommodate two-way traffic and overweight and oversize loads the first construction season. The acceleration of almost seventeen months to completion on the I-84 Quarry Bridges (LaGrande Section) project is principally attributable to concurrent design and construction activities.

B. Costs

The following table compares actual I-84 Quarry Bridges (LaGrande Section) project figures realized utilizing the Design-Build contracting model with what would have been expected under the traditional hard bid method of project delivery, based upon ODOT historical experience. The actual total construction cost for the project was $20,286,418.22, inclusive of change orders, as enumerated below.

Base contract amount: **$18,899,881.54**

Change Order Item	Change Order Amount
Mobilization, Guardrail, TP&DT, QA/QC Striping	$188,317.05
12.5 MM Dense HMAC	$302,427.35
PG 70-28 in HMAC	$168,470.40
WBBUQ Bridge Shoring Design	$51,529.75
Sign Bridge Updates	$58,063.28
Revised Ilumination Plans	$29,365.21
35 Mpa Deck Concrete	$39,914.00
Modify (increase) AC oil quantity in contractor mix design	$7,050.35
Additional Engineering – UQWB Bridge Load Rating	$29,515.90
Crack Monitoring - UQWB Bridge	$66,619.47
Temporary Striping – WB Lane	$4,314.00
HMAC Bonus Fall 2003	$23,276.40
WB Bridge Joint Changes	$100,545.14
HMAC Bonus Spring 2003	$16,235.98
Bent Maintenance Platform Design	$7,713.84
35 Mpa Deck Concrete WB Structure	$69,684.67
OJT Hours	$4,800.00
HMAC Bonus 2004	$27,813.40
Illumination System Modifications	$21,899.84
Replace Guardrail with Concrete Barrier	$24,189.02
Additional Fencing	$17,301.80
HDR Engineering Surveying	$14,856.41
TP & DT	$10,736.00
Modify AC Design to 6.65%	$19,402.16
Modify Time/Incentive Award	$4,000.00
Clean up Debris at LQWB	$22,920.17
Relocate/Install Signs	$2,548.40
Reimburse for Claim Review Board	$7,105.25
Prime Contractor 8% mark-up	$1,136.84
Claim Settlement	$42,295.65
Statutory Interest	$2,488.95
Total Change Order Amount	$1,386,536.68

Base contract plus change orders: **$20,286,418.22**

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 project.

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

Estimated Cost for Hard Bid Delivery:	
Design	$3,004,662.00
Environmental/Permitting	$1,001,553.00
Construction	$17,551,378.00
ODOT Construction Engineering/Construction Management	$1,055,267.00
Change order costs	$1,386,536.68
Total Estimated Cost:	$23,999,396.68
Actual Cost for I-84 Quarry Bridges Design-Build Delivery:	
ODOT Preliminary Design and partial Permitting	$233,500.00
Final Design and partial Permitting (Design-Builder)	$2,634,000.00
Construction	$16,7858,489.22
ODOT Project Management	$560,429.00
Total Actual Cost :	$20,286,418.22
Difference between Hard Bid and Design-Build in Total Cost Savings:	$3,712,978.46

The construction value assigned to the hypothetical hard bid project utilized the actual construction costs incurred on the I-84 Quarry Bridges (LaGrande Section) project. It does not included 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 project would have concluded, the difference in cost grows wider. The numbers used in arriving at the hypothetical hard bid 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 I-84 Quarry Bridges (LaGrande Section) replacement bridges being opened for public use up to seventeen months earlier than it would have been anticipated under a typical hard bid contracting model. Also of note, due to the contractor's overall project design, the weight restrictions on the

four (4) restricted bridges were removed seventeen months earlier in the project than would have been anticipated in a hard bid 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 15.47%. This does not take into account the efficiencies and savings of the actual construction time period, approximately nineteen months, which was substantially shorter than, and occurs earlier in the process than, would have occurred in a hard bid project.

III. I-84 Quarry Bridges (LaGrande Section) Actual Results vs. Contract Requirements

The comparisons made in this section are between the original I-84 Quarry Bridges (LaGrande Section) project contract requirements and the actual results.

A. Project Successes.

Among the successes experienced on the I-84 Quarry Bridges (LaGrande Section) 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 one (1) year into the project. This is one (1) year earlier than anticipated and seventeen months sooner than would be expected under hard bid. Prior to the project the bridges had weight or width restrictions requiring freight over 105,000 pounds and heavy haul trucks (over 98,000 pounds) to divert around the bridges. The diversion increased the time to transport a load by a minimum of one (1) hour if Tollgate Road was a viable option or significantly longer if it was not.

2. Based upon original contract requirements this project had an estimated cost savings of $2,405,737.54 when compared to the original ODOT engineer's estimate. Utilization of Design-Build method resulted in a cost savings of $3,712,978.46 when compared to the estimate cost in utilizing hard bid method.

3. Safety. No injuries to highway workers.

4. Claims Avoidance. There was one (1) claim on this project that resulted in a settlement of $42,295.65.

B. Project Failures.

Due to the accelerated construction efforts there were increased construction errors and repairs to be completed by the Design-Builder. These issues included the need for a second retaining wall to shore up a retaining wall that began to be displaced and pads being added to a number of columns due to improper height when they were originally constructed.

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 I-84 Quarry Bridges (LaGrande Section) 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 I-84 Quarry Bridges (LaGrande Section) project. In fact, three (3) 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 model. ODOT concluded that if Oregon experienced similar results, it could expect to realize a total savings of approximately $494,000. Utilizing ODOT's historical experience, the project cost approximately $3,712,978.46 less than would have been expected on a comparable hard bid project. 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 model, yielding a potential savings on the I-84 Quarry Bridges (LaGrande Section) project of up to $900,000. In fact, the I-84 Quarry Bridges (LaGrande Section) project incurred $1,386,536.68 in change order cost, for a total of 6.83% 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 $15,000 on the I-84 Quarry Bridges (LaGrande Section) project, as compared to the hard bid model. Data on preliminary engineering indicates actual savings of $39,000.

   c. Maintenance. ODOT projected a savings of over $300,000 in maintenance and repair expenditures in the event the project was completed twelve months earlier than could be expected under the typical hard bid model. Since the project exceeded the early completion goal, completing more than seventeen months early, the projected savings is presumed to have been achieved. The construction of MSE walls (4, 4-A) raises concerns of increased maintenance costs in the future. However this is not enumerable.

   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 I-84 Quarry Bridges (LaGrande Section) project against the hard bid model. The completion of the work ahead of schedule by seventeen months demonstrates that even greater savings were achieved.

e. Commercial Traffic/Industry Savings. ODOT records show that between 50 and 52% of the traffic over the bridges is truck traffic. Due to the nature of the restrictions, ODOT was unable to determine the number of trucks that were actually diverted. This area does have a high number of heavy haul vehicles traversing the highway. Estimated conservatively the detour cost the industry $250,000.00 a year. As the project was completed nineteen months earlier than might have been expected under the hard bid model, and the fact that the bridge was open to full weight loads seventeen months earlier, it is expected that industry saved in excess of $350,000.00 due to early project completion and replacement of the weight-limited bridge during the first year of the project.

IV. Summary.

In conclusion, the I-84 Quarry Bridges (LaGrande Section) 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 contracting model. Furthermore, the project was completed ahead of schedule and under budget. There was one claim settlement. Whether evaluating the project on the basis of comparisons to comparable hard bid projects or expectations in the contract, the Design-Build delivery model implemented on the I-84 Quarry Bridges (LaGrande Section) 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	I-84 Quarry Bridges Projected	I-84 Quarry Bridges Actual	Typical Hard Bid (Design-Bid-Build)
Project Cost	$21,309,451	$20,286,418.22	$23,999,396.68
Project Duration	24 months	19 months	36 months