

APPENDICES 6-1

Final Evaluation For The I-5 Willamette River Bridge, Bundle 220 Construction Manager/General Contractor (CM/CG) Project *(as required by ORS 279C.355)*

Project Name: I-5 Willamette River Bridge, Bundle 220
Construction Manager /General Contractor Project

Exemption Number: 2007-51 Amend 1

Contract Number: 13480

Project Key Number: 14259

FAP Identification Number: NH-OTIA-S001(277) OTIA III

CM/GC: Hamilton Construction Company

A&E: OBEC Consulting Engineers and T.Y. Lin International

Project Description

The I-5 Willamette River Bridge Bundle 220, Construction Manager/General Contractor (CM/GC) project replaced two (2) bridges on Interstate 5 (I-5) in Lane County, Oregon; the 1800-foot Willamette River Bridge, and the 100-foot Canoe Canal (a.k.a. "Patterson Slough") Bridge. The Agency built detour bridges at both locations in 2004. ODOT decommissioned the existing Willamette River Bridge. Both detour bridges and the decommissioned bridge were removed as part of this project. I-5 runs generally north-south in the project area, forming the boundary between the cities of Eugene to the west and Springfield to the east. The project area is located within the urban growth boundary of both cities. The bridges were replaced as part of the Oregon Transportation Investment Act (OTIA) III State Bridge Program.

In addition to crossing the Willamette River, the new bridges crossed pedestrian paths, Franklin Boulevard, two (2) Union Pacific Railroad (UPRR) tracks, and the northbound I-5 to westbound Franklin Boulevard off-ramp. With I-5 being the West Coast's major trade **corridor** and one of the top **freight** routes in the nation, traffic flow had to be accommodated on all of these facilities during construction.

I. Introduction.

On December 2, 2007, the Oregon Department of Transportation's (ODOT) I-5 Willamette River Bridge Bundle 220 (the "I-5 Willamette River Bridge project") CM/GC project received an order from the ODOT Director granting an exemption from competitive bidding to allow the use of the CM/GC project delivery method. ORS 279C.335(2) permits the Director of Transportation to grant exemptions to 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. The public hearing was held on November 1, 2007 and there were no comments received.

ORS 279C.355 requires an evaluation of the public improvement project upon its completion. The evaluation must include, but is not necessarily limited to the following matters:

1. The actual project cost as compared with original project estimates.
2. The amount of any guaranteed maximum price.
3. The number of project early work amendments and change orders issued by the public contracting 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 279C.335.

In the following sections, two types of comparisons are made. The first evaluation, reported in Section II, compares actual results of the project with results that would be expected if the project had been a design-bid-build project. The second evaluation, reported in Section III, compares actual results of the project with the expected results described in the exemption findings.

Notice-to-Proceed was issued to the CM/GC contractor on June 17, 2008 and construction was completed on July 30, 2015. The dollar amounts provided in this report are rounded to the nearest whole dollar.

II. Comparison of the I-5 Willamette River Bridge Project Actual Results vs. Expected Results of a Hypothetical Design-Bid-Build Project

A. Schedule and Project Duration

Under the traditional design-bid-build method, ODOT obtains all environmental clearances and permits, and completes biddable final plans and specifications prior to advertising and awarding the construction contract to the lowest responsive bidder. The CM/GC contracting method utilizes an integrated team approach applying modern management techniques to the planning, design, pre-construction and construction phases of a project in order to control time and cost, and to assure quality for the project owner.

CM/GC contracting augments the traditional scope of work of the general contractor with that of a construction manager under a single contract with the owner. At an early point in the design phase, the owner, using a competitive selection process, selects a contractor to provide construction management and general contracting services. By joining the project team during design, the CM/GC firm can collaborate with the Architect and Engineer (A&E) firm (retained by ODOT), on the development of the design and preparation of the design documents. Once the design has progressed to an acceptable level, the CM/GC contractor undertakes the construction of the facility pursuant to ODOT approved Early Work Amendments (EWAs), Contract Change Orders (CCOs), and ultimately a Guaranteed Maximum Price (GMP). The CM/GC contractor procures subcontracts with trade contractors using multiple bid packages to construct the project, and manages the construction process on behalf of the owner.

A project equivalent to the I-5 Willamette River Bridge project completed under the design-bid-build method of delivery would take approximately 24 months for design and 104 months for construction, 128 months total. Using the CM/GC method, the I-5 Willamette River Bridge project, took 30 months for design, from Notice-to-Proceed on May 7, 2008 to final design on November 9, 2010 and 85 months for construction from Notice-to-Proceed on June 17, 2008 to

construction completion on July 30, 2015, 115 months total, or approximately 13 months earlier than the estimated duration if the design-bid-build method had been utilized.

To avoid purchasing additional right of way and significant impacts to the environment and local city parks ODOT changed the bridge configurations from single structures to separate north and south bound structures. The additional work added approximately 31 months to the project schedule. In spite of the additional time required to implement this important project improvement, the project still took significantly less time than the estimated time required for the project with one (1) bridge structure under the design-bid-build method.

Completion of project closeout activities took longer than anticipated but the parties successfully resolved the issues and reached agreement on the GMP, and Third Notification was issued on May 29, 2016.

Additionally, the on time completion, per the contract amended by EWAs and CCOs, of the I-5 Willamette River Bridge project restored and enhanced a vital transportation link in the highway connecting the Western U.S to Canada and Mexico. At the same time, it has made travel easier for local drivers and has improved access for emergency vehicles and commuters between two vibrant Oregon communities.

B. Costs

The initial authorized construction funding and CM/GC contract scope of work consisted of the contractor providing Pre-construction services. Per the CM/GC contract provisions, ODOT utilized EWAs and CCOs to add construction work in phases to the Contract's scope of work.

The final total amount paid to the CM/GC for pre-construction and construction services was \$148,824,363.56, inclusive of EWAs and CCOs, as enumerated below. There were 14 EWAs, 136 CCOs, and a GMP Amendment issued for the project.

<u>CM/GC Contract Pre-Construction Services Amount:</u>	\$ 2,165,140.00
<u>Total EWAs and CCOs for Construction Services Amount:</u>	\$146,659,223.56
(Including Adjustments and Extra Work Orders)	
<u>Pre-Construction Plus Construction Amounts:</u>	\$148,824,363.56
<u>Guaranteed Maximum Price (GMP) Amount:</u>	\$149,599,363.56
<u>Adjusted CM/GC Contract Amount</u>	\$148,824,363.56
(Above dollar amounts are not rounded)	

Final Project Costs Under CM/GC Method vs. Estimated Cost Under Design-Bid-Build Method

The final to total cost for the I-5 Willamette River Bridge project was \$162,917,204.00. The total cost includes the following individual project costs:

Final I-5 Willamette River Bridge CM/GC Project Cost:

Project Cost:	Final Amounts
Pre-Construction	\$ 2,165,140.00
Adjustments	\$ 869,545.00
Extra Work Orders	\$ 229,790.00
EWAs and CCOs	\$ 145,559,889.00
State Force Orders	\$ 1,390,529.00
Engineering	\$ 12,702,311.00
Final Total Cost :	\$ 162,917,204.00

The exemption finding estimated that construction costs would be approximately \$150M and other project costs for engineering, permitting, and project management would be approximately \$30M. In the exemption findings ODOT estimated that total project cost would \$180M. ODOT estimated the costs for a similar project utilizing design-bid-build method would be \$164M for construction and total project cost would be \$194M.

C. Conclusion

The use of CM/GC contracting resulted in the I-5 Willamette River Bridge project being opened for public use about 13 months earlier than it would have been anticipated under the design-bid-build contracting method. Input from the CM/GC and the local community, stakeholders and public agencies helped ODOT to control costs, schedule, and design, manage risks, and resolve and adjust outcomes as the project proceeded. The partnership and constant collaboration among the parties significantly contributed to the success of the project.

Final total cost of the project was \$162,917,204.00. When compared to the estimated cost for delivery of the project using design-bid-build of \$194M, ODOT realized an estimated cost savings of \$31,082,796.00, or about 16%.

This does not take into account the cost efficiencies and savings resulting from construction acceleration using CM/GC as compared to the traditional design-bid-build delivery method.

III. I-5 Willamette River Bridge Actual Project Results vs. Estimated Results Stated in the Exemption Findings

In this section, the actual project results are compared to the original estimated project results in the exemption findings for the I-5 Willamette River Bridge project.

A. Project Successes

Successes experienced on the I-5 Willamette River Bridge project were:

1. On-time Completion – Project construction completed on July 30, 2015, on time per the contract as modified by EWAs and CCOs. Completion of the I-5 Willamette River Bridge project restored and enhanced a vital transportation link in the highway connecting the Western U.S to Canada and Mexico. At the same time, it has made travel easier for local drivers and has improved access for emergency vehicles and commuters between two vibrant Oregon communities.

The project took more time to complete than the timeline estimated in the exemption findings. However, this was due primarily to the important project improvement decision to build separate north and south bound bridge structures, which added work and extended the project completion date.

2. Direct Cost Savings – In the exemption findings, by evaluating the potential benefits from using CM/GC to deliver the project, ODOT determined that by accelerating the project by one (1) year and potential savings from value engineering, that the project could achieve \$14M in direct cost savings for construction. When comparing the final total CM/GC construction cost of \$148,824,364.00 to the estimated \$164M design-bid-build construction cost, the actual direct cost savings for project construction cost was approximately \$15,175,636.00. The direct cost savings for project construction were \$1,175,636.00 more than the estimated savings stated in the exemption findings.

3. Innovations:

a. *Mobility* – Northbound and southbound traffic flow was maintained on the previously constructed temporary detour bridge. After competing construction of the new southbound bridges, ODOT rerouted northbound and southbound traffic on to the new bridges. After construction of the new northbound bridges was completed ODOT rerouted northbound traffic on to the new bridges.

b. *Construction Methods* – ODOT's requirement to stay within the existing right-of-way resulted in the reconstruction of the I-5 freeway and connector ramps within their current footprints. This required complicated construction sequencing, resulting in nine traffic control stages. The CM/GC contractor and the A&E jointly developed 3-D models of the project site that accurately reflected the precise size, location, and elevation of each temporary and permanent construction feature. The CM/GC contractor and A&E utilized the additional details provided by the 3D modeling to identify and resolve potential construction conflicts before they could lead to construction delays in the field. Construction progressed with no significant conflicts or modeling busts.

c. *Traffic Control* – None

d. *Value Engineering* – By having the CM/GC at the table with the designers and owner representatives, the design process was a consistent value added process. One example of the CM/GC contractor's contributions included the use of the "Bubbleator" which provided an air curtain surrounding the piles as they were driven in the river as a method to attenuate noise and vibration. This innovative method in muffling noise and vibrations from underwater pile driving was highly regarded by the permitting agencies for its potential use on other projects with fish bearing waters.

e. *Environmental Stewardship:*

- Instead of disposing of the materials from the demolished temporary detour bridge into a landfill, ODOT salvaged more than 200 concrete and steel beams, and sold them to agencies that include Multnomah County, the city of Florence, and the U.S. Forest Service. ODOT realized significant savings by avoiding the cost to move and store or dispose of the beams.
- ODOT reused 50 precast box girders from the demolished temporary detour structure to construct a viaduct to extend the south bank multi-use path along the Willamette River. The new path significantly improved commuter safety for cyclists and pedestrians, and provides a beautiful view of the river and the I-5 Willamette River Bridge.
- The CM/GC utilized innovative construction practices such as: 1) Use of Bubble Curtains to protect fish during pile driving. 2) Use of equipment fueled by vegetable-based fuel rather than petroleum-based products. 3) Use of fully contained work bridges to minimize construction impact to the environment. 4) Use of fish by-pass systems that assure that fish were able to swim around the barriers safely, thereby preserving the environment of endangered species.

4. Awards:

The I-5 Willamette River Bridge project received more awards than any other single project in the OTIA III State Bridge Program. The project received the following awards:

- 2015 Excellence In Concrete Construction sponsored by the American Concrete Institute. Second Place, Infrastructure category.

- 2015 Engineering Excellence Awards, National Recognition Award, American Council of Engineering Companies.
- 2015 Oregon Heritage Excellence Award, Oregon Parks and Recreation Department, Oregon Heritage Commission.
- 2015 Alliant Build America Awards, Highway and Transportation category, Associated General Contractors.
- 2015 Engineering Excellence Awards, Grand Award, American Council of Engineering Companies of Oregon.
- 2014 Best of the Best Projects Award, Highways and Bridges category, McGraw-Hill's Engineering News Record
- 2014 Excellence in Concrete, sponsored by the Oregon Concrete and Aggregate Producers Association. First place for best cast in place, Bridges category.
- 2014 Best Projects Award, Northwest Best Overall Project, McGraw-Hill's Engineering News Record.
- 2014 Best Projects Award, Northwest Safety category, McGraw-Hill's Engineering News Record
- 2014 Fourteenth Biennial Competition, Concrete Bridge Award, Portland Cement Association.
- 2014 USA Core Values Award Honorable Mention, Project of the Year category, International Association for Public Participation.
- 2014 Bronze Beacon Award, Special Events category, International Association of Business Communicators, Oregon Chapter.
- 2014 Top Project, Transportation category, Daily Journal of Commerce.
- 2014 PRIDE Award, First Place, Community Relations, Public Sector category, American Road and Transportation Builders Association.
- 2014 Blue Pencil & Gold Screen Award, Second Place, Special Purpose Publication category, National Association of Government Communicators.
- 2014 First Place Slag Award for Durability, American Concrete Institute.
- 2013 Project of the Year Slag Cement Association.
- 2013 Next Generation of Government Leadership Award, GovLoop and Young Government Leaders.
- 2011 Bronze Beacon Award of Merit, external video in Video/Multimedia/Electronic category, International Association of Business Communicators, Oregon Columbia Chapter.
- 2011 Bronze Beacon Award Honorable Mention, blog in Video/Multimedia/Electronic category, International Association of Business Communicators, Oregon Columbia Chapter.
- 2010 Spotlight Award, Blog category, Public Relations Society of America, Portland Chapter.

5. Safety: No lost-time injuries or injuries to the public occurred

6. Claims Avoidance –There were no claims.

B. Project Failures –

There were no failures.

C. Comparison to ORS 279C.335 Exemption Findings.

The comparisons made in this section are between the findings presented in support of an exemption for the I-5 Willamette River Bridge project and the actual CM/GC project performance.

1. Impact on Competition – In the exemption 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-5 Willamette River Bridge project. Two (2) contractors submitted proposals in response to request for proposals on this project, resulting in a competitive procurement.

2. Net Cost Savings – In the exemption findings, ODOT presented data from national studies that indicated cost savings could be expected in several areas through utilization of the CM/GC project delivery method when compared to the traditional design-bid-build method. ODOT experienced similar results by providing a scope of work and constructible design that best met the requirements of the project with significantly lower risk of cost overruns due to delay and redesign. Involving the contractor during design allowed for potential risks to be addressed early and provided the contractor with detailed knowledge of the project. In the exemption findings, ODOT estimated a total direct cost savings of approximately \$14,000,000. For this project, actual direct cost savings were \$15,175,636.00, which is approximately \$1,175,636.00 more than the estimated savings in the exemption findings.

3. Schedule Changes –The original construction completion date for the I-5 Willamette River Bridge project was based on the new I-5 Willamette River Bridge being a single structure. Shortly into project design, the project team determined that separate structures were required for north and south bound traffic. To address this new requirement ODOT issued a contract change order to add the additional work and nearly two (2) years to the construction portion of the contract. However, this change proved to be well worth the added cost and time in terms of the improved final product.

IV. Summary

In conclusion, the I-5 Willamette River Bridge project exceeded the estimated completion time presented in ODOT's exemption findings. Actual project cost savings exceeded the expectations presented in ODOT's exemption findings.

In-addition, the project had significant achievements and successes in innovations, environmental stewardship, and recognition by the industry with 21 awards. The achievements and successes of the I-5 Willamette River Bridge project presented in this report support the granting of an exemption from competitive bidding.

The successes of the I-5 Willamette River Bridge project demonstrated that the CM/GC method when compared to traditional design-bid-build method could save ODOT time and money for certain construction projects.

FINAL PROJECT RESULTS AND ESTIMATED RESULTS COMPARISON SUMMARY

Evaluation Factors	I-5 Willamette River Bridge (CM/GC) Exemption Findings Estimated Results	I-5 Willamette River Bridge (CM/GC) Final Project Results	Hypothetical (Design-Bid-Build) Estimated Results	I-5 Willamette River Bridge Actual Savings Compared to Exemption Findings
Project Cost	\$180,000,000.00	\$162,917,204.00	\$194,000,000.00	\$15,175,636.00 (More)
Project Duration	56 Months	115 Months	128 Months	None

The public benefited from this project through improved safety by increasing both the flow of traffic and increased allowable load capacities for interstate commerce and recreational travel along this portion on the interstate highway system.

Archived