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February 26, 2013

The Honorable Jay Inslee
Governor of Washington State
P.O. Box 40002
Olympia, WA 98504-0002

Dear Governor Inslee:

Enclosed are the SR 520 Pontoon Construction Expert Review Panel Report, the Pontoon Construction Project Internal Review Report, and my letter of direction for follow through on findings and recommendations.

Please call me if you have any questions or need more information.

Sincerely,

A handwritten signature in black ink, appearing to read "Paula J. Hammond". The signature is written in a cursive style with a large, sweeping flourish at the end.

Paula J. Hammond, P.E.
Secretary of Transportation

PJH:lsh
Enclosures



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February 26, 2013

Steve Reinmuth
WSDOT Chief of Staff

Dear Steve:

I commissioned the attached SR 520 Pontoon Construction Project Internal Review (Internal Review) last October. I am incorporating its findings into this letter by reference.

The two purposes of the Internal Review are simple: 1) if WSDOT employees or managers acted, or failed to act, between 2008 and 2012, in ways that led to greater-than-anticipated pontoon spalling and cracking, deficiencies in contract administration and lack of proactive resolution of problems, those individuals must be held responsible and appropriate corrective action must be taken; and 2) where WSDOT can improve management, communications and internal alignment of capital project delivery practices, changes must be made. Please ensure responsible division managers address those recommendations.

I have reviewed the Internal Review thoroughly and talked with its authors in-depth. I agree with the findings regarding technical design, construction management, and decision-making failures by our employees and managers. I also agree with the eight recommendations to clarify WSDOT roles, responsibilities, authorities and accountabilities that suggest changes to agency protocols and practices.

As Secretary of Transportation, I am directing you to work with appointing authorities for those employees and managers involved, to issue pre-disciplinary letters before March 8, 2013, based on the findings in the Internal Review. Based on the employee and manager responses when the meetings occur, you should then proceed with any appropriate disciplinary action(s), in consultation between WSDOT Human Resources and the Secretary's Office, prior to April 12, 2013.

Thank you for giving these findings your highest level of attention in the next month.

Sincerely,

Paula J. Hammond, P.E.
Secretary of Transportation

cc: Governor Jay Inslee
Lynn Peterson
Kara Larsen, Assistant Attorney General

**SR 520
PONTOON CONSTRUCTION PROJECT
INTERNAL REVIEW
REPORT**

February 26, 2013

**Prepared, compiled and submitted by:
John Reilly Associates International, Ltd.
In collaboration with, and input from, key WSDOT managers, staff and consultants.**

¹ Released February 26, 2013.
Minor typographical, format and spelling errors corrected March 8.

Table of Contents

1. OVERVIEW	2
2. BACKGROUND	3
<i>The PCP & FB&L Contracts</i>	<i>3</i>
<i>PCP - Early Procurement of pontoons</i>	<i>3</i>
<i>PCP pontoons, spalling and cracking</i>	<i>3</i>
3. HISTORY, RELEVANT DECISIONS	4
<i>Decision to Use Design-Build</i>	<i>4</i>
<i>The Pontoon Construction Project Design-Build Contract</i>	<i>5</i>
<i>Structure of the Contract, Options A and B</i>	<i>6</i>
<i>Components of the PCP contract</i>	<i>7</i>
<i>The PCP Construction Site office</i>	<i>7</i>
<i>Contract Administration</i>	<i>8</i>
4. MANAGEMENT, CONTRACTING, DECISIONS, COMMUNICATIONS, ALIGNMENT	8
<i>WSDOT - Contracting Approach, Contract Management</i>	<i>8</i>
<i>WSDOT Project Delivery Culture / Schedule issues</i>	<i>9</i>
<i>WSDOT Management and Decision Making</i>	<i>9</i>
<i>WSDOT Executives - Management</i>	<i>10</i>
<i>Internal and External Communications</i>	<i>10</i>
<i>Alignment - Executives, SR 520 Program, HQ Functional Groups and Site Office</i>	<i>10</i>
<i>Legislation-related elements</i>	<i>11</i>
5. TECHNICAL AREAS	12
<i>PCP pontoons – cracking / prestressing forces</i>	<i>12</i>
<i>BSO, Design of bolt-beam</i>	<i>13</i>
<i>BSO Quality Control / Quality Assurance (QC/QA) process</i>	<i>13</i>
<i>WSDOT Construction Management Procedures</i>	<i>14</i>
6. RECOMMENDATIONS	15
<i>Technical</i>	<i>15</i>
<i>Construction Management</i>	<i>15</i>
<i>Management and Decision Making</i>	<i>15</i>
APPENDIX A – SCOPE OF WORK / SECRETARY’S QUESTIONS	17
<i>Scope</i>	<i>17</i>
<i>Plan and Approach</i>	<i>17</i>
<i>Secretary’s Questions, organized by category:</i>	<i>17</i>
APPENDIX B – SITE PERFORMANCE AUDIT REPORT	19
<i>(See attached Report)</i>	<i>19</i>

1. OVERVIEW

This report responds to a request, by the WSDOT Secretary of Transportation in October 2012, to review the history, events, and decisions which are related to recently identified problems with the SR 520 Pontoon Construction Project (PCP) pontoons constructed in Aberdeen Washington.

As directed by the WSDOT Secretary of Transportation, the scope included the following tasks:

1. Address the following issues and questions (see Appendix A), as possible depending on access to personnel and the existence and availability of relevant documentation.
2. Review and access documents relevant to this task within WSDOT and the SR 520 Program.
3. Compile observations, findings and related recommendations in a structured format and report to the Secretary.

This report reviews decisions and actions taken by WSDOT between 2008 and 2012 that have, in whole or in part, contributed to concrete spalling plus greater than anticipated pontoon cracking. It makes recommendations for agency actions to ensure that lessons learned are incorporated. In order to completely understand issues and concerns, this report should be read in conjunction with the report of an expert review panel convened to investigate the technical aspects of pontoon spalling and cracking².

Specifically, this report provides an understanding of the organizational, managerial, and procedural factors that led to the pontoon concerns and is intended to help support changes as needed in those areas. Other more urgent actions to repair the pontoons and to ensure better performance on future pontoon cycles have been underway since the initial concrete spalling occurred on May 11, 2012.

Unless stated otherwise, the findings and recommendations in this report apply only to the Pontoon Construction Project and should not necessarily be construed to apply to other projects in the SR 520 Program or to other WSDOT Programs.

Context:

This report relies on available data and documentation and information provided during interviews with knowledgeable WSDOT staff, managers and consultants. The accuracy and validity of the results are therefore dependent on the quality, accuracy and consistency of the information so obtained, which in many cases could not be independently verified and which, in some cases was reported differently, in fact or in opinion, by different persons and/or functional groups.

Accordingly, it is expected that there will continue to be disagreements between, and misalignment of, persons and groups related to the statements made and findings in this report. The work-out process to resolve these differences, in the context of advancing the PCP and the related Floating Bridge & Landings (FB&L) projects according to strict interpretations of their respective contractual requirements and conditions, is a WSDOT management responsibility.

Determination of WSDOT responsibility related to PCP contract change orders is not part of this work.

Respectfully submitted:



John J. Reilly

² WSDOT SR 520 Program, Pontoon Construction Project, Expert Panel Report, Phase 2, February 18, 2013

2. BACKGROUND

The SR 520 Bridge Replacement and HOV Program includes a new floating bridge with six lanes - two general-purpose lanes and one HOV lane in each direction. The 12.8-mile program begins at I-5 in Seattle and extends to SR 202 in Redmond.

Until July 2012, the program reported to both the WSDOT Chief Operating Officer and the WSDOT Chief Engineer (the Chief Operating Officer retired in July 2012). It has the same organizational status as a WSDOT Region, and is not a part of any WSDOT Regional Office. The program consists of a set of several major complex and inter-related construction projects to replace the existing floating bridge - a vital transportation link across Lake Washington, which is nearing the end of its life and is vulnerable to damage from wind, waves and earthquakes.

The PCP & FB&L Contracts

The first major SR 520 construction project is the Pontoon Construction Project (PCP), located in Aberdeen, Washington. This project will construct 33 concrete pontoons for use in replacement of the existing bridge support structure.

A separate contract, the Floating Bridge & Landings Project (FB&L) will produce an additional 44 pontoons, accept delivery of the PCP pontoons, assemble the bridge and add the bridge superstructure, including the road deck and pedestrian path / bikeway. The replacement bridge brings the roadway up to current design standards and is capable of accepting light rail in the future.

PCP - Early Procurement of Pontoons

The PCP is an early construction contract in the SR 520 Program, entered into before the preferred alternative for the complete bridge was established. One goal of the PCP contract was to provide pontoons that could be used in any of the several alternatives that might emerge as the final decision. This was necessary in order to be ready to quickly replace the existing, aging floating bridge in the event of a catastrophic failure. If this early procurement had not been implemented, it would have taken approximately 5 years to replace the cross-lake transportation if the existing bridge were to fail, resulting in extreme economic impacts to the region.

Due to the length of time taken to arrive at an alternative acceptable to all stakeholders, increasing concern about earthquake and wave action, and considering Legislation enacted in 2007³ which stated that “it is the conclusion of the legislature that time is of the essence”, Governor Gregoire, in discussion with WSDOT executives, announced in March 2008 that the bridge needed to be complete in 2014.

Finding

The urgency to build these initial pontoons has driven many decisions for this project. The urgent need and strategic direction, as confirmed by Governor Gregoire and the Legislature in 2007 and 2008, became a fundamental guiding principle in the advancement and execution of the work – with effects that led, in part, to the impacts and issues which are being resolved today.

PCP Pontoons, spalling and cracking

The PCP contract was awarded in January 2010. The first six pontoons were scheduled to be floated out from the casting basin in mid-2012. On May 11, 2012, unanticipated spalling and cracking was observed

³ ESSB 6099, 2007

in one of the first pontoons. WSDOT immediately worked on a corrective design⁴, directed the Design-Builder, Kiewit-General (KG), to repair the cracking and spalling and commissioned an Expert Review Panel to determine the cause. WSDOT and the Expert Review Panel identified significant design and construction concerns and made recommendations for changes and improvements to the Cycle 1 pontoons and for subsequent production cycles.

3. HISTORY, RELEVANT DECISIONS

This report summarizes decisions and actions taken within WSDOT between 2008 and 2012 that have contributed to problems, including spalling and unanticipated cracking of the pontoons of the Pontoon Construction Project, as well as organizational and management findings that are necessary to lead to a strengthened WSDOT capital project delivery process.

The cost and schedule impacts of these actions are currently being quantified through a separate effort by WSDOT. Corrective design and construction measures are being taken to ensure that the pontoons will meet their serviceability requirements and their 75-year service life. Some corrective actions regarding staff capabilities, performance, and organizational responsibilities have been taken, and we have been advised by the Secretary that others are imminent.

Decision to Use Design-Build

Given the delivery schedule urgency noted above, WSDOT convened an expert review panel in 2008 to analyze possible contracting approaches. The panel recommended Design-Build as the only way to complete the project by 2014. There were several factors which determined that the form of the PCP contract should be Design-Build.

1. Urgent replacement of the existing bridge as required by legislation and dictated by concern over vulnerability to wave and/or seismic activity dictated a very ambitious schedule.
2. That schedule required compression of design, permitting and pontoon construction.
3. That compression required that the Design-Build contracting method be used, as was recommended by the expert panel, and confirmed by WSDOT executives and experts.
4. Early contract award before the NEPA Record of Decision (ROD) would be necessary to achieve the schedule. This required approval by the Federal Highway Administration (FHWA).

In 2009, Design-Build contracting at this level was relatively new to WSDOT. Several Design-Build projects had been completed or were underway (Tacoma Narrows Bridge, Everett HOV, I-405 projects). However, the number of employees who had actively worked on administering a Design-Build project was small, and they were not widely dispersed within WSDOT. While the levels of authority for a Design-Build project remain unchanged, the roles of WSDOT staff in administering Design-Build contracts are very different from WSDOT's more common contract methods (Design-Bid-Build) i.e. oversight rather than approval, end-product review as opposed to means and method control and increased use of performance specifications which specified the end product but not means and methods. Establishment of clear contractual expectations and understanding of roles, responsibilities and authorities (among WSDOT

⁴ The circumstances of the corrective design being done by WSDOT and not the Design-Builder, done in part for expediency, reflect the ambiguous nature of the division of responsibility for the design of the pontoons themselves and the components of the work, in this case the design and installation of the prestressing tendons (PT) and provision for curvature (deviation) forces and stresses. Communication and contractual protocols are also a factor as addressed later in this report.

staff and between WSDOT staff and the Design-Builder) are key ingredients to a successful Design-Build project.

Design-Build contracts generally allocate a substantial amount of design and construction risk to the Design-Builder (the contractor). Every Design-Build contract on major projects has a risk profile which is dependent on the characteristics of the project to be built. It is often prudent for the owner to share or maintain certain risks, as the owner may be the best entity to manage those risks through their own performance or influence. This is generally done to ensure a stable and fair bidding environment and reduce the amount of risk contingency Design-Builders will include in their proposal prices. The Design-Builder ultimately takes the overall risk of project completion in accordance with the contract requirements, and must certify that the project has been built in accordance with the contract requirements.

The Pontoon Construction Project Design-Build Contract

In May 2009, WSDOT's Chief Engineer, State Construction Engineer, State Bridge Engineer, SR 520 Program staff and others met to discuss the feasibility of delivering a completed bridge by 2014. The State Bridge Engineer advised that the Bridge and Structures Office (BSO) could not deliver completed (100%) plans in time to make that date. The group concluded that using a Design-Build contracting method was the only way to meet the schedule. It was understood by all that the PCP contract would be Design-Build and the BSO would be proceeding on this basis with preliminary design⁵.

In July of 2009 WSDOT's Chief Engineer issued specific instructions⁶ regarding bridge design responsibilities for this project – specifically that the pontoons should not be fully designed by the BSO, and that the Design-Builder should be the Engineer of Record (thus owning all of the responsibility and risk for any design and construction problems).

During the summer of 2009, as the RFP⁷ was being developed, BSO staff were working independently of the rest of the RFP group. However, they did indicate strongly, several times to SR 520 staff working on the RFP and to WSDOT executives, that they felt the specifications and plans for the pontoons should be much more developed and prescriptive than what was normally called for in Design-Build.

In August 2009, just prior to issuance of the RFP, the BSO delivered their specification requirements to be incorporated in the RFP. These specifications were found to be too rigid to meet FHWA Design-Build requirements. That is, they specified exacting (prescriptive) methods for the work, rather than using desired performance requirements. The concern was that use of these specifications would limit the flexibility of the Design-Builder to achieve the result. Therefore, at this point, the SR 520 Program staff and BSO staff were directed to urgently and quickly revise the specifications so that they would meet FHWA requirements for a Design-Build contract.

Findings

- a. *The WSDOT BSO either did not understand the appropriate level of design and specifications for a Design-Build contract or, if they did, they did not communicate that they were advancing their design to higher, more prescriptive level than the SR 520 Program office or WSDOT Executives expected.*

⁵ In general, use of Design-Build means that the preliminary design should be advanced to about a 30% completion (more or less, depending on specifics) to allow the design to be completed by the Design-Builder in order to allow innovation and possibly realize cost and schedule savings.

⁶ Chief Engineer's email July 10, 2009

⁷ RFP is the Request for Proposal, defining the contract terms and conditions and soliciting bids from interested contractors.

- b. *The urgency and short timeframe for this work probably contributed to the different and problematic understandings of the requirements of these specifications and their application in construction.*

Structure of the Contract, Options A and B

The RFP was issued on August 24, 2009. Given that the BSO had completed substantial pontoon design work at this time (reported on the order of 70-80% complete design documents), the RFP was then revised to provide two options for the Design-Builders. It is not clear who directed this and why it was imposed so late in the process.

Option A allowed the Design-Builder to use plans and specifications developed by the BSO, with substantial design details regarding pontoon design (as supplied in Appendix M11⁸ of the RFP). An addendum to the RFP in November 2009 made it clear that WSDOT would assume full responsibility for the M11 drawings, thus for the pontoon design. However, from input to this report, it was still not clear to several internal WSDOT managers whether WSDOT or the Design-Builder had full responsibility for final design for the pontoons⁹ under this option.

Option B required the Design-Builder to do a complete and comprehensive design of the floating bridge pontoons and all associated structures in the PCP contract. This option would allow flexibility and perhaps substantial innovation on the part of the Design-Builder (customary for Design-Build). It would also have clearly placed complete responsibility for all design and construction on the Design-Builder.

Findings

- a. *The late submittal of the Bridge and Structures RFP specifications, combined with the requirement to modify the specifications to meet FHWA Design-Build requirements, led to confusion between the BSO, the SR 520 Program Design-Build staff, and the site office construction staff as to how the contract should be contractually administered.*
- b. *The Option A and B structure, and the understanding of requirements under Option A, also contributed to this confusion.*

The following points contributed to that confusion:

- The contract documents provided the Design-Builder with substantially complete drawings holding WSDOT as the Engineer of Record. However, the contract documents also stated that the pontoon design, as detailed by the M11 plans supplied in the RFP, reflected only the “minimum technical requirements”. This term was not defined and has become a source of disagreement between the BSO and other offices (construction site office, SR 520 Program and HQ Construction).
- The initial M11 drawings, as included in the RFP, were not complete, and were not stamped and signed. Drafts of these drawings were part of the RFP, but were not completed, stamped and signed by the BSO until March 31, 2011 – more than 1-1/2 years after issuance of the RFP.
- Further compounding the confusion, even though Design-Builders were told by addendum that WSDOT would retain responsibility for pontoon design, the contract was not modified accordingly with respect to “Released for Construction” (RFC) drawings. That is, the contract still required that the Design-Builder stamp and sign the RFC drawings for construction, even though WSDOT had acknowledged responsibility for design, according to the M11 plans, and the

⁸ M11 is the designation given to the package of WSDOT drawings that were supplied as part of the RFP which define the basic design of the pontoons themselves.

⁹ Design responsibility for the casting basin was clearly that of the Design-Builder.

incorporation and integration of the M11 requirements were included in the RFC drawings. While there was some logic to this, in that some other drawings and requirements were still the responsibility of the Design-Builder, it contributed to confusion on this issue.

The rationale for including Option A was that the substantial work already completed by the BSO would make a significant contribution toward meeting the scheduled completion date, and might result in lower bid prices as well. If WSDOT had required that Design-Builders design and own the risk for the pontoon design and construction it is likely that the bid prices submitted would have been much higher, that design work would have taken longer, and that the target opening date for the bridge could not have been achieved.

However, with WSDOT retaining risk for the pontoon design, any cost of repair or delays caused to the project, caused by errors or omissions in the design of the pontoons, would most likely be a WSDOT responsibility.

As it turned out, this risk allocation resulted in a substantial savings in the bid price of the winning Design-Builder. The original bid for the PCP contract was \$367 Million, compared to WSDOT's estimate of \$547 million. The contract was awarded to Kiewit-General (KG) in January, 2010. (The companion Floating Bridge and Landings Project, also Design-Build, was bid at \$587 million, compared to WSDOT's estimate of \$641 million.)

Findings

- a. *The Design-Builder was told he could rely on the M11 plans and that WSDOT was the Engineer of Record for the design of the pontoons.*
- b. *The lack of definition of the term "minimum technical requirements" caused confusion regarding responsibilities and appropriate administration of the contract.*
- c. *Requiring the Design-Builder to stamp and sign the RFC drawings contributed to this confusion.*

Components of the PCP contract

There were two major construction components in the SR 520 PCP contract:

1. The casting basin in which the pontoons would be constructed, including the gate holding back the water until pontoons were ready for float-out, was clearly understood by WSDOT and the Design-Builder to be Design-Build where the Design-Builder was fully and completely responsible for design and construction.
2. The pontoons, in several configurations – longitudinal, cross (end) and supplemental stability pontoons – with the contractual and responsibility ambiguities noted above.

Essentially, the contract was a "hybrid" contract – contractually defined and administered as a Design-Build contract but with the major component of the contract, the pontoons, designed by WSDOT.

Finding

The implications of this "hybrid" contract were not fully vetted in the time leading up to advertisement (RFP) and contract award, although WSDOT executives and headquarters construction did consider these implications just before contract award and briefly considered changing the contract, via change order, to make the successful Design-Builder fully responsible for design and construction. Given the high cost of making this change, at this point in time (increased contract time, and project cost), this was not implemented.

The PCP Construction Site office

The construction site project office management team (initially located in Puyallup, subsequently at the construction site in Aberdeen) was drawn mostly from WSDOT Olympic Region staff, since they had recently delivered the Hood Canal Bridge replacement and were knowledgeable in construction of floating

bridges. However, Hood Canal Bridge was not a Design-Build contract. It was instead target price contract where the WSDOT construction and BSO design staff were working more interactively and iteratively with the contractor – a very different environment from Design-Build.

The construction site project office initially was considered to report to the Olympic region but the Chief Operating Officer, in consideration of the concern regarding the Hood Canal construction environment, directed that the office would report to the SR 520 Program Design-Build Manager.

Contract Administration

An audit of contract administration practices for this contract (Appendix B) conducted by the WSDOT HQ Construction Office in 2012 found that some changes in the contract, in Cycle 1, were being incorporated without appropriate approval of documentation, by various mechanisms, and that not all requirements of either the contract or WSDOT policy for administration of contracts had been completed as required. While design modifications were being fully reviewed by the Engineer of Record, change orders should have been utilized to document any potential contractual implications associated with such changes. It was also noted that quality oversight by WSDOT project staff did not appear to be sufficient to ensure that quality observations were addressed in a timely manner.

Findings

1. *Required and expected WSDOT contracting practices and procedures were not strictly followed by the site project office.*
2. *Concerns of WSDOT executives in this regard were not resolved and were not followed-up.*

4. MANAGEMENT, CONTRACTING, DECISIONS, COMMUNICATIONS, ALIGNMENT

Several key areas and factors have been identified which, individually and collectively, influenced the progress, direction and manifestation of issues for the Pontoon Construction Project. This section deals, in general, with management, contracting, communications and decision-making.

WSDOT - Contracting Approach, Contract Management

As mentioned above, the contract for this project is unusual, in that it is a Design-Build contract incorporating a very specific and prescriptive design with WSDOT having design responsibility as Engineer of Record.

While WSDOT has successfully delivered a number of large Design-Build projects, Design-Build expertise still resides with a relatively small number of individuals. WSDOT staff continue to learn more about how much to specify and how much to allow the Design-Builder to determine, and how complex Design-Build contracts should be administered. This contract presented some very unusual challenges both in regard to design specificity, responsibility and proper contract management oversight.

Findings

- a. *The PCP contract was not well vetted within WSDOT, specifically around the issue of assuming pontoon design risk and the difficulties of explicitly defining responsibilities of WSDOT and the Design-Builder.*
- b. *The decision to take responsibility for pontoon design risk resulted in a lower bid price, but the ramifications of possible design flaws and performance issues were not fully quantified by a risk*

analysis. The risk was thus not well understood or quantified – if it had been, WSDOT executives may have decided differently

- c. *An appropriate process for administration of the contract was not clear to the leadership at the Aberdeen site construction office level. This was reported to have been discussed early in the construction by the site managers, however apparently they did not take adequate steps to make this clear to the SR 520 Program Design-Build manager and/or the WSDOT functional managers or the appropriate executives.*

WSDOT Project Delivery Culture / Schedule issues

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.

This is in contrast to normal and historical WSDOT practice. In recent history, WSDOT has been very sensitive to meeting project schedule for all projects and managing to budget. This has developed over the last 12 years as the agency focused on accountability, transparency and the successful delivery at or under the legislated cost and schedule for the great majority of the “Nickel” and TPA projects.

Attention to schedule is important and has been useful to WSDOT in establishing credibility and securing needed funding for projects. The pressure associated with meeting schedule can help teams accomplish work more efficiently and, if managed well, can reduce costs. However, in this case schedule pressure was assumed by many to be paramount which led to:

Findings:

- a. *A very compressed RFP schedule, resulting in some poorly defined specifications and contract requirements.*
- b. *A lack of time to review the specifications provided by the BSO prior to submittal for RFP – leaving inadequate time to validate their suitability for the RFP, to suitably review the revised versions¹⁰ which has resulted in problems with their application and understanding on the construction site.*
- c. *Short-cuts of normal WSDOT required procedures at the Aberdeen construction site.*
- d. *An inappropriate design completion level, advanced within the BSO without clear communication with executives and SR 520 Program staff, different from WSDOT Policy decisions and expectations.*

WSDOT Management and Decision Making

Findings:

- a. *Definitions of responsibilities, authorities, communications and working relationships between WSDOT executives, SR 520 Program personnel, Bridge and Structures Office personnel and Aberdeen construction site office personnel were not sufficiently well defined and understood, even though the size, complexity and specific conditions of this project made it extremely important to have those responsibilities, authorities, communications and working relationships well understood by all, in advance.*
- 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*

¹⁰ This may have led to the current difference in opinion and expectations regarding how the contract specifications, specifically Section 2.14, were to be understood and administered by the WSDOT site construction office. BSO repeatedly focuses on their intent for these specifications, WSDOT Construction administers the specifications according to their interpretation of the contractual requirements.

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.
 - iii. Limited planning regarding how WSDOT would strategically approach this contracting situation.
 - iv. Limited effort to align the SR 520 Program, WSDOT executives, HQ support groups and the site construction management office to clear goals, authorities, expectations, and agreement on an approach which could successfully accomplish delivery under these circumstances.
 - v. Reluctance of certain offices and individuals to move beyond past events and focus on resolving the issues has caused delays and additional costs to the project.
- c. When WSDOT officially took responsibility for pontoon design via an addendum to the contract, the contract should also have been modified to clarify who would be responsible to stamp and sign Released for Construction drawings. The fact that the contract still called for the Design-Builder to do this, while WSDOT was responsible for pontoon design, led to confusion and possible errors in contract administration.

WSDOT Executives - Management

The lines of responsibility and communication between the Chief Engineer and Chief Operating Officer were not well defined related to the SR 520 Program. Neither was sufficiently aware of some specifics (noted above) nor were they sufficiently proactive in taking action when it was identified, in June of 2009 and later, that there were major difficulties in:

- a. Management of the structure and responsibilities in cooperatively developing the RFP.
- b. Concerns regarding the ability of the various offices to coordinate, communicate and commit to program-level deadlines.
- c. Concerns about the level of design of the pontoons required by Design-Build and FHWA.

Internal and External Communications

WSDOT has developed an excellent external communication program. However, internal communications related to this contract were often not clear, timely, or sufficient in many respects.

Finding

Internal communications, particularly around decision-making and impacts of decisions between the SR 520 site project office, the Bridge and Structures Office, the SR 520 Program Design-Build Manager and WSDOT executives, were inadequate and insufficient.

Alignment - Executives, SR 520 Program, HQ Functional Groups and Site Office

WSDOT executives and key staff at the SR 520 Program, the Bridge and Structures Office, the HQ Construction office and the PCP site project office did not have a sufficiently complete, integrated, mutual understanding of, and commitment to, the goals, processes, and practices necessary to successfully deliver the SR 520 PCP Contract within the context of the overall SR 520 Program and with due regard to roles

and responsibilities, authorities, communications and working relationships of, and between, the various offices and personnel – the elements of alignment¹¹.

An industry recognized team alignment process had been established within the SR 520 Program office in 2007 but had not been extended to, or integrated with, HQ functional offices and the site office – although the PCP site office had implemented a local alignment process, not linked to the SR 520 Program office or functional offices at headquarters.

This lack of alignment, specifically in terms of clarity of roles and responsibilities, authorities, communications and working relationships, was highlighted in the events following the concrete spalling of Pontoon V on May 11, 2012. It was reported that, after the initial concrete repair, and questions arose related to the process of approval to move the PT tangent point (as indicated in RFI 111)¹², rather than working together as an integrated team to resolving the related problems, the BSO in particular, focused its efforts on deficiencies of site construction contract administration enforcement (in terms of the BSO's expectations as they desired the contract to be, not necessarily as it was written or specified and should therefore be enforced by the construction offices) and strongly resisted efforts of others to review the design.

Findings:

- a. *Lack of a sufficiently complete internal alignment process, for the SR 520 Program but related to key HQ support groups – WSDOT executives, the BSO and between the BSO, HQ construction and the site construction office, led to problems with the pontoon design, definition of design responsibility, RFP suitability and development and, construction implementation of the pontoon design¹³.*
- b. *Neither the PCP site managers, nor the SR 520 Design-Build manager, or the HQ functional offices (the BSO and Construction), nor WSDOT executives, understood that they needed to integrate and align these units with a clear understanding of roles and responsibilities, authorities, communications and working relationships sufficient to deliver the very complicated PCP contract.*

Legislation-related elements

Legislatively required design elements, changes and the compressed schedule affected the progress of the design (e.g. a change in bridge height that required a revision of wind and wave analysis) and the specification regarding the configuration of the pontoons (a requirement that the replacement bridge be limited to “a single row of pontoons”) added to the technical complexity of the project.

Finding

Legislative requirements led to problems with design completion (schedule) and work-arounds that were problematic for the PCP design and construction. See other findings by area.

¹¹ Alignment is a key management process which works to clarify key goals and objectives, roles, responsibilities, authorities, accountabilities, communications and working relationships. It is particularly necessary for non-traditional projects which are different than normal company practice and for distributed offices.

¹² RFI is a “request for information”. In this case RFI 111 was used to indicate approval, by WSDOT, to move the PT tangent point outside the thick bolt-beam area, which should have been processed as a contract change – which may have caught the problem and avoided the spalling.

¹³ There were also issues with the casting basin, particularly the flood gate between the site construction office and BSO related to approvals of the design-builder's design.

5. TECHNICAL AREAS

This section deals with the more technical and construction / contract administrative areas. See the Expert Review Panel Report of February 18, 2013 and Appendix B – Pontoon Construction Performance Audit Report – for specific details and definitions of terms..

PCP Pontoons – cracking / prestressing forces

Several types of cracking were experienced by the SR 520 pontoons for Cycle 1 in Aberdeen. Much more detail is given in the Expert Review Panel Report – the following relates to WSDOT management and technical responsibilities for the PCP contract and relevant expectations.

1. Cracking caused solely by thermal effects, drying shrinkage or autogenous shrinkage.

This type of cracking was expected, was consistent with the experience of cracking in other WSDOT floating bridges, and can be sealed effectively using normal WSDOT and industry crack sealing techniques.

Findings

- a. *The WSDOT Bridge & Structures Office, Engineer of Record for the pontoons, correctly anticipated and provided for this condition.*
 - b. *Cracking caused by thermal effects might have been better prevented or minimized if proper thermal controls, as specified in the contract, had been implemented.*
 - c. *The Design-Builder's Quality Control / Quality Assurance processes did not correct deficiencies in implementation of thermal control procedures, and the WSDOT Quality Verification procedures and contract stewardship were not followed sufficiently to ensure correction of noted quality issues in a timely manner.*
2. Cracking caused by forces and or stresses, including prestressing, but not spalling or bursting cracking.

Cracking of this type occurred more than anticipated. It was caused by uneven stress distribution from Post Tensioning (PT) forces, plus the effect of deck slab compression and the resistance of the interior pre-cast cell walls.

Finding

This should have been anticipated by the Bridge and Structures Office both with respect to cracks in the upper and lower bolt-beams and with respect to the extent of cracks in the field of the end walls which, for the cross-pontoons, are exposed to lake wind and wave conditions for the service life of the bridge.

3. Spalling or bursting caused by concentrated and/or unrestrained prestressing forces.

Finding

Cracking of this type was unexpected but was foreseeable and should have been avoided.

BSO, Design of bolt-beam

There were two main issues with BSO design related to cracking of the pontoon bolt-beam and end walls:

The ERP report found that the BSO design of the bolt-beam using “strut and tie modeling” is an accepted procedure for ensuring that a connection has adequate strength. However, such modeling provides no information on what cracking may be associated with achieving that strength or the resulting extent and width of cracking at service loads.

Further, for a structure in which strength considerations for the transverse direction (y-direction) are as important as that in the longitudinal direction (x-direction), the AASHTO LRFD Bridge Design Specifications require that three dimensional effects be examined and that as a minimum the connection be designed separately for two orthogonal directions.

Findings

- a. *BSO design of key aspects of the pontoons was flawed - it did not appear that, based on the calculations reviewed by the ERP, the transverse direction in the bolt-beam was adequately analyzed.*
- b. *BSO’s internal Quality Assurance reviews, which they stated were carried out according to BSO Bridge Design Manual requirements, did not catch these errors.*

BSO Quality Control / Quality Assurance (QC/QA) process

As explained further in the Expert Review Panel report, issues associated with the bolt-beam design should have been foreseen by the BSO as part of an adequate Quality Control/Quality Assurance (QC/QA) process in the design phase. The SR 520 Program had defined QC/QA process requirements applicable to all entities working on the program – both agency and consultant. These included, for example, communications, document control systems, management plans, schedule process and, QC/QA procedures. These processes require check-ins and peer reviews at significant stages throughout the design (not just at the end of design), so that any problems or errors can be corrected before substantial work is completed.

The BSO uses the Bridge Design Manual (BDM) requirements. It was stated to the SR 520 Program QC/QA manager that the BSO did not perform formal Quality Control until the design is 100% complete although they stated that they do conduct informal checking at significant stages during the process. They do not officially note and sign that QC/QA checks have been made until design is 100% complete. In some instances, this procedure was not adhered to. It is possible that, had the quality checks been made, some of the impacts of the design flaw could have been reduced.

This would seem to be a misunderstanding of the QC/QA process, which must be continuous from the beginning and built into normal work processes. Quality Assurance (QA) validates that the quality control (QC) process has been and is being implemented correctly and is appropriate. Waiting until 100% plans to perform quality control would defeat the intent and integrity of quality control.

Findings

- a. *Some QC/QA processes, for the pontoon design, required by SR 520 Program procedures, were not understood or agreed upon by the BSO, were inadequately implemented and/or documented, or were not carried out properly by the BSO.*
- b. *The ERP Report of February 18, 2013 notes that the BSO did not understand that QC/QA should be a continuous process from the very beginning of the project, not a process to be done at “100% design” as was stated.*

- c. *The BSO consistently put off the SR 520 QC/QA manager with regard to the implementation and finalization of the SR 520 required QC/QA process. A chronology is available.¹⁴*

WSDOT Construction Management Procedures

(See Appendix B, Performance Audit Report, for details)

WSDOT's Construction management policies and procedures are well established and understood by staff within the agency. However, for very large and complex projects (megaprojects) these procedures needed to be reviewed, revised or augmented, as appropriate, specific to the application. Such revisions or augmentations are a complex and difficult undertaking in the context of an existing agency with well-established "ways of doing business". The need to adjust procedures for WSDOT's large and complex projects was understood and communicated early in the development of these projects, through the formation, in 2002, of the WSDOT Urban Corridors Office, tasked specifically with delivery of the megaprojects within Washington State. The WSDOT Urban Corridors Office was disbanded in May of 2009, as part of measures to reduce staff levels to match decreasing budgets. Partly as a result there was insufficient implementation - of both normal WSDOT and new procedures - that were sufficiently applicable and relevant for this specific application – a large, complex Design-Build construction project.

Findings

The following specific findings are explained in detail in Appendix B.

- a. *Changes to the contract were allowed without appropriate approval or contract change documentation.*
- b. *Conflicts within the final contract were not addressed by project staff. These conflicts caused confusion by those supporting the project.*
- c. *Many of the drawings marked as Released for Construction (RFC) do not have the stamps and signatures required by the contract. In several instances, work had proceeded without complete RFC drawings in place. (See elsewhere in this report regarding lack of clarity regarding RFC drawings responsibility.)*
- d. *The thermal control plan as submitted and approved was not followed and contract requirements to modify that plan were not met. These issues were recurrent and repetitive with no action taken through the Design-Build contractor's QC/QA procedures and WSDOT Quality Verification procedures (as described in the Quality Management Plan) to correct these problems. WSDOT actions in response to these repeat issues failed to hold the Design-Builder accountable for proper implementation of these plans as required by the contract and failed to hold the Design-Builder accountable for compliance with their Quality Management Plan.*
- e. *Not all requirements of either the contract or WSDOT policy for administration of contracts were completed as required.*

¹⁴ Documented in "Chronology of events".

6. RECOMMENDATIONS

The following recommendations flow from the issues and concerns noted above. They should be reviewed by WSDOT executives and key managers for implementation of specific action plans.

Technical

1. **Require strict adherence to policy and procedures.**

Quality Control, Quality Assurance and Quality Verification processes in design and construction must be followed. If for any reason they must be changed, or if they are considered not applicable, or if existing procedures are used, decisions related to this, with an evaluation of any associated risks, should be documented and communicated to appropriate managers.

Where design is concerned, appropriate review and checking by those not responsible for the initial design, who are sufficiently experienced and expert, should be done and documented at significant progress points, not just at the end of design.

Construction Management

2. **Review current Design-Build guidance and procedures and rewrite if necessary.**

Train key staff in proper development of Design-Build Requests for Proposals and in construction administration practices for Design-Build.

Communicate pertinent facts and process so that the agency and the contracting community have a clear understanding of Design-Build contracting with WSDOT.

Update policies and procedures for specific application for Design-Build contracts.

3. **Correct any contractual conflicts via change order.**

Since the contract defines responsibility, it is imperative that any changes to the contract are clear, that the effect of any change is understood by all who are involved in administration, and that all parts of the contract affected by a change are also modified accordingly. For example, when WSDOT assumed full responsibility for pontoon design, there should have been a thorough scrubbing of all contract language regarding Released for Construction drawings, to minimize confusion about responsibility for signing and stamping.

Management and Decision Making

4. **Clearly define roles, responsibilities, authorities and accountabilities.**

Executive management must be aligned and working together in areas where roles, responsibilities authorities and accountabilities overlap.

Managers should be held accountable to follow procedures appropriately and to working productively as part of a team.

In the future, this should be worked through and communicated in advance of contract execution, and check-points should be established along the way as needs change over the course of project development.

Put roles, responsibilities authorities and accountabilities in writing and insist that managers meet in person with staff to review these roles, responsibilities authorities and accountabilities and determine clarity of understanding and agreement.

5. Establish and implement a clear decision making process.

Especially with respect to decisions that impact overall policy and direction of the projects.

The process should include discussion and documentation of the decision - who was involved, considerations, what decisions were made, who needs to be informed, and how it will be communicated.

This should be recorded and kept as a record for the project or program.

6. Critically evaluate abilities of personnel in key positions, and make adjustments as necessary.

Address staff deficiencies and inappropriate actions that have, or will, require reorganization, reassignment or discipline.

Communicate these actions and the reasons for them to WSDOT staff.

7. Work to rebuild effective cross-functional teams.

Consider a facilitated approach to help repair trust, clarify goals and responsibilities, and improve commitment and accountability for team members. This effort should begin at the executive management level, and involve key participants from the SR 520 Program, the site project office, the Bridge and Structures Office, HQ Construction Office, and other staff who interact with, or have responsibilities for, construction contracts.

8. Review other large WSDOT programs currently underway.

To determine whether similar issues are present on those programs and which need to be addressed.

APPENDIX A – SCOPE OF WORK / SECRETARY’S QUESTIONS

Scope

1. Address the following issues and questions, as possible within the above timeframe and depending on access to personnel and the existence and availability of relevant documentation.
2. Review and access documents relevant to this task within WSDOT and the SR 520 Program and
3. Compile observations, findings and related recommendations in a structured format
4. Report initial findings to the Secretary.
5. Finalize findings in a summary report

Subsequently, if authorized:

6. If requested, assist with recommendations and actions to respond to these findings.

Plan and Approach

The following is an outline of the intended implementation plan for this task:

1. Plan the Review Process. Confirm with WSDOT executives
2. Coordinate documentation identification and review process related to internal WSDOT decision making as documented in Olympia (HQ), Tumwater (Bridge), Aberdeen (SR 520 PCP site office) and Seattle (SR 520 Program office).
3. Access, extract and review relevant documentation as is available and accessible to identify baseline decision path(s), considerations and key issues as identified in these documents.
4. Develop interview protocols
5. Conduct interviews
6. Analyze results
7. Develop a report which includes a timeline showing when key decisions got made and by whom.
8. Facilitate up to 6 meetings to: vet emerging findings, facilitate root cause analysis in particular areas, and facilitate team debrief/communication meetings.
9. Provide ongoing progress reports updates/ review meetings with Secretary.

Secretary’s Questions, organized by category:

Note: These questions were posed by the WSDOT Secretary. They are answered to the extent possible in this report, the Expert Review Panel report of February 18, 2013 and the WSDOT SR 520 Performance Audit Report of August 2012.

1. Procedures.

- a. Evaluate WSDOT procedures and processes that may have had an effect on the cycle 1 pontoon construction problems which were identified by the SR 520 Expert Review Panel.

Notes:

- i. Determination of State’s cost responsibility for PCP change orders will be by the Director and State Construction Engineer).
- ii. Results of the review will be used to determine, by the Secretary, any necessary personnel disciplinary actions or procedural changes necessary to ensure there is not a repeat.

2. Design and Construction Administration

- a. Pontoon design Engineer of Record. What determined the decision to provide a WSDOT pontoon design (Engineer of Record) within the Design-build Pontoon Contract? List risks and opportunities, decision makers, and any other factors necessary.
- b. Did removal of reinforcing steel in a previous change order occur in any area where additional steel is now being added due to cracking? If so, what was the reason for the steel removal, analysis and approval process that initiated that change order? Were all WSDOT protocols followed? Is there a correlation to the cracking in cycle 1 to the removal of the steel?

3. Post tensioning system.

- a. What did WSDOT define and/or specify for alignment and materials of the post tensioning conduit in the pontoon design, and was that an adequate definition and/or specification, considering the difficulties encountered in Cycle 1?
- b. What transpired that allowed changes to that design to be made, and if WSDOT allowed changes to the original design, who approved that, and were agency protocols followed? If not, what should that process have been?
- c. Was the RFC (released for construction) drawing approval process followed in Cycle 1? If not, why? If not, was this a contributing factor to the pontoon cracking problems?
- d. Did the contractor construct the pontoons and post tensioning system per the approved design and required means and methods (water/cement ratio, thermal controls, curing, length of pour, concrete mix design, post-tensioning sequencing)? If not, were any of these items contributory to the problems? Document reasoning.
- e. What was the reason for the spalling in the post tensioning area (Pontoon V), and what was done to repair this and related problems, in order to ensure the pontoons are serviceable and in quality condition? (Design changes, cost and time involved).

4. End wall cracking

- a. What was the reason the abnormal cracking occurred in the end wall? What analysis has been done to determine the root cause of end wall cracking? (describe design factors, construction means and methods, and whether contractor constructed per design.)
- b. What role does WSDOT have in QA/QC or QV of the pontoon construction, and was that protocol followed? Are their factors in WSDOT's role of contract administrator that have an effect on the end wall (or other) cracking issues?
- c. Have design changes of end wall cracking design been completed and verified for Cycle 2 and beyond?
- d. Document the differences in design modifications (cost and time involved) that have been made for Cycle 2 and Cycle 3 (and beyond).

5. Construction/Contractor Delay

- a. What was the pontoon contractor's critical path of construction of pontoons in cycle one, and what was the impact of the delay of the cracking and spalling issues? What affect did the cycle one problems have on the contractors' critical path of cycle two and beyond?
- b. Were the design revisions provided by WSDOT prepared and delivered in a reasonable time? Where there factors in the contract administration team (design, construction and administration) that contributed to delay beyond what is considered "standard". How were the design revisions analyzed and were protocols followed to ensure the revisions were adequate? Provide a detailed chronology of all change condition activities (problem identification, expert panel recommendation, design revisions, contractor notification, etc.
- c. What was the effect of the delay of the pontoon project on the floating bridge replacement contract critical path?
- d. What other factors not mentioned above need to be analyzed?

APPENDIX B – SITE PERFORMANCE AUDIT REPORT

(See attached Report)

Performance Audit Report

SR 520 Pontoon Construction Design-Build Project

August 2012

Audit Performed by:

**David Erickson, P.E.
State Roadway Construction Engineer**

**Amy Revis, P.E.
Assistant Region Construction Engineer**

TABLE OF CONTENTS

	Page
Report Summary	3
Summary of Recommendations	4
Background	5
Introduction	5
Findings & Recommendations	6
Request For Information	6
Pontoon Concrete and Thermal Control/Curing Plan	9
Quality Management	11
Appendices	
A: Request For Information	13
B: Timeline: Pontoon Concrete and Thermal Control/Curing Plan	29
C: Construction Quality Management Plan	40

Report Summary

The purpose of this performance audit was to determine if the construction and administration of the SR 520 Pontoon Design-Build project has been in accordance with the requirements of the Contract and Washington State Department of Transportation (WSDOT) policy. This audit has focused on reviewing work that could have long term performance or cost impacts and identifying recommendations for a successful project. As of August 2012 the major work that has been completed on the project includes construction of the casting basin facility and the first six of thirty-three pontoons. Fabrication of the second cycle of pontoons is currently in progress.

The foundation of this performance audit has been the review of Requests for Information (RFI), Nonconformance Reports (NCR), Nonconforming Issues (NCI), concrete curing and concrete cold weather protection. The audit initially reviewed Contractor submitted RFIs. This review found that many of the RFIs referenced work that was not in conformance with the Contract. Work that is not in accordance with the requirements of the Contract should be identified as a part of the design-builder's quality management plan or WSDOT's quality verification. As a result of the number of RFIs for work that was not in conformance with the Contract requirements, the performance audit has reviewed NCRs and NCIs for compliance with the Quality Management Plan and other Contract requirements. Review of the NCRs and NCIs indicated that compliance with concrete cold weather protection and thermal control was a common problem, warranting further in-depth evaluation.

The review of these documents has determined that not all requirements of either the Contract or WSDOT policy for the administration of Contracts have been completed as required. For many of the RFIs there is not clear documentation that there was proper closure. For some, a change order should have been processed and for others there were additional requirements to be completed. An example of this is where there are instructions from the Engineer of Record (EOR) with no documentation that the requirement was adhered to.

Based on the findings that the contract is not being administered in accordance with the terms of the contract and WSDOT policy it is recommended that both Kiewit-General (KG) and WSDOT immediately implement changes to their respective work operations to bring all aspects of the Contract into compliance.

Summary of Recommendations:

In general, our review found that there are significant areas of concern where the Contract is not being followed. Changes to the Contract are being allowed without appropriate approval or documentation. Contract clarifications are being determined by the project engineer's office (PEO) without consultation with Region or HQ Construction. Those same Contract clarifications are not being applied consistently. Recommendations to correct these deficiencies, and others, are identified through this review.

The most critical recommendation for the success of the project is that both KG and the WSDOT PEO need to perform all of their respective work per the terms of the Contract and additionally the PEO needs to adhere to WSDOT's policies for administration of a Contract (e.g. Construction Manual).

This is a large scale project with a critical time schedule and delays are costly for both KG and WSDOT. Issues need to be resolved in a short time and KG should not be allowed to continue with work when that work does not meet the Contract requirements. For many RFIs, the time period from identification to resolution of an issue would extend over a period of a month or more. During this period KG would continue with work that was not in conformance with the Contract. Other examples of work not in conformance with the Contract are the repeated NCRs for concrete cold weather protection and thermal control and the construction of work prior to a Released For Construction (RFC) drawing.

The following are specific recommendations based on the subjects reviewed in the performance audit:

- Follow the RFC Drawings requirements of the Contract. The requirement to have in hand current RFC Drawings reflecting changes that are under construction is not being adhered to by the project team.
- Provide a determination on Engineer of Record issues for the pontoons. This determination should clearly define what the Contractor has responsibility for and what WSDOT has responsibility for in order to correctly identify what constitutes a change to the Contract.
- The RFI process be reviewed and refined to clearly identify when an RFI constitutes a change to the Contract. When KG is requesting a change via an RFI it needs to state that a change to the Contract is being requested and include all of the documentation specified in Section 1-04. Changes need to follow the Contract and Construction Manual requirements and have the appropriate approvals prior to proceeding with the work.
- Require a Cold Weather Protection Plan that meets the requirements of the Contract.

- Require a Thermal Control Plan that fully adopts the recommendations of the ACME project or require a full test section in accordance with the Contract to support proposed materials, processes and practices.
- Enforce the Quality Management Plan in all aspects, including requiring corrective action plans and root cause analyses for noncompliance issues within the required timelines to be effective in addressing issues and avoiding reoccurrences.

Background

The SR 520 Pontoon Construction Design-Build Project is one of several projects that are either under Contract or development for improvements to State Route 520. These projects are administered by the SR 520 Bridge Replacement and HOV Program under the leadership of Julie Meredith, SR 520 Program Director. The on-site administration of the SR 520 Pontoon Construction Design-Build Project is the responsibility of David Ziegler, Principal Engineer.

A \$367.3 million SR 520 Pontoon Construction Design-Build Project was awarded to Kiewit-General (KG) on January 8, 2010. KG broke ground in February 2011 at a 55-acre site in Aberdeen where they have built a casting basin facility. Pontoon construction is currently underway; at the project's completion, crews will have constructed 33 pontoons. The pontoons constructed will ultimately become a portion of the new bridge on SR 520 across Lake Washington. Delivery and assembly of the pontoons are not included in this Contract.

This design-build project was awarded with an option to use a pontoon design with a WSDOT engineer of record. KG selected to use the WSDOT design and by selecting this option KG has less flexibility in their construction means and methods used to fabricate the pontoons and also less risk should there be construction problems specific to the design. Changes that would normally be a choice of the design-build Contractor now become a change to the Contract and questions per details that the Contractor's engineer would typically answer are now submitted to WSDOT. These questions are reflected in the greater than 400 RFIs that have been submitted by KG prior to completion of the first cycle of pontoons.

Introduction

A performance audit of the SR 520 Pontoon Design-Build Project has been completed to determine if construction and administration of the Contract complied with the Contract requirements and WSDOT policy. In addition to this audit report there have been ten reviews of the Contract by the SR 520 team; seven for materials documentation and three for office documentation.

For this audit it was determined that the greatest potential benefit would be to review work that could impact the long term performance of the pontoons or have financial impacts to either KG or WSDOT. All types of contractor questions are submitted as an RFI; the RFI process therefore provides an overview of the Contract and allows for a review of the performance and administration of the Contract on a range of issues. This broad spectrum of contract questions allows for an analysis of KG's compliance with specifications including submittals, changes, notifications and WSDOT's response to these requests.

The majority of the information for the performance audit was obtained from the PEO staff, the PEO records and KG's electronic document control system. KG is responsible for the construction documentation per section 2.1.3.4 and is required to use an electronic Document Control System (DCS) to track and manage all Project documentation. Centric Project is KG's DCS and is the source of much of the information from which this report was developed. The use of Centric Project was difficult in that data retrieval was slow and the organizational structure did not lend to easy retrieval of all related documents from a single source. Similar documents were not always stored together for easy retrieval. In talking with staff who must use Centric Project in administration of the project, this system hampers effective communication for the project. Slow response, difficult organizational structure and no clear ball in court assignments for communications are some of the issues noted with this system. The PEO also uses ProjectWise to manage documents and information retrieved from ProjectWise is included in the audit. Additionally, the State Materials Laboratory Construction Audit Tracking System (CATS) provided data for the NCIs.

Findings & Recommendations

Request For Information

An RFI is submitted by the Contractor when they seek clarification to a construction requirement, when requesting a change, proposing repair procedures and for other miscellaneous project issues. A review of RFIs can provide insight into KG's conformance to the Contract requirements and WSDOT's administration of the Contract. Eighty RFIs were selected for review representing approximately 20% of the RFIs that had been processed as of June 28, 2012; two of the RFIs selected were voided for a total of seventy-eight RFIs that were reviewed. A random number table was used to eliminate any bias in the selection of the RFIs.

There are many RFIs that were reviewed and accepted by the project office that modified drawings where WSDOT is the Engineer of Record without a change order. The RFIs were stated to be within the intent of the Contract and, as such, a change order was not required.

Section 1-04.4, Intent of Contract, defines the intent of the Contract and includes correction of any errors, omissions, inconsistencies or other defects of the Conceptual Design. However, the definition of Conceptual Design, as found in Section 1-01(3)1, Defined Terms, specifically excludes appendix M11; therefore drawings in appendix M11 cannot be revised without a change to the Contract. The RFP does require the contractor to develop and be responsible for the design of specific items of Work in conjunction with the M11 drawings; these designs would typically not require a change order but may require review by the EOR for the M11 drawing.

It is recommended that the RFI process be reviewed and refined to clearly identify when an RFI constitutes a change to the Contract. When KG is requesting a change, it should be clearly identified in the RFI when it is submitted. Changes need to follow the Contract and Construction Manual requirements and have the appropriate approvals prior to proceeding with the work.

In reviewing the RFIs, it was questioned how the changes to the design addressed by the RFIs were being documented for field application and inspection purposes. Changes should be made to drawings through the process established for Released For Construction (RFC) drawings. It was found that the Contract requirement to have changes documented on RFC drawings prior to implementation of changes in construction is not being followed. Current practice is to not require updated RFC Drawings for revisions being implemented in construction, but to only require reissuance of the RFC drawings on a set schedule regardless of changes, and to have complete RFC drawings prior to acceptance of the pontoon. While the Contract does not require new RFC Drawings for every revision to any individual drawing, allowing up to five changes per drawing before reissuance of an RFC Drawing, the Contract is clear that an RFC Drawing reflecting all changes has to be released before any change can be implemented in construction. It is recommend that the contract requirement for current RFC drawings prior to construction be followed.

It was also observed that many of the drawings identified as RFC do not have the stamps and signatures required by the Contract. To ensure proper Quality Assurance (QA) has been completed and accurate and complete drawings are used for construction and inspection of the work, the Contract requirements for RFC drawings must be followed.

Thirty six of the responses to RFIs reviewed were determined to be appropriate and in accordance with the Contract. Six of these resulted in change orders that had all required approvals in place through the RFI process. The remaining thirty either provided a minor clarification or referenced the Contract for the response and did not require a change order.

Of the RFIs reviewed, sixteen were a result of design errors (omissions or conflicts) in the M11 drawings that required modifications or clarifications. Seven of the RFIs reviewed were

incorporated into change order number 10 which made numerous changes to the M11 drawings, where WSDOT is the engineer of record, and addressed schedule delays and provided compensation for related overhead. While this change order was ultimately approved by the HQ Construction Office, the individual changes through the RFI process were only approved through the Bridge Design Office. HQ Construction Office approval came well after the RFI responses were provided to the Design Builder to be incorporated into the work. With no Bridge Technical Advisor (BTA) assigned to the project, the Bridge Design Office has no authority to approve changes to the Contract. These changes should have been approved through the HQ Construction Office at the time the RFI was processed and prior to incorporation into the Contract.

Two of the RFIs reviewed were incorporated into change order no. 14, which addressed changes to the M11 drawings. Approval for this change was provided by Marco Foster, Assistant State Bridge Construction Engineer. However, this approval was months after the RFI responses were provided to KG. At the time the RFI response was provided to the Contractor, the only approval was from the Bridge Design Office, again with no authority to approve changes to the Contract.

Thirty one of the RFIs reviewed appear to be changes to the Contract with no change order processed to document those changes. These RFIs address changes to the Request for Proposal (RFP) and changes to the M11 drawings at the Contractor's request. Approvals were limited to the Bridge Design Office. Fourteen of these RFIs appear to be repair procedures for construction related errors, which require HQ Construction approval, per the Construction Manual. The PEO is relying on the RFP Section 1-04.4(2)j for justification for not following the change order approval process for these changes. This section states that certain items are not eligible for a change order and item j specifically calls out correction of nonconforming work. While the construction errors covered by these RFIs are not eligible for added compensation, the responses to the RFIs constitute changes to the M11 drawings. Rather than correct the nonconforming work, these RFIs address the errors by requesting modifications to the design to compensate for the errors. A design change to an M11 drawing requires a change order; therefore the Contract reference used by the PEO to determine that a change order was not allowed was applied in error.

Two of the RFIs reviewed were changes in the field to fix Contractor errors where the fix could be allowed without a change order. However, the changes appear to have been allowed to be cast in concrete prior to submittal of the RFI. This is not in compliance with the Contract for QA.

Pontoon Concrete and Thermal Control/Curing Plan

The intent of the Contract is to fabricate pontoons with few cracks. The RFP in Section 2.14.5.2.9 states “All means and methods shall be selected to produce a crack free pontoon without reliance on crack repair procedures...”

All of the NCRs and NCIs related to compliance with cold weather protection and thermal control plans were reviewed. Between November of 2011 and March of 2012 there were nine NCIs documented for failure to follow thermal control and cold weather plans and between November 2011 and May 2012 there were 33 NCRs for failure to meet requirements of the thermal control and/or cold weather protections plans. In reviewing the documentation provided to address each of these items, a pattern of noncompliance and failure to implement corrective action as required by the Quality Management Plan and by the Contract is evident.

In general, responses from KG’s construction group do not provide procedural modifications or specific actions that will ensure compliance on future concrete pours. The responses reference proposed changes in the plans and consultation with their consultant on “minimum requirements” as reasons that the plans do not apply. Statements are made that all concrete placed was in compliance with the ultimately approved revised plan for cold weather protection. A review of the noncompliance issues indicates this is not valid as many of the noncompliance problems related to missing or incomplete monitoring of the concrete for effects of cold weather and/or thermal control, which is a requirement of the specifications and not changed by the approved plan. Statements are also made about requirements of the thermal control plan being recommendations, not requirements. A review of the thermal control plan, as revised and approved, clearly calls out specific requirements. The noncompliance incidents were issues with failure to meet these requirements. It is also noted that they engaged their consultant on the noncompliance issues to confirm that they were not required. However, the plan was never revised to reflect any modified requirements. The Contractor adopted the procedures resulting from the ACME project. The Contractor’s modifications to the thermal control plan make it no longer in compliance with the ACME recommendations. To be in compliance with the Contract, any change from ACME would require some acceptable level of testing to prove that changes will produce the desired results. The plan as submitted and approved was not followed and Contract requirements to modify the plan were not met.

These issues were recurrent and repetitive with no action taken through the Quality Management Plan process to correct the problems. WSDOT actions in response to these repeat issues failed to hold the Contractor accountable for proper implementation of these plans as required by the Contract and failed to hold the Contractor accountable for compliance with their Quality Management Plan. NCI 00280.006 was issued in March of 2012 by WSDOT regarding the

failure of QA to exercise their authority to stop work in light of the numerous noncompliance incidents related to cold weather protection. However, KG's response to this NCI was accepted despite it being inaccurate and incomplete.

A review of the latest approved cold weather protection plans raises some concerns about compliance with the Contract. The Plan proposes the use of maturity meters and a minimum strength requirement for determining the duration of cold weather protection. While this is a deviation from the requirements of the specifications, it provides a better measure of concrete cure related to environmental conditions than what is provided in the specifications. While the plan addresses monitoring through this revised method, the plan as submitted and approved provides no specific means and measures to provide cold weather protection. The standard specifications state that "the Contractor shall provide a written procedure for cold weather concreting to the Engineer. The procedure shall detail how the Contractor will adequately cure the concrete and prevent the temperature from falling below 35 degrees F." The plan as submitted and approved provides no detail of the preventative measures that will be taken. It references providing insulation in conformance with the thermal control plan, which is not applicable and does not provide cold weather protection. As an example, according to the thermal control plan, with an ambient air temperature of 20 degrees, no wind, and an initial concrete temperature of 60 degrees, concrete can be placed in the exterior wall with no insulation in place. This does not meet the requirements for cold weather protection. The plan also references a witness point at the completion of the thermal control period. This is not adequate to ensure cold weather protection is properly maintained. The cold weather protection plan needs to be monitored independently of the thermal control plan to ensure proper cold weather protection criteria are met. Prior to any future concrete placement falling under cold weather protection requirements, the Contractor should submit a revised plan that meets the requirements of the Contract.

In reviewing comments regarding compliance with the Thermal Control Plan, it appears that KG made multiple changes to the plan through verbal discussions with their consultant. However, the Contract allows either adoption of the results of the ACME report with reduced requirements for the test section, or a full test section to prove the materials, procedures and practices to be implemented in the construction of the pontoons. KG adopted the ACME report, did not perform the full test section and then failed to comply with the recommendations of the ACME report. This is not in compliance with the Contract as the recommendations of the ACME report become Contract requirements to be complied with once they adopt those practices in lieu of the full test section. It is recommended that prior to any concrete placement on the cycle two pontoons that the thermal control measures actually being implemented on this project be reviewed against the recommendations of the ACME report. Any deviations from the recommendations in the ACME

report should be fully supported with adequate test data to indicate successful performance or they should not be allowed.

A full review of each NCR and NCI related to cold weather protection and thermal control plan compliance is attached as Appendix B.

Quality Management

The quality of the finished work is the summation of many factors beginning with the scope of the project, development of the Contract documents, the Contractor's adherence to the Contract requirements and their quality control and the project office's inspection of the work in accordance with the terms of the Contract and WSDOT policy. The Contract provisions require that the Contractor implement a quality management plan (QMP) to identify the overall framework for implementation of its Quality Control (QC) and Quality Assurance (QA) program across all aspects of the Contract. This is the foundation upon which the work will be inspected and accepted. WSDOT then performs Quality Verification (QV) inspections, sampling and testing to validate the Contractor's QA procedures.

KG was required to submit a QMP in accordance with the requirements of Section 2.31; the QMP details how KG will provide quality assurance (QA) and quality control (QC) for design and construction of the project. A draft QMP is required within 30 calendar days after Phase 1 Notice To Proceed and a Final QMP for construction, approved in writing, is required prior to construction Work activities that require QA or QC.

The initial draft QMP was submitted on January 11, 2011; QMP Revision 0 was submitted on February 8, 2011 and approved on March 29, 2011; QMP Revision 1 was submitted on February 21, 2011 and approved on March 4, 2011. It is not clear why the Revision 0 was approved after Revision 1. An explanation was not provided by the PEO to this question. Subsequently QMP revisions 2, 3 and 3a were submitted and on June 20, 2012 QMP revision 3a was approved. Neither QMP revision 2 or 3 was approved. With groundbreaking for the casting basin in February 2011 and the first QMP approved in March 2011 the Contract requirement for an approved QMP prior to construction was not met.

KG's QMP states "The QA and QC organizations and personnel shall be completely independent of each other, with separate reporting authorities." The separation of the QA and QC is an important requirement for each has a role in the project that is vital in the final overall quality of the work completed. An overlap of the two roles may lead to a diminished performance of one or both functions.

In reviewing the documents there are many instances where QA has noted nonconformance in the work by KG that required correction without an NCR being written. Section 2.31.5.12 states the following:

“The construction QA staff shall identify and document all elements of Work that have not, or are believed to have not, been constructed in accordance with the approved drawings and specifications, and the reason for nonconformance in an NCR.”

The QMP requires weekly reviews of the NCRs and a quarterly review of the QMP’s suitability and effectiveness. If the QMP is not implemented as written, including the entry and review of NCRs, then the weekly and quarterly reviews will not have the same positive results.

The quality management plan (QMP) submitted by KG also allows an RFI to be used as a tool to request a change to the Contract. At the start of the audit there had been 437 RFIs written. Twenty percent of the RFIs were selected to be reviewed using a random number process for the selection as a means to eliminate any bias.

As part of the QMP, NCRs written are to have a corrective action plan prepared to address the source of the non-compliance. A majority of the NCRs reviewed did not meet this requirement. In addition, repetitive non-compliance issues identified in NCRs, as determined by the executive oversight committee (EOC), are to have a root cause analysis. No root cause analyses have been developed to date, yet from a review of the NCRs there are several categories of non-compliance issues that would qualify as repetitive in nature. Also, all NCIs require a root cause analysis. Again, despite numerous NCIs on the project, there are no root cause analyses developed to date.

From our review, it does not appear that the Quality Management Plan is being implemented as required. It is recommended that the EOC review the performance to date and implement changes to current processes to align with the requirements of the QMP. It is also recognized that methods used by the project team do not facilitate identification of differences of opinion that can then be advanced through the chain of command for resolution. Repetitive issues dealt with repetitive answers from KG and repetitive comments from WSDOT do not bring an issue to resolution. Rather, the issue continues on unresolved as seen from the history of the first cycle of pontoons. When an issue is identified, swift and immediate action is required to identify the source of the issue, determine the Contract requirements that apply and implement corrective action. When there is a difference of interpretation of what the Contract requires, identifying that difference of opinion and moving the issue up the chain of command is imperative to getting the issue resolved and moving forward with quality work. The QMP as written provides the necessary processes; the plan simply needs to be followed in actions taken by the project team.

APPENDIX A

REQUEST FOR INFORMATION (RFI)

General Discussion:

In our review of the RFIs, we found that many were actually requests for changes to the Contract, either as a result of construction errors that needed remedial action or to resolve conflicts or for convenience of the Contractor. However, the RFI as submitted for the change did not clearly identify the issue as a change and did not provide complete supporting information required to consider the request as required by the RFP in Section 1-04.4(5).1.

Many of the changes could have been approved by a Bridge Technical Advisor (BTA). A BTA was not assigned to the project at the time of these changes; therefore the approval from WSDOT Bridge Design Office does not provide approval to change the Contract.

For each RFI a summary is provided and the audit review comments are provided as indented text.

RFI 5: Identifies a discrepancy in M11 drawing SA1 regarding a dimension from the wall face to the centerline of a bolt sleeve. Clarification was provided by Tony Messmer of the WSDOT Bridge Design Office that the correct dimension is 1'-7", confirming the design builder (DB) review and requiring no other changes to the structure/dimensions.

No approvals are noted in the RFI, clarification of the dimension results in a change to the Contract that required HQ approval prior to incorporation into the work. This change was included in change order number 10, with change order approval from Craig McDaniel, but approval was well after the change was incorporated into the work.

RFI 7: KG requests a change to a detail on an M11 drawing. The change is to replace 3/16" bar anchors with 1/2" shear studs and the response from Doug Olson, WSDOT Bridge Office, through Tony Messmer, was that the 1/2" shear studs should be acceptable.

No other approvals are noted; this issue is related to the water tight doors and the design of the doors is the Contractor responsibility under the Contract. As such, no change order required and no exceptions are noted with this RFI.

RFI 10: Requests clarification of the correct size of the alignment key recess frame channels on M11 drawing XP39 (ZP39 in WSDOT response). The drawing shows a size of C10x25 and Paul Spiznas through Tony Messmer, WSDOT Bridge Design Office, verified that the correct size is C12x25.

No approvals are noted in the RFI, clarification of the dimension results in a change to the Contract that required HQ approval prior to incorporation into the work. This change was included in change order number 10, with change order approval from Craig McDaniel, but approval was well after the change was incorporated into the work.

RFI 13: Requests clarification on discrepancy of bar size on sheet XP46. On the same sheet two different views identify the same mark bar as two different sizes, as a #8 in one view and #5 in another view. Clarification from Tony Messmer, WSDOT Bridge Design Office, provided #8 is the correct bar size.

No approvals are noted, clarification of the bar size results in a change to the Contract that required HQ approval prior to incorporation into the work. This change was included in change order number 10, with change order approval from Craig McDaniel, but approval was well after the change was incorporated into the work.

RFI 16: Requests clarification of a discrepancy for the spacing of the W203 rebar on sheet XP6 in M11. The bar spacing is called out as 60 spaces at 6 inches on center (30 feet) in one location and as 31 feet in another location. The response from Eric Ferluga, WSDOT Bridge Design Office, is that the Type 3 pontoons require 60 spaces at 6" for an overall dimension of 30' and the Type 3A pontoons require 63 spaces at 6" for an overall dimension of 31.5'.

No approvals noted; the change to the specified dimensions results in a change to the Contract that required HQ approval prior to incorporation into the work. Clarification of 30' and 31.5' match all other overall dimensions and no other changes are required. This change was included in change order number 10, with change order approval from Craig McDaniel, but approval was well after the change was incorporated into the work.

RFI 18: Requests clarification of bar B261 on sheet XP45 in M11. The size is called out as #5 in one view and #6 in another. The response from Tony Messmer, WSDOT Bridge Design Office, provided that a #6 bar is required.

No approvals are noted, clarification of the bar size results in a change to the Contract that required HQ approval prior to incorporation into the work. This change was included in change order number 10, with change order approval from Craig McDaniel, but approval was well after the change was incorporated into the work.

RFI 24: Requests clarification of the correct detail to use between sheets S7 and S17 in appendix M11; clarification was provided by Eric Ferluga, WSDOT Bridge Design Office.

No approvals are noted, clarification of the detail results in a change to the Contract that required HQ approval prior to incorporation into the work. This change was included in change order number 10, with change order approval from Craig McDaniel, but approval was well after the change was incorporated into the work.

RFI 36: Requests a clarification to sheet SA 26; note 3 shows 2 of the 4 pontoons detailed require jib crane pedestals with a note for moorage cleats and fender inserts. KG requested that WSDOT identify which pontoons require the pedestals and which pontoons require the cleats and inserts. Clarification provided by Tony Messmer, WSDOT Bridge Design Office, to designate the two pontoons for pedestals based on their placement in the final configuration, and clarified that all four pontoons require moorage cleats and fender inserts in accordance with the plans.

No change to the Contract resulted from this RFI, concur a change order was not required.

RFI 37: Requests a clarification to the inconsistent rebar details between different drawings for the keel slab bottom mat on sheets S2, S17 and S19, appendix M11. The response from Tony Messmer, WSDOT Bridge Design Office, provided clarification that the detail on sheet S2 applies. KG had noted no cost impact if sheet S2 applied.

No approvals are noted, clarification of the detail results in a change to the Contract that required HQ approval prior to incorporation into the work. This change was included in change order number 10, with change order approval from Craig McDaniel, but approval was well after the change was incorporated into the work.

RFI 39: KG requests a change to the deck hatch curb and extension ladder details on sheet A1, appendix M11. Concept approval was received from Tony Messmer, WSDOT Bridge Design Office.

No other approvals are noted. This change was included in change order number 14, which had approval from HQ Construction, Marco Foster. However, the approval came well after the RFI response that granted approval to include the change in the work. RFI notes as no cost, change order appropriately provided a credit for the reduced work associated with the change.

RFI 49: KG requests a revision to Section 2.14.5.2.8 regarding no construction joints (CJ) allowed in walls. Identified need for CJ in vertical walls at the anchor gallery locations. References attached drawing that is not attached to hardcopy, so cannot verify that CJ is required versus convenient for forming. Proposal approved by Eric Ferluga, WSDOT Bridge Design

Office; no HQ approvals noted. Changes to construction joints are allowed with approval from the Engineer per Std Spec 6-02.3(12)A; no change order required.

No exceptions are noted with the RFI.

RFI 50: KG requests clarification for an OSHA design standard specified in Chapter 2 of the RFP that does not exist. The correct OSHA design standard was provided by Eric Ferluga, WSDOT Bridge Design Office; no HQ approvals noted.

The correction of the OSHA standard is a change to the RFP and a change order should have been required.

RFI 51: KG proposes a change to eliminate a detail determined to be a construction aid to align sleeves. The response from Tony Messmer, WSDOT Bridge Design Office, was to leave the detail on the referenced sheets until WSDOT approved an alternate method or detail.

The detail included in the M11 drawings did not allow as optional, to make this detail optional a change order should have been prepared.

RFI 59: The RFI identifies a conflict with nelson studs for the water tight doors as designed in M11 drawings and reinforcing steel and a KG proposal to revise nelson studs to avoid conflict. In the new layout the 1/2" and 3/4" nelson studs are replaced with a single row. Concept approved by Tony Messmer, WSDOT Bridge Design Office, no HQ approvals noted.

The design of the water tight doors is the Design Builder's responsibility, as such changes to the design are theirs, no change order required.

RFI 66: The RFI identifies a conflict on sheet LP45 of appendix M11 between the nelson studs and M111 rebar at watertight doors. KG's proposal revises the layout of the rebar to a single bar at the center of the embed channel. The proposed change was determined to be structurally acceptable by Tony Messmer, WSDOT Bridge Design Office, and he noted that this should be submitted as a Request for Change since it is a change to the Contract.

This is a change to the M11 drawings for the portion of the drawings where WSDOT is the designer of record which required a change order.

RFI 75: KG requests clarification to a detail on sheet XP46 of the revised M11 drawings. The clarification provided that plan dimensions do not change based on revised dimension for keel slab thickness.

This response is not a change, but is a result of changes to drawings where those changes should have been a change order.

RFI 77: KG requests direction on how to resolve conflicts. The revisions to top track beam in Type 3/3A anchor galleries conflicts with 4 access hatches. Response from Eric Ferluga, WSDOT Bridge Design Office, is to see the signed M11 plans; the PE responded that the conflicts were resolved in a revised set of plans.

No other approvals are noted; this is a change to the Contract that requires HQ approval. Resolution provided with new plans, included in change order 14 which had approval from HQ Construction, Marco Foster; however the approval came well after the RFI response provided approval to incorporate the change into the work.

RFI 84: KG requests confirmation that Schedule 40 PVC pipe for conduit is an acceptable material at the interior wall penetrations. The response by Dewayne Matlock references requirement to meet Standard Specification 9-29.1, per the Contract, no change to Contract.

No exceptions are noted with the RFI.

RFI 85: KG proposes a change from the 2008 version of AWS D1.1 to the 2010 version; only in respect to issue at hand. Change order 13 addresses, approval from the EOR and KPFF, no other approvals noted. Review of change order number 13, approval from Mark Gaines and Dave Zeigler 4/19/11, response to KG 4/22/11, all approvals in place prior to implementing change.

No exceptions are noted with the RFI.

RFI 96: KG requests clarification of Contract regarding responsibility for testing hot mix asphalt (HMA), the response provided Contract references for DB responsibility for HMA testing and WSDOT responsibility for HMA testing. The RFI is clarification only, no change order required.

No exceptions are noted with the RFI.

RFI 114: KG requests clarification for the consolidation of concrete. Section 2.14.5.2.6 requires internal vibration to consolidate the concrete; the Contract also allows adoption of successful processes from ACME and ACME successfully used external vibration supplemented by internal vibration at specified locations. Eric Ferluga, WSDOT Bridge Design Office, responded that the Contractor may use external vibration in accordance with ACME. The Contract allows adoption of successful ACME procedures, no change order is required.

No exceptions are noted with the RFI.

RFI 115: KG proposes to use curing compound per manufacturer's recommendations in lieu of standard specification.

Response provided was that the proposal was not acceptable as it does not meet the requirements of the Standard Specifications Section 9-23.2; however response allows deviation from standards with recommended testing. Use of curing compound as requested in this RFI, with or without testing, would require a change order as it would allow curing compound in lieu of other moisture cure methods, where the Contract specifically disallows it. Need for a change order to allow response as provided was not identified.

RFI 116: KG identifies a conflict in bar designation between sheets XP6 and XP50; the bar is shown as #11 on one sheet and #8 on another. Response from Tony Messmer, WSDOT Bridge Design Office, was that the correct designation is #8, no other approvals noted.

The resolution of the conflict requires a change to an M11 drawings and a change order is required.

RFI 118: KG is proposing acceptance criteria for materials that do not have specified criteria in the Contract. The response addresses Contract requirements, no change is required.

No exceptions are noted with the RFI.

RFI 123: KG has identified a rebar conflict and proposed revisions to resolve. The RFI proposes a minor adjustment to the rebar; this adjustment was reviewed and agreed to through our Bridge Design Office.

No change order prepared; without an assigned BTA for this project, the Bridge design office has no authority to approve changes. While this is a very minor adjustment, it is technically a change to the Contract, M11 drawings, and the appropriate approval process was not followed.

RFI 126: KG requests an alternate to the shear key when spacing does not allow construction of the standard shear key. The proposal was approved with conditions; approval from Eric Ferluga, WSDOT Bridge Design Office, no other approvals noted.

This modification to the shear key changes the RFP Technical Requirements Section 2.14.5.2.8; a change order is required.

RFI 132: KG proposes a material substitution for fencing as the specified material is not commercially available. Approval for the change was from Marco Foster, but no change order.

This substitution changes the material requirements of the Contract, a change order is required.

RFI 134: KG requests a change to a rebar configuration. The request was approved by Tony Messmer, WSDOT Bridge Design Office, no other approvals noted. The change resulted in less steel and less labor to place and tie, cost not addressed and a change order was not completed.

This is a change to the Contract, M11 drawings, a change order is required.

RFI 139: KG requests to use a concrete mix design with an 8" slump and no air entrainment. The use of the mix design was approved through Construction Office

No exceptions are noted with the RFI.

RFI 140: KG requests confirmation of the ½" concrete cover requirements over bracing and picking inserts. WSDOT confirmed that the ½" cover is acceptable with the exception that "mounding" is not an acceptable method to achieve cover. No change order was required, confirmation of Contract requirements only.

No exceptions are noted with the RFI.

RFI 151: KG requests confirmation that a tack weld is acceptable where a spot weld is specified; spot welding is not defined in AWS D1.4. Response from Tony Messmer, WSDOT Bridge Design Office, provided that a tack weld is acceptable. No change to the Contract, clarification of terminology only.

No exceptions are noted with the RFI.

RFI 159: KG requests to confirm testing requirements for steel plates for bollards and padeyes. Drawing M1 Rev 1 indicates the steel plates meet ASTM A588 for this application and this specification does not require charpy testing. Eric Ferluga, WSDOT Bridge Design Office, confirmed that charpy testing is not required. No other approvals are noted, no change to the Contract, confirmation of Contract requirements only.

No exceptions are noted with the RFI.

RFI 165: KG requested a construction joint for ease of construction. After the initial review of the RFI by WSDOT, KG decided to drop the request as the proposed construction joint will not be used.

No exceptions are noted with the RFI.

RFI 168: KG proposed to leave black metal construction aids encased in concrete. The WSDOT response was that it is acceptable provided rebar clearances are maintained, per Contract requirements and included in Pontoon Welding Continuity Plan and RFC drawings. It

was noted there could be a potential conflict with other steel (A124 and A123). This request does not change the Contract, no change order is required.

No exceptions are noted with the RFI.

RFI 175: KG requested information not included in the plans regarding splice length for rebar for temporary access openings. Response provided splice lengths for bar size but specifically does not approve location of temporary access openings. No change order is required, the temporary accesses are allowed by Contract, requirements and locations to be determined by Design Builder.

No exceptions are noted with the RFI.

RFI 181: KG proposes a change to the oval eye nut size from 3/8" to 5/16" based on results of the mock up. Approval from Doug Olson and Eric Ferluga, WSDOT Bridge Design Office, no other approvals noted. This is related to towing and moorage connections which are the Design Builder design responsibility; the change to the eye nut size is OK without a change order.

No exceptions are noted with the RFI.

RFI 192: KG requests the addition of lap splices in rebar in precast panel P. The request is allowed via response from Eric Ferluga, WSDOT Bridge Design Office, no other approvals noted. Standard Specification Section 6-02.3(24)D allows changes to type, number and location of splices if approved in writing by the Engineer. A change order is not required.

No exceptions are noted with the RFI.

RFI 194: KG requests a change in location of tie for rebar for the hatch cover. The response from Eric Ferluga, WSDOT Bridge Design Office, approved the change provided that the spacing be revised from 1'-0" max to 6" max to account for the decrease in hook development length associated with the requested revision. This Contractor requested change results in added materials and a change in rebar spacing.

This request changes the Contract, M11 drawings, a change order is required.

RFI 196: KG submitted a request to confirm proposed hook lengths for precast panels, no reference to specific plan sheet is provided. WSDOT Response indicates the proposal is in line with Bridge Design Manual, but without a plan reference cannot determine if this is a change or a clarification to the Contract.

With information available at this time, it appears a change order should have addressed this issue, as this either changed the tail length called out in the plans or provided

information that was missing from our plans. Both these options would require a change order to correct.

RFI 197: KG requests to use formsaver lap splice bars instead of full length formsaver bars in the precast panels for the temporary access openings. The request was approved by Eric Ferluga, WSDOT Bridge Design Office, no other HQ approvals noted. Per the specifications, this is allowed with Engineer's approval. No change order required.

No exceptions are noted with the RFI.

RFI 199: KG request to confirm the verbal direction for duct installation on a batter to match wall face to avoid rebar conflicts. WSDOT response is to install vertical if possible and once the column design is complete and a solution to install the ducts vertical is determined a change order will be negotiated. Change order 38 compensates KG for installing the ducts vertical on cycle one only; this issue will be addressed on future cycles in coordination with Evergreen Point Floating Bridge and Landings Project (FB&L) design. The change order had HQ approval.

No exceptions are noted with the RFI.

RFI 202: KG identified a construction conflict during the installation of precast panel #G-R and requested approval to cut a bar and add a splice to allow installation. The response from Eric Ferluga, WSDOT Bridge Design Office, approved the splice and provided splice lengths. Adding a splice is allowed by the Standard Specifications, a change order required is not required.

No exceptions are noted with the RFI.

RFI 206: KG requested to add a rebar splice to precast panel E in pontoon VSW. Eric Ferluga, WSDOT Bridge Design Office, approved the splice. Adding a splice is allowed by the Standard Specifications, a change order required is not required.

No exceptions are noted with the RFI.

RFI 208: KG discovered conflicts between PT ducts and inserts and embeds in Type 3/3A pontoon and requested approval to modify PT duct location by adding a 1" sweep. Tony Messmer, WSDOT Bridge Design Office, reviewed the proposal and responded that the proposed duct location is acceptable. No approval by HQ Construction is noted and a change order was not completed.

This change to M11 drawings is a change to the Contract, a change order is required.

RFI 209: KG requests to add a splice bar in a precast panel for pontoon V as a result of another bar (bent) that does not have the required embedment. The RFI references the requested change as work that has been completed. The repair was implemented prior to approval of the change; QC/QA should have identified the nonconforming work.

An added splice does not require a change order; if the lack of embedment of the bent bar is a change to an M11 drawing then this should have been a change order.

RFI 210: KG requests approval for pontoon VSW cast on December 8th with wrong size rebar under the temporary access blockout. Eric Ferluga, WSDOT Bridge Design Office, reviewed and determined that it is acceptable to leave in place. No other HQ approvals are noted in the RFI.

This is a change to an M11 drawing and requires change order.

RFI 215: KG request for adding lap splices in a precast panel for pontoon V. Eric Ferluga, WSDOT Bridge Design Office, reviewed and determined the lap splices are structurally acceptable. Adding a splice is allowed by the Standard Specifications, a change order required is not required.

No exceptions are noted with the RFI.

RFI 221: This RFI is associated with RFI 214; KG requests approval to move lap splices on pontoon T bolt beam to meet other contract requirements. Eric Ferluga, WSDOT Bridge Design Office, reviewed and determined leaving the lap splice was not structurally acceptable; moving the lap splices similar to RFI 214 is structurally acceptable. Adding a splice is allowed by the Standard Specifications, a change order required is not required.

No exceptions are noted with the RFI.

RFI 233: KG requests rebar configuration change to the 1T and 14T wall vertical rebar on sheet LP39 in appendix M11 for pontoons V, U and T; the as-built condition of the rebar layering is reversed. Eric Ferluga, WSDOT Bridge Design Office, reviewed and responded “The solution shown in the linked document (Type 1 End Wall.pdf) is an acceptable solution for the in-place conditions on the Lake for which WSDOT is engineer of record. Acceptance for other cases (towing, handling, etc) for which others are engineer of record is to be provided by others.”

The PEO did not process a change order based on the interpretation that the Contract does not allow a change order for correction of nonconforming work. As this changes the M11 drawings which are our responsibility under the Contract, the contract reference is being misinterpreted. A change order is required.

RFI 240: KG requests rebar configuration change to sheet XP45 of the M11 drawings. This RFI changes a rebar configuration and requires added rebar as a Contractor proposed repair procedure. Eric Ferluga, WSDOT Bridge Design Office, reviewed and determined that it acceptable to leave bars in a rotated configuration. The PEO did not process a change order.

This is a change to M11 drawings and is a change to the Contract, a change order is required.

RFI 246: KG requests approval to revise rebar details on sheets SA37, XP36 and S18. The changes were reviewed by Patrick Clarke, WSDOT Bridge Design Office; the proposal was OK for detail A and rejected for detail B.

These changes to M11 drawings are changes to the Contract, a change order is required.

RFI 256: The rebar shown on sheet XP46 of the M11 drawings is out of alignment for pontoon W; KG requests to batter the form to maintain rebar clearance. The proposal was reviewed by P. Clarke, WSDOT Bridge Design Office, and determined to be structurally acceptable; no HQ approvals noted.

This is repair work requiring modification to M11 plans, a change order is required.

RFI 259: KG requests to rotate tails on B106 rebar on all type 1/1A pontoons to keep the tails out of wall pour. RFI does not address what the problem is that results in this request. Looking at the plan, it appears it can be built per plan and avoid the change, avoiding congestion of rebar at the revised location. P. Clarke, WSDOT Bridge Design Office, determined that the change is structurally acceptable, no other approvals noted.

This is a change to M11 drawings and is a change to the Contract, a change order is required.

RFI 269: KG cast rebar in wrong location in pontoons VNW and VSW and have requested approval to adjust other rebar to accommodate. P. Clarke, WSDOT Bridge Design Office, determined that the change was structurally acceptable; no HQ Construction approvals noted. Dewayne Matlock responded that the modification is within the intent of the Contract and a change order is not required.

A repair procedure, requiring a change to the M11 drawings, is a change to the Contract and a change order is required.

RFI 270: KG is requesting a change to rebar; the plans call for a hook bar and the RFI proposes straight with a lap splice. Eric Ferluga, WSDOT Bridge Design Office, reviewed and

determined the lap splice was structurally acceptable. Adding a splice is allowed by the Standard Specifications, a change order required is not required.

No exceptions are noted with the RFI.

RFI 285: KG requests confirmation of WSDOT direction on rebar conflicts on M11 drawing sheets XP7 and XP40. WSDOT response provided that the issue is a result of DB error, WSDOT is not directing fix. Patrick Clarke, WSDOT Bridge Design Office, responded that the proposal is structurally acceptable provided KG addresses how the exposed bar in the blockout will be protected against corrosion. Not all of Patrick's comments are addressed in PEO response: protecting bar from corrosion and potential conflict with FB&L. The Design Builder error required a change to the reinforcing as detailed in the M11 drawings that was originally tracked for a change order along with RFIs 100 and 286. Determination by PEO change order not required for these RFIs.

These changes to M11 drawings are changes to the Contract, a change order is required.

RFI 286: KG is requesting a change to the rebar to correct a Contractor error. This RFI for a repair procedure requiring a change to the M11 drawings requires a change order.

These changes to M11 drawings are changes to the Contract, a change order is required.

RFI 298: KG is requesting to modify track beam by extending to match precast element that was made longer than shown on M11 drawings, as depicted on RFC drawings for precast element. Approval provided from Patrick Clarke, WSDOT Bridge Design Office and Fred Tharp, State Construction Office. Dewayne Matlock responded that the modification is within the intent of the Contract and a change order is not required.

These changes to M11 drawings are changes to the Contract, a change order is required.

RFI 301: On pontoon VNW bars were cast at the wrong height requiring modifications to maintain clearances. KG proposed to trim bars and add an additional bar. Patrick Clarke, WSDOT Bridge Design Office, determined that the proposed repair is structurally acceptable; no HQ approvals are noted. The repair required by Contractor error changes M11 drawings.

These changes to M11 drawings are changes to the Contract, a change order is required.

RFI 303: KG is proposing two rebar revisions to M11 drawings; one to correct missing bars, one due to congestion. Patrick Clarke, WSDOT Bridge Design Office, determined that the proposed repair is structurally acceptable; no HQ approvals are noted. Dewayne Matlock responded that the modification is within the intent of the Contract and a change order is not required.

These changes to M11 drawings are changes to the Contract, a change order is required.

RFI 316: KG requests to modify a pontoon U column. This appears to be a casting/rebar placement error requiring a modification to the column to correct. Patrick Clarke, WSDOT Bridge Design Office, determined that the proposed repair is structurally acceptable; no HQ approvals are noted. Dewayne Matlock responded that the modification is within the intent of the Contract and a change order is not required.

These changes to M11 drawings are changes to the Contract, a change order is required.

RFI 321: KG request to add a rebar splice for M11 drawings sheet LP29, pontoon Type 1/1A. Patrick Clarke, WSDOT Bridge Design Office, reviewed and determined the lap splices are structurally acceptable. Adding a splice is allowed by the Standard Specifications, a change order required is not required.

No exceptions are noted with the RFI.

RFI 324: KG requests a reduced cure time for PT pour back area prior to contact with sea water. Section 2.14.5.2.9 of the RFP requires all exterior surfaces of the pontoons to be cured for at least ten days before contact with sea water is allowed. The RFI is recognized as a change and forwarded through HQ Construction. Fred Tharp requested data to support that there would be no impacts to WSDOT; the request was approved by Mark Gaines, State Bridge Construction Engineer, for locations where it isn't possible to achieve the full 10-day cure required by the Contract.

This was not needed for cycle 1. This is a change to a Contract requirement; appropriate approvals are in place and a change order will be processed if requested by KG for cycle 2.

RFI 328: KG requested approval for a repair procedure to place inserts that were left out of the pour for temporary falsework support, not permanent work. Request approved for cycle 1 only, approval from Fred Tharp, with either: removal and patching or isolation protection. Change order noted as required, PEO confirms this issue was addressed in change order 47.

No exceptions are noted with the RFI.

RFI 343: KG request for splice in rebar to address bars that were cut too short, repair also requires adjustment to duct location to ensure electrical continuity. Patrick Clarke, WSDOT Bridge Design Office, reviewed and determined the lap splices are structurally acceptable; no HQ approvals noted. Response from PEO only addresses splice, does not address adjusted location of duct.

The added splice is OK without change order, relocated duct changes M11 drawings and should be a change order.

RFI 348: The dimensions for the temporary access doors in pontoons VNW and VSW are not correct and do not provide sufficient space for the required lap splice. KG has requested a change in rebar splice from a lap splice to a welded splice. Patrick Clarke, WSDOT Bridge Design Office, determined the proposal is structurally acceptable provided they use a double flair bevel weld; no HQ approvals are noted. A change to a splice is allowed by the Standard Specifications, a change order is not required.

No exceptions are noted with the RFI.

RFI 351: This RFI is requesting as-built approval of a repair documented in NCR 75; the repair added a splice to rebar that was cut. Patrick Clarke, WSDOT Bridge Design Office, determined the proposal is structurally acceptable. Adding a splice is allowed by the Standard Specifications, a change order is not required. However, this splice was made and concrete cast well ahead of approval being requested.

Proper QA should have stopped work prior to incorporating unapproved changes into the final work. It does not appear that this happened. QA procedures were not followed.

RFI 354: An embed for a watertight door was installed upside down in a panel that was subsequently installed in a pontoon. KG has proposed to repair by drilling opposite the door frame to allow the door to be installed per plan. Patrick Clarke, WSDOT Bridge Design Office, determined the proposal is structurally acceptable; no HQ approvals noted. Doors are Design Builder's responsibility; a change order is not required.

No exceptions are noted with the RFI.

RFI 366: Request to add a splice, rejected by Patrick Clarke, WSDOT Bridge Design Office, approved by M. Gaines with reference to Br. Sht LP2. Added splice allowed per spec without a change order.

No exceptions are noted with the RFI.

RFI 377: KG requested to use curing compound in lieu of required cure for pour back of temporary access openings. The request was denied by Mark Gaines, State Bridge Construction Engineer, the curing required by the RFP is a better curing process.

No exceptions are noted with the RFI.

RFI 381: KG requested approval of a repair procedure to correct for using a #6 formsaver bar when the plans called for a #7 bar. Mark Gaines, State Bridge Construction Engineer, with structural review by Patrick Clarke determined that the proposal is acceptable. Rafael Reyes, Assistant Project Engineer, identified in RFI response that this is a change to the Contract and a change order will be required.

In following up on this RFI, verification that a change order had been processed was requested. Per PEO, change order was not prepared based on same contract reference as RFI 233. This is incorrect, a change order is required.

RFI 383: The couplers shown on sheet XP7 of the M11 drawings that were cast into a wall were the wrong size. KG has proposed a repair procedure; Mark Gaines, State Bridge Construction Engineer, responded that the repair is acceptable. It was noted that a change is order required; a change order is in process.

No exceptions are noted with the RFI.

RFI 392: The saddleblocks on drawing LP33 of the M11 drawings are to be painted in accordance with note 2. For cycle one pontoons, the galvanized blocks were cast prior to painting. KG proposed to roughen the galvanizing and paint with “thick” coat of approved paint. The request was approved by PEO and Rafael Reyes noted that this is within the intent of the Contract and no change order is needed; no HQ approval noted.

This appears to be a change to a contract requirement; a change is required.

RFI 396: KG request to change the material to be used for pour back of a blockout from grout to concrete. Mark Gaines, State Bridge Construction Engineer, determined that the proposed substitution is acceptable and that a change order is required for the change in material.

The change order is in process; no exceptions are noted with the RFI.

RFI 402: This RFI was submitted as a resolution to NCR 121. The RFI proposes a repair procedure for the 1” inserts on sheet LP32 in appendix M11 that did not meet criteria for clearance for electrical isolation. Mark Gaines, State Bridge Construction Engineer, reviewed and approved the change; Rafael Reyes noted that a change order is required. Concern in RFI regarding acknowledgement of no cost for associated contract (FB&L) was not addressed by PEO response.

No exceptions are noted with the RFI.

RFI 403: KG request to apply waterproofing to top of penetration pourbacks to avoid water intrusion. Mark Gaines, State Bridge Construction Engineer, determined the proposal was acceptable and approved the change. It determined that the additional work was within the intent of the Contract and not a change to the Contract.

No exceptions are noted with the RFI. Compared to other RFIs identified as within the intent of the Contract but actually were a structural change to an M11 drawing that required a change; this added work did not require a change.

RFI 406: KG requested approval to repair and use precast panels for pontoon Q with cracks exceeding contract specified limits. Mark Gaines, State Bridge Construction Engineer, reviewed the request and recommended that it be denied and the panels be rejected as not meeting Contract requirements. No change to the Contract resulted from this response.

No exceptions are noted with the RFI.

RFI 413: KG request for additional splice for ease of construction. Mark Gaines, State Bridge Construction Engineer, determined the splice is acceptable and approved the request. Standard Specification Section 6-02.3(24)D allows changes to type, number and location of splices if approved in writing by the Engineer. A change order is not required.

No exceptions are noted with the RFI.

RFI 421: The mapping of cracks was completed per contract and additional cracking is noted since mapping was completed; KG states they have met contract requirement to map cracks. Mark Gaines, State Bridge Construction Engineer, response is that mapping is to occur no sooner than 10 days after pour, Contractor is responsible for all crack repair and the repair requirements apply. Response provided is per the Contract, no change.

No exceptions are noted with the RFI.

APPENDIX B

TIMELINE: PONTOON CONCRETE AND THERMAL CONTROL/CURING PLAN

Summary of NCIs and NCRs related to thermal control and cold weather protection.

The thermal control plan was submitted on June 1, 2011, then revised and resubmitted on November 18, 2011. The cold weather protection plan was submitted and approved as part of the original Construction Quality Management Plan, resubmitted as a separate document on February 29, 2012, approved March 28, 2012.

Nov 4, 2011

NCR 10: The Cold Weather Protection Plan was not implemented. Precast panels were not covered with thermal blankets or connected to maturity meters and the concrete temperature fell below 50 degrees.

KG's response on November 10th does not address how the problem occurred or how it will be prevented and references the thermal control plan, not the cold weather protection plan. KG stated their intent to submit a revised plan, however, no plan had been submitted, the approved plan needs to be followed until revisions are reviewed and approved. The response from KG is not sufficient, and with the reference to the incorrect plan, demonstrates a lack of attention to the issues. On November 28th WSDOT Assistant Project Engineer (APE) stated "It is critical that all concrete cold weather protection procedures be clarified ... cold weather is a daily occurrence."

Nov 16, 2011

NCI 00214.003: The wood forms were not covered as required to prevent the loss of moisture. The response does not address the specific issues noted in the NCI, a root cause analysis was not completed, and there was a month and a half delay in issuing the response.

Dec 15, 2011

NCR 32: Numerous observations where KG failed to comply with the Cold Weather Protection Plan and moisture retention plan on pontoon V.

KG's response on January 11th addressed corrective action for the moisture that was not in conformance with their thermal control plan (soaker hoses applying water, thermal control plan addresses moisture retention measures in lieu of applying water to artificially influence concrete temperature) but failed to provide a positive proactive plan to ensure future compliance. WSDOT inspector response on February 2nd and APE response on February 29th was that KG QC to ensure compliance.

Jan 5, 2012

NCR 52: Maturity meters not installed per the Cold Weather Protection Plan.

KG's response on January 11th simply acknowledges that cold weather protection plan is to be followed; WSDOT approval on February 29th. No corrective action noted and no action plan to prevent future occurrences. Response is not sufficient.

January 24, 2012

NCI 00245.007: Concrete cure did not meet the RFP or standard specification requirements for pontoon V; the concrete surface and curing blankets were completely dry.

KG's response on February 1st acknowledges the specification requirements and commits to QA continuing to monitor, no mention of any QC actions. Root cause analysis warranted but not provided, response is not sufficient. WSDOT accepts response on February 2nd, acceptance of an insufficient response is not appropriate.

Jan 30, 2012

NCR 84: The Cold Weather Protection Plan not implemented as required for pontoon U.

KG's response on February 9th was to assign a field engineer to ensure cure requirements are met and discussing issue with superintendent. WSDOT APE responded on March 22nd that KG's QC needs to ensure implementation of cold weather protection plan.

Feb 7, 2012

NCI 00252.002 and 00252.004: The cold weather protection plan requirements were not met for precast panels. The cold weather protection was not installed correctly and the temperature of the panel was below the minimum allowed.

KG's response on March 7th stated that an emphasis on following the current cold weather was discussed with the crews. Also a reference that KG is working with WSDOT to review specifications for specialized concrete mix. As this is a repeat issue, with previous commitments to provide resources to correct, this response cannot be considered sufficient. The required root cause analysis is not provided.

Feb 7, 2012

NCI 00252.006: The cure for pontoon V and precast panel L was not maintained properly.

KG's response on March 1st; they will comply with cure as clarified in RFI 218. The changes allowed in RFI 218 are related to water curing; NCI 00252.006 observation is that thermal data loggers not installed per the approved plan. No action plan to ensure future compliance

provided for installation of the thermal data loggers; the response is not sufficient. WSDOT inspector accepted the response on March 8th.

Feb 8, 2012

NCR 94: The cold weather protection plan for pontoons T and U was not followed; the concrete was not maintained at 50 degrees or above for the minimum required time.

KG's response is reference to a revised protection plan that they are working on with CTL and WSDOT, the revised plan had not been submitted at the time of this NCR. The response is not sufficient.

Feb 13, 2012

NCR 99: The cold weather protection plan for pontoons V, W, T and U was not followed and had incomplete data in order to verify the cure as required.

The response from KG again references a revised concrete cold weather protection plan under development. The specifications require monitoring of temperature; no acceptable plan revision will correct the issues identified in this NCR. The response by KG is not sufficient and as this is a repeat problem that has not been adequately addressed further corrective action would be appropriate.

Feb 16, 2012

NCR 103: The thermal control plan for pontoons V and W was not implemented.

KG's response on February 29th involved discussion with crew and audit of plan and procedures. This is similar to other actions by KG and since this is a reoccurring issue does not appear to be effective at correcting the nonconforming work. APE responded on March 27th "QC is to ensure the Design Builder implements all aspects of the thermal control plan as approved..." and ask "What is QA doing to prevent non-conforming issues from recurring?" Both are appropriate but response was over a month after NCR issued. It does not appear there was any follow up, no action was initiated and noncompliance continued.

Feb 22, 2012

NCR 108: The thermal control plan was not followed for pontoon V. Cooling pipes were not installed and data loggers not read as required to provide data to verify temperature differentials are maintained within the requirements of the thermal control plan.

KG addresses frequency of readings, but does not address missing cooling pipes or correcting concrete subject to excessive temperature differential. Response on February 29th from KG again discussed the importance of thermal control with crews. Response is not sufficient.

Feb 23, 2012

NCR 111: Failure to comply with thermal control plan for pontoon W. The required monitoring for temperature differential was not performed.

KG's response on February 29th the same as previous to discuss with crews, appears no action is being taken to support response. As such, response is not sufficient.

Feb 23, 2012

NCI 00259.003, 00259.005 and 00259.009: The thermal control plan was not followed; data loggers were not installed correctly.

KG's response on March 8th is that loggers will be installed per the thermal control plan. No plan provided for either QC or QA to ensure future compliance. This is an ongoing issue identified in numerous NCR's, now being identified in NCIs, with a response that does not address the issue. The response was accepted by WSDOT on March 8th.

Feb 24, 2012

NCR 116: Failure to apply thermal control plan for pontoon V and W; insulation not sealed over bracing, protruding steel not covered and insulation not overlapped onto adjacent concrete by 3' minimum.

KG's response on February 29th is the same as for previous NCRs; the response appears to be copied and does not address the issues identified in this NCR. WSDOT response on March 5th requested a corrective action plan. Cannot find that a corrective action plan was provided and no action was implemented to follow up. APE response on April 18th is "QC to ensure concrete is placed in accordance with the Contract Specifications and the approved Cold Weather Protection Plan when required."

Feb 24, 2012

NCR 117: Cracking was observed that is in excess of allowable 30 feet of repairable cracks.

KG's response on March 28th is that KG will be repairing the cracks that have been identified. This is not responsive to the problem as it does not address what is causing the cracking and what will be done to prevent this cracking from occurring again. Response by the APE on April 19th is for QC to ensure the crack mapping is performed per the contract requirements. This does not address the problem in the NCR; the excess cracking, nor does it identify the cause and corrective action to prevent future issues.

Feb 24, 2012

NCR 118: The thermal control plan for pontoon U was not met.

KG's response on April 2nd references meeting with WSDOT on the necessary minimums to meet requirements. This answer is not responsive, does not address the issue. The approved plan in place at the time must be met.

Feb 28, 2012

NCR 120: The thermal control plan for pontoon U is not being followed.

KG's response on April 2nd is that the plan elements not being met are suggestions, not requirements. Review of the plan in effect at the time clearly states that these are requirements, not options or only to be implemented in the event they are needed. Response is not sufficient and does not address the problem. Request by APE on May 2nd was a repeat of previous requests for QC to ensure plans are followed.

Feb 28, 2012

NCR 122: The cold weather protection and thermal control plans for pontoon V were not being followed. Insufficient or no data was available to verify compliance as required by the plans.

KG's response on April 2nd indicates additional resources have been put in place to collect and manage data and that this is working well. No specifics details were provided. Additional resources were identified as a response to NCR 84, dated Jan 30, 2012. WSDOT inspector on April 6th responded that concrete to be place per specifications and approved plans. On April 18th APE directed QC to ensure work is per contract again. Given this NCR is addressing the same issues this response is not sufficient to accept that the actions of KG are acceptable.

Feb 29, 2012

NCR 123: The thermal control and cold weather protection plans not being implemented for pontoon V.

KG's response on April 2nd states that a revised cold weather protection plan was accepted by the Quality Task Force (QTF) on March 29th. The cold weather plan that was in place at the time of this NCR was not followed and until a new plan is approved the existing plan must be followed. The response on thermal control requirements again references minimum requirements. The response by KG is not sufficient to address how they will comply with the Contract requirements. On April 6th the WSDOT stated that "concrete shall be placed in accordance with the Contract Specifications and the approved Cold Weather Protection and Thermal Control Plans when required" and the APE responded on April 18th, 49 days after the NCR, that "QA shall verify all NCR issues are resolved and in compliance with contract requirements."

Feb 29, 2012

NCR 124: The thermal control plan for pontoon T was not implemented.

KG response on March 28th references guidelines for thermal control plan. The thermal control plan as written is to be complied with, the plan requires these elements and they are not optional. WSDOT inspector responded on April 6th and APE replied with typical QC comments on April 19th. The response by KG is not sufficient to address how they will comply with the Contract requirements.

March 7, 2012

NCR 127: The cold weather protection plan for pontoons V and T was not followed; data required by the plan was not available.

KG's response on April 2nd was the same as for NCR 130. The response by KG is not sufficient to address how they will comply with the Contract requirements.

March 7, 2012

NCR 130: The thermal control plan for pontoon U was not being followed. Data required by the thermal control plan was incomplete and temperature differential being exceeded.

KG's response on April 2nd; additional resources assigned, this is similar to responses in November through February. Compliance issues continue to occur, the responses are not sufficient.

March 12, 2012

NCR 132: Missing sensors necessary to measure concrete temperature for cold weather protection for pontoon U.

KG's response on April 2nd was that they had hand sensors available to measure the surface temperature and can be provided to QC/QA for verification. This does not meet the requirements of the standard specifications or the approved cold weather protection plan. The response does not address how issue will be addressed so it does not reoccur and is not sufficient.

March 13, 2012

NCR 134: The recording thermometer/maturity meter was not installed for pontoon T as required by the cold weather protection plan.

KG's response on March 28th is the same response as NCR 132, it does not comply with specifications or approved plan and does not address how issue will be dealt with in the future to ensure compliance. The response is not sufficient. The responses by the WSDOT inspector on April 6th and APE on April 18th were the same as on previous NCRs, to comply with the Contract and for QC to ensure work is in accordance with the Contract.

March 15, 2012,

NCR 136: The thermal control plan for pontoon T was not met. Temperatures were too hot; exceeded allowable temperature differential and data was lacking.

KG's April 6th response does not address the issue and is not sufficient. The responses by the WSDOT inspector on April 6th and APE on April 18th were the same as on other NCRs to comply with the Contract and for QC to ensure work is in accordance with the Contract.

March 15, 2012,

NCR 137: The thermal control plan for pontoon V was not met. The insulation does not extend as required by the cold weather protection plan. NCR notes first notice to KG field staff on March 12th, still not corrected by March 15th.

KG's response on April 19th says field personnel are responding as soon as issue is discovered, contradicted by report from QA. The response does not provide a plan for addressing to ensure compliance; the response is not sufficient. The responses by the WSDOT inspector on April 19th and APE on May 2nd were the same as on other NCRs to comply with the Contract and for QC to ensure work is in accordance with the Contract.

March 15, 2012,

NCR 140: The cold weather protection plan and thermal control plan for pontoon V was not met.

KG's response on April 25th continues to fail to address the issue that has been a repetitive finding since November of 2011.

March 16, 2012,

NCR 141: KG was unable to comply with the thermal control plan for VSW pontoon placement wall 2 and lower anchor gallery. The temperature difference was outside the acceptable temperature range for the control joint sensor and 5' sensor due to a boiler malfunction.

KG's response was reasonable, including purchase of additional boilers for backup and installation of a wireless system to monitor the boiler function. WSDOT response, dated April 6, references revised Cold Weather Protection Plan, not appropriate for the issue at hand.

March 16, 2012,

NCR 142: KG was unable to comply with the thermal control plan on VSW pontoon placement for wall 2 and lower anchor gallery. One keel slab thermal coupler broke after the concrete placement and KG was unable to retrieve data showing compliance with the thermal control plan.

KG's response on April 25th was a commitment to install backup data loggers. WSDOT inspector response April 25th was to follow the thermal control plan. WSDOT APE response on May 2nd was QA shall verify all NCR issues are resolved and work is in compliance with Contract requirements.

March 19, 2012,

NCR 143: The surface temperatures on concrete pour dated March 13th on pontoon V fell below 50 degrees F on several reading between March 15th and 19th. This is not in compliance with the CCWPP.

QA's response on March 27th; QC must monitor and take action as necessary to stay in compliance with the approved Concrete Cold Weather Protection Plan. KG's response April 3rd referenced discussion with the appropriate superintendents and on the importance of following the current plan. WSDOT inspector responded on April 6th that concrete shall be placed in accordance with the Contract specifications and the approved Cold Weather Protection and Thermal Control Plans and that a revised CCWP was submitted and approved at the March 29th Quality Task Force meeting. WSDOT APE responded on April 18th that QA shall verify all NCR issues are resolved and in compliance with Contract requirements.

March 20, 2012,

NCR 147: It was observed on March 20th, that no cold weather protection blankets or plastic in place was in place for LAG-2(NE corner) on pontoon W. The surface temperatures were in the mid 30's degree F range and are not in conformance with the CCWPP.

QA's response on March 27th, Corrective Action Plan needs to be approved and implemented to keep this from reoccurring. KG's response on April 23rd referenced a revised CCWP and again committed to follow the revised plan and that all concrete had met the revised plan (QA verified that requirements of the revised plan, that had been submitted but not yet approved, were met for this concrete placement). WSDOT inspector response on April 25th acknowledges the revised CCWP and reiterates that KG is to follow the revised plan. WSDOT APE responded on May 2nd that QA shall verify all NCR issues are resolved and in compliance with Contract requirements.

March 21, 2012,

NCR 148: U Pontoon W-3 East. Observed that Thermal control was not installed per the thermal control plan, Insulation for the concrete must extend at least 3 feet onto any adjoining concrete portions that are pre-existing or placed with the insulated concrete section including reinforcement steel.

KG's response on April 25th, "Crew awareness has been heightened and CTL is regularly called to address current issues for guidance. Crack mapping of the pontoons of the location are being done to verify crack size and width to determine repair procedure if one is needed." Response is considered inadequate on several levels, first, this is an ongoing quality issue for work that has been underway for six months, crew should be fully aware at this point, an approved plan giving

specific requirements is in place to be followed, unapproved guidance from CTL is not appropriate, and the intent of the thermal control is to avoid cracking, not to map and repair cracking that occurs due to KG's failure to implement the plan. WSDOT's response was to concur with comments, an inappropriate response for reasons outlined above.

March 21, 2012,

NCI 00280.006: The QA staff has not used their authority to ensure work is in compliance with Contract related to numerous NCRs and NCIs related to cold weather plan implementation for pontoon V.

Response from KG on April 26th references revisions to cold weather protection plan, KG's response does not address failure to follow approved plan. Indicates all concrete in conformance to approved plan, review indicates this is not supported by the NCRs and NCIs issued in comparison to the ultimately approved revised plan. WSDOT accepted KG's response on April 27th.

March 27, 2012,

NCR 150: This NCR is to document the lack of data needed to comply with the current CCWPP on pontoon W type 3A for LAG-2(NE) and wall-4, both poured on March 16th. The data available as of this time reflects only 5 days of surface temperature readings (03/16 - 03/20) where 7 days are required by the CCWPP. The CCWPP that was currently approved when this concrete was placed required data to be available for the entire seven day period.

KG's response on April 25th references the revised CCWPP plan approved on March 29th (QA verified that requirements of the submitted revision to the CCWP plan, that was approved the day after this NCR was written, were met for this concrete placement). Under the revised plan the concrete met the performance criteria and that KG will still need to implement the current plan even during revisions as necessary. WSDOT response on April 25th acknowledges the revised CCWPP plan approved on March 29th and concurs that under the revised plan the concrete met the performance criteria.

April 2, 2012,

NCR 154: Pontoon VSW's column center temperature was 100.4 degrees F when taken off thermal control on afternoon of 3/29/12. The average ambient temperature was 47.2F at this time and the maximum temperature difference was 39.7F. The center of column exceeded this maximum temperature difference by 13.5F. QA's responded on April 16th that KG's QA must verify that thermal control is complete before removal of insulation.

KG's response on April 25th was that QC is doing a better job at communicating if and when thermal control can come off; QA and QC are working together to verify proper paperwork for

removal of thermal control; KG is currently crack mapping the area to determine if an approved corrective action plan is needed for cracks or not with repair, if needed, as designated in RFI 292.

WSDOT response mimics KG response. Response on this NCR by both KG and WSDOT is inappropriate as intent of thermal control is to prevent cracking, not repair if it occurs. Also, this violates the revised cold weather protection plan in place at this time by removing protection when concrete temperature is too high compared to ambient air temperature, potentially damaging concrete. Response from WSDOT accepting lack of action is not appropriate.

April 11, 2012,

NCR 156: QA performed final inspection for cold weather protection for pontoons T, V & U. Observed that the walls stated did not have weather surface sensors and incomplete data. QA noted that these were placed under the previous CCWPP and do not comply with that plan. The missing surface sensors do not comply with either plan.

KG response on April 19th does not address the issue, citing the new plan. However, as pointed out by QA, the sensors are also required by the new plan. The response is not sufficient and does not address the issue. Response from WSDOT inspector on April 25th is to simply reiterate that the plan needs to be followed, response is not sufficient to address the repeat issue. WSDOT APE response on May 2nd is the same as previous that QC is to ensure concrete is placed in accordance with the Contract specifications and approved cold weather protection plan and that QA shall verify all NCR issues are resolved in compliance with the Contract requirements.

April 18, 2012,

NCR 160: (VOID)

U Pontoon UAG; observed that plastic sheathing and or thermal blankets were not installed per the thermal control plan over or around CJ's and top of forms to hold heat in from thermal pipes/heaters. Kiewit QC was aware of this issue and did not correct prior to placement of concrete.

This NCR was voided by KG Quality Manager; reported to be a misunderstanding per the heating requirement under the UAG placement per the thermal control plan.

No details are provided to explain the misunderstanding and follow up through the PEO did not yield any additional information to support the conclusion of a misunderstanding. Thermal control plan requires the use of insulation on existing concrete to maintain a nearly uniform temperature when applying heat to the existing concrete for thermal control. In voiding NCR, some explanation, with reference to appropriate plan, should be provided to adequately document how noted deficiency was, in fact, in compliance with the Contract and approved plans in place at the time.

May 7, 2012,

NCR 167: On 05/05/12 the cover requirements for the Thermal Control Plan were not followed for the 05/04/12 TS-2 pour on pontoon type 3a (W). No cover was in place on the west side wall section of TS-2.

On May 17th KG discussed the importance of Thermal control with the crews. The thermal control was placed on the east side of the pour however the thermal control was missed on the west side. KG mapped the cracks verifying that no cracks were present at that thickened section confirming the concrete is within specifications for cracks caused by thermal control. WSDOT inspector responded on May 17th that QC shall ensure that the approved thermal control plan is followed for all placements.

The response from KG Construction Group is a continuing repeat of previous responses with no action taken to prevent future issues. Purpose of thermal control is to prevent cracking, needs to be in place to ensure cracks do not develop. Response continues to be insufficient.

APPENDIX C

CONSTRUCTION QUALITY MANAGEMENT PLAN

CQMP Submittal/Approval

CQMP rev. 0 (Draft Dated 1-11-2011)

Submitted 1-14-2011 Revised 2-8-2011 Approved 3-29-2011

CQMP rev. 1

Revised 2-21-2011 Submitted 2-22-2011 Approved 3-4-2011

CQMP rev. 2

Dated 1-11-2011 Not Approved (KG; obsolete when submitted)

CQMP rev. 3

Revised 3-6-2011 Not Approved (version 3a coming)

CQMP rev. 3a

Revised 6-2-2011 Approved 6-20-2011

Evaluation of Construction Quality Management Plan (CQMP) Implementation

According to the approved Quality Management Plan, Section 2.5.1, all NCR's are to have a Corrective Action Plan prepared and reviewed prior to submittal to WSDOT. While some NCR's reference an attached Corrective Action Plan, most do not. The NCR form has a comment box for the Construction Group's Recommended Disposition for the issue. This could be interpreted as the action plan. However, the comments included in this field for the majority of the NCR's reviewed lacks any detail or specific action that will be implemented to correct the issue and prevent future occurrences. Examples are as follows:

Related to hold points:

- QC and QA will be using the Hold Points more often and communicate between each other before QC turns over each panel to QA.
- This will be a rolling hold point and the first inspection/hold point can be seen from the 5 week schedule for each pontoon in the main conference room. There will be more communication between QA and QC on when to setup the hold point time for each pontoon
- K-G with QA used a camera snake to verify that the closure pours in question were approved prior to pouring. QA needed to verify that the bar moved was re-tied with 50% ties and the tails did not intrude in the clear zone. KG internally discussed with Superintendents and General Superintendents the importance of

hold points. KG and PCS reiterated the importance of hold points to the crew in the U pontoon. A witness point was observed but an official hold point was not performed.

- The lap splice locations were reiterated with the wall crews for PCS. QC and QA discussed the importance of witness points and looking at all issues and small differences between pontoons. An RFI will be written with the linked acceptance to document the change.

Related to thermal control, cold weather protection,

- Per the agreed upon discussion during the QTF meeting, K-G will follow the thermal control plan as submitted with the QMP, if; 1) on the day of placement that temperature will fall below 35 degrees, 2) the ambient temperature for 7 days falls below 35 degrees, or 3) during the curing time that there is a possible chance for the temperature to drop below 35 degrees.
- KG reviewed CCWPP with concrete Superintendent's, Engineers, and General Foreman. As soon as the issue was noticed crews corrected the problem.
- KG to follow the approved cold weather protection plan and verify maturity meters are in the pour

Related to thorough QC prior to turning over to QA:

- Will have to keep reminding PCS about their ties and check prior to accepting the panels and to pass them from QC to QA for acceptance
- QC will need to verify that the panels have the required strength prior to stripping each panel. QC will need to verify with QA that the panel has the required strength prior to stripping the panels.
- K-G will continue on work with the other trades for the sequence of work to be able to do a final clean prior to turnover to QA.

Related to timing of pours to meet specification requirements:

- KG is working on options to speed up the time between the pour lifts. At all times the concrete was worked and pliable prior to placement and care was taken to tie the two lifts together.
- KG is working with the foremen to notify when concrete lifts might exceed 30 minutes to receive WSDOT approval. KG is also continually planning work to minimize the time in between concrete lifts. Note: this comment or very similar was repeated 10 times over a period of 10 weeks and the problem continued resulting in 10 NCR's.

According to the Quality Management Plan, the Executive Oversight Committee is to review NCR's and direct formal Root Cause Analyses for issues with a likelihood of reoccurrence. In reviewing the NCR's written for this project, there are several categories of recurring problems:

- Failure to follow the thermal control plan
- Failure to follow the cold weather protection plan
- Failure to follow requirements for witness and hold points
- Failure to adequately QC work prior to turn over to QA, especially related to rebar issues
- Failure to meet requirements for timing for concrete placement to avoid cold joints

No Root Cause Analyses were performed despite the repeat nature of issues resulting in NCR's. It was also found that responses often did not address the underlying cause of the problem to ensure it would not reoccur.

Non-Conformance Issue Reports

Per the Quality Management Plan, Section 2.5.2, when Quality Verification identifies work that is not in conformance with the Contract, a Non-Conformance Issue Report (NCI) will be prepared. Each NCI is to have a formal Root Cause Analysis to define the cause of the problem in order to implement actions to prevent a reoccurrence. Of the 42 NCIs prepared on this project, we find no Root Cause Analyses were performed. Of the NCIs issued, there are several themes of repeat issues, similar to the NCRs noted above, that would warrant a Root Cause Analysis due to the repeat nature of the issue, absent the commitment for a Root Cause Analysis for all NCIs. Responses from the Quality Manager and the Construction Group are similar in nature to responses to the NCRs, giving no specific corrective action to prevent future occurrences.

In general, it appears the Quality Management Plan is not being adhered to by KG and not being enforced by QA or QV. Recommend a meeting with the Executive Oversight Committee to lay out a plan to ensure the Quality Management Plan is followed, issues are identified appropriately, and timely action is taken to determine the root cause of the issue and implement effective and definitive actions to prevent future occurrences.