

Evaluation of WisDOT's Consultant Design/Construction Transparency Effort

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CMSC Project: 2008-WO 2.14

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EXECUTIVE SUMMARY

During the 2008-2009 construction season, the Wisconsin Department of Transportation (WisDOT) conducted a statewide pilot program to test the concept of compensating consultant design firms for providing consulting services to consultant construction project leaders during construction of highway projects. The pilot program, called the Transparency Effort, was undertaken in response to an action plan developed by a joint WisDOT, Wisconsin Transportation Builders Association (WTBA), and American Council of Engineering Companies of Wisconsin (ACEC) workgroup that recommended this strategy as way of improving construction communications on consultant managed projects so that project leaders could make timely project decisions.

Sixteen projects were included in the Transparency Effort pilot program, with at least one project in each of WisDOT's five Regions. There was a reasonable mix of state and local projects involved and there was a good distribution of project sizes based upon construction let costs. A variety of contractual methods were used to retain the design consultant firms and the contracts were capped at amounts generally recommended by the Transparency Workgroup.

The Construction and Materials Support Center (CMSC) at the University of Wisconsin-Madison was asked to conduct a qualitative evaluation of the pilot program and make recommendations regarding future use of the technique and determine if modifications should be made to improve the effectiveness of the program. Conclusions and recommendations were to be based on opinions and experiences of personnel involved with the pilot projects. Interviews were conducted with members of the workgroup, WisDOT Project Managers, consultant construction Project Leaders, and representatives from the consultant design firms and construction contractors.

A structured interview process was utilized where each group of interviewees were asked the same questions but allowed to digress as desired, with clarifying or follow-up questions asked by the interviewer. Surveys were administered through a combination of telephone interviews where responses were written down by the interviewer and e-mails to participants where they provided written responses to the survey questions. A total of 57 individuals were surveyed during the course of the evaluation study representing: 15 consultant construction services firms, 13 consultant design firms, 12 prime contractors and 3 WisDOT Regions.

Based upon the results of this evaluation study, the following recommendations are made:

- The Transparency Program should continue. Communications between the consultant project leaders and the consultant design firms seems to have been improved on the pilot projects and there is sufficient qualitative data showing that there is value in the program. Future construction projects would benefit from having design firms compensated for providing consulting services to construction project managers in the form of quicker and more thorough responses.

- The design consultant should be engaged by WisDOT through either a 2-party direct contract or work order to a Master Agreement. The practice of retaining the design firm through a subcontract to the consultant construction services contract raises questions concerning the assignment of responsibility and liability should problems occur.
- Regions should be better informed of the Transparency Program's existence and benefits. Standardized contract language and scopes of work should be developed for the Facilities Development Manual (FDM) so that Regions can quickly and efficiently put contracts in place. Construction project personnel, including contractors, should be informed that the design firm is under contract to provide support to the field personnel and encouraged to use the program when needed.
- Projects that utilize a Transparency contract should be more selectively identified by the Region. Not all projects need such a contract, and it should be reserved for the more complex projects. A suggested evaluation technique is provided in the report. Timing of the contract is important as most of the questions from the field staff are discovered during review of the plans and contract documents in preparation for starting work. The Transparency contract should be in place well before the project Preconstruction Meeting to ensure that the designer is available to address design related questions.
- Transparency contracts should be capped based upon the PS& E estimate amount or construction let cost. The amounts suggested by the Transparency Workgroup are sufficient, but project teams should have the ability to exceed this amount based on the complexities of their projects.
- Projects in the Transparency Program should use a Design Information Request (DIR) form to document questions going to the design firm so that there is no confusion with an RFIs that may come from the contractor to the construction Project Leader. A suggested draft form is provided in the report.
- Project Managers should subsequently review DIR forms after they have been answered to insure that the program is not abused and design consultants are not being compensated for answering questions that should be answered by the consultant Project Leaders or been answered as part of the initial design contract. Also such a review would assist in determining if any errors and omission issues should be raised.
- The Transparency Program should be continued, but expansion should be done in a deliberate and premeditated fashion so as to build support and better document the costs and benefits. For the 2011 construction season the Transparency Program should strive to involve from 7 to 10 of the most complex construction projects in each Region. That level of program represents approximately 10% of the projects built by the department in a year. Costs can be estimated to be from 0.05% to 0.1% of the total construction let amount based upon usage found in the Pilot program.

BACKGROUND

Delivery of highway construction projects by the Wisconsin Department of Transportation (WisDOT) involves a construction team that includes the contract administration personnel (WisDOT internal staff or consulting engineers) and the contractor. Typically the construction team does not include the project designer; nor does the construction team have ready access to the project designer for assistance in answering questions concerning plan clarifications or decision making regarding design changes needed in the field. This can lead to delays in decision making while the construction team researches the rationale for the design or field changes potentially being made without an understanding of the design intent. The degree to which this situation was causing issues on construction projects came to light in a breakout session of the 2008 WTBA-WisDOT Contractor Engineer Conference. During that breakout session, road-building contractors made it known that they felt there was a noticeable difference between construction projects that were administered by WisDOT staff and those administered by consultant engineering firms. Specifically, they felt that decisions were being made faster on WisDOT administered projects, and there were delays in getting decisions on consultant administered projects and those delays were impacting projects.

In response to the issues raised at the conference, the Wisconsin Transportation Builders Association (WTBA), American Council of Engineering Companies (ACEC) of Wisconsin and WisDOT formed a joint Transparency Workgroup to determine what could be done to improve communication between WisDOT, the design consultant, the consultant project manager and the contractor on consultant managed projects. The Workgroup concluded that improving communications on construction projects could reduce potential delays to contractors; furthermore, and that the construction contract manager having access to the project designer during construction was critical in terms of understanding the intent of plans and addressing contractor questions. The Workgroup developed an action plan for improving communication that involved giving access to the consultant designer so that consultant contract managers could make timely project decisions.

The Workgroup concluded that consultant design firm responses would be timelier if a mechanism was in place so that they could be compensated for the time they spent providing consulting services to the consultant construction manager. If the consultant design firm responded as quickly on a consultant administered construction project as a WisDOT administered one, there should be no difference in the time it took to resolve issues and make decisions and the two processes should be the same. The Workgroup recommended that a statewide pilot program be initiated for the 2008-2009 construction season. (1)

WisDOT's Consultant Management Office initiated the Transparency Effort pilot program as recommended by the Transparency Workgroup to test the concept of contracting with the design consultant to compensate them for their consulting efforts regarding plan questions during construction. The Transparency Workgroup's action plan also called for the pilot effort to be evaluated. In November, 2009, WisDOT requested that the Construction and Materials Support Center (CMSC) at the University of Wisconsin-Madison conduct an evaluation of the pilot program and make recommendations regarding future use of the technique, and if program modifications should be made to improve the effectiveness of the program. Conclusions and

recommendations were to be based upon opinions and experiences of project personnel involved with the pilot projects.

TRANSPARENCY EFFORT PILOT PROGRAM DESIGN

In early 2009, WisDOT's Consultant Management Office initiated the Transparency Effort, as suggested by the Transparency Workgroup. The Transparency Workgroup's action plan recommended the following:

1. Initiate a statewide pilot project for the 2008-2009 construction season that will require the consultant designer be contracted to provide consultation services to the construction project engineer regarding plan questions during the construction project.
2. Render the designer consultant services either through a direct contract between the designer and WisDOT or through a contract between the construction services consultant with the design consultant as a subconsultant.
3. Establish the following contract limits for the consultant design engineer's services during the construction project.

| Construction Project Let Cost | Consultant Designer Contract Amount |
|--|--|
| Less than \$1 million | \$2,500 |
| \$1 million to \$5 million | \$5,000 |
| Over \$5 million | \$10,000 |

4. Implement a Request for Information (RFI) worksheet and log for the 2008-2009 construction season to assist in facilitating and tracking the consultant designer's involvement.
5. Implement a standardized scope of services for this pilot project.

The Consultant Management Office followed the action plan when establishing the Transparency effort and included some additional requirements regarding projects included in the pilot program. Those included that there should be:

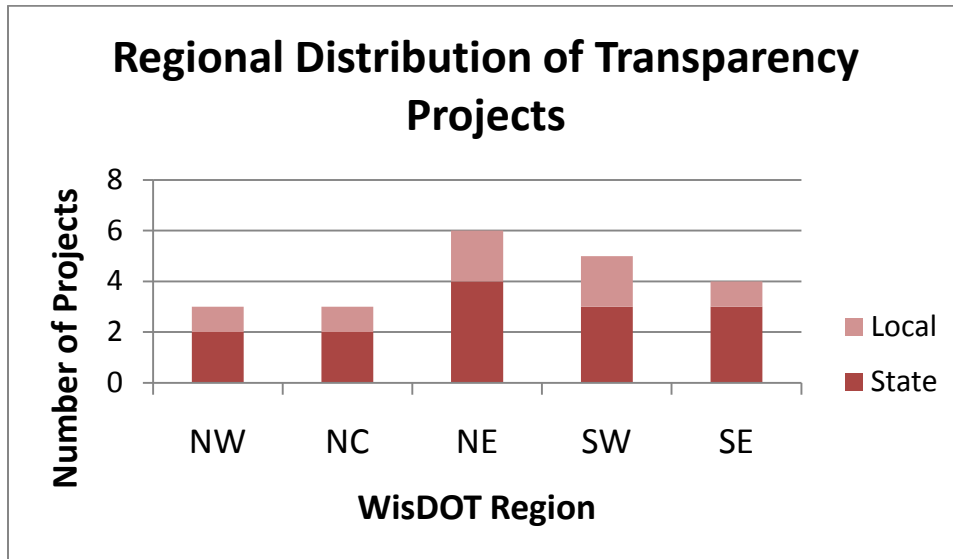
- A mix of bridge and roadway type projects
- A variety of project sizes (large complex, medium and small)
- 2 to 3 state system projects and 2 to 3 local projects from each Region
- Projects that are designed by the consultant and administered by the construction consultant administered
- A consultant design firm retained using a variety of contract methods

The five WisDOT Regions were then polled as to projects would be candidates for inclusion in the program and would be constructed during the 2008-2009 construction season. Once the Regions identified potential projects, the Consultant Management Office then selected 21 construction projects to be included in the pilot program. The projects are listed in Table 1 and the distribution by Region as shown in Figure 1.

Table 1: Projects Identified as Transparency Projects

| Project # | Project ID | Region | County | Highway # | Limits | State/Local |
|-----------|------------|--------|------------|-------------|---|-------------|
| 1 | 9195-07-70 | NC | Vilas | STH 17 | Phelps-CTH A, St. Louis Rd-CTH A | State |
| 2 | 4322-08-71 | NE | Manitowoc | STH 67 | STH 32/57-CTH AA | State |
| 3 | 4065-12-71 | NE | Winnebago | STH 114 | Tayco Street-Racine Street | State |
| 4 | 1120-11-72 | NE | Winnebago | USH 41 | Fountain/Snell overpass | State |
| 5 | 1120-11-73 | NE | Winnebago | USH 41 | USH 45 Furneau, Snell, Stillman | State |
| 6 | 1066-02-72 | SW | Dane | IH 94 | Badger Interchange - Koshkonong Creek | State |
| 7 | 1390-04-75 | SW | Jefferson | STH 26 | High Road-CTH T | State |
| 8 | 6145-00-75 | SW | Sauk | USH 12 | Dell Creek Bridge & Apps | State |
| 9 | 2475-08-70 | SE | Washington | STH 145 | Bridge over USH 41 | State |
| 10 | 2140-00-70 | SE | Ozaukee | STH 181 | Mequon Rd-Pioneer Rd | State |
| 11 | 1330-14-70 | SE | Washington | Union St | Main St-Wilson Ave | State |
| 12 | 9455-03-70 | NC | Oneida | CTH J | CTH E-STH 70 | Local |
| 13 | 4538-01-71 | NE | Brown | CTH KB | Bohemia Dr-CTH R | Local |
| 14 | 5033-00-70 | SW | Dane | CTH N | Yahara River Bridge & Apps | Local |
| 15 | 5233-00-71 | SW | Lafayette | CTH H | Fever River Bridge & Apps | Local |
| 16 | 8750-00-70 | NW | Douglas | CTH A | Business 53-1200' N of Long Lake Rd | Local |
| 17 | 1620-01-75 | NC | Marathon | STH 13 | Division St, City of Colby, S Jct. CTH N-Wausau St. | State |
| 18 | 1023-02-65 | NW | Jackson | IH 94 | Black River Falls-Tomah Rd | State |
| 19 | 7650-01-61 | NW | Pierce | STH 29 | Prescott-River Falls Rd, USH 10-Cemetery Rd | State |
| 20 | 4985-00-41 | NE | Brown | Lawrence Dr | Scheuring Rd-Main Ave | Local |
| 21 | 3230-07-70 | SE | Kenosha | 75th St | 38th Ave-7th Ave | Local |

Figure 1: Regional Distribution of Transparency Effort Pilot Projects



STUDY SCOPE AND EVALUATION METHODOLOGY

The scope of this study was to do a qualitative evaluation of the Transparency Effort pilot program conducted by WisDOT during the 2009 construction season and make recommendations regarding future use of the technique, as well as determine if program modifications should be made to improve the effectiveness of the program. Conclusions and recommendations were to be based upon opinions and experiences of personnel involved with the pilot projects. In addition, the study was intended to explore the potential of developing metrics to measure and evaluate the cost effectiveness of the program.

The study methodology included developing a database identifying the pilot projects, key project personnel (consultant construction project leader, design consultant task leader, prime contractor superintendent, WisDOT project manager, etc.), and the contractual method used to retain the design firm. Effectiveness of the program was to be based upon the opinions of those involved with the program. Study results were felt to be more reliable if they were based upon several different sources of information. Accordingly, attempts were made to survey every member of the Transparency Workgroup, all WisDOT Project Managers, all consultant construction Project Leaders, and representatives from the prime contractors and design consultant firms or teams. A structured interview process was utilized where interviewees were asked the same questions but allowed to digress as desired, with clarifying or follow-up questions asked by the interviewer. Surveys were administered through a combination of telephone interviews, where responses were written down by the interviewer, and e-mails where participants provided written responses to the survey questions.

ANALYSIS RESULTS

Results of the evaluation study are organized and presented based upon the functional responsibility and role of the participants in the projects. Surveys and interviews were conducted with 57 individuals during the course of the study and the results are summarized in each section. Individual survey and interview responses are not included in the report for brevity, but are available at the CMSC offices. The survey questions are shown in Appendix B. First, however, an overall analysis was done of the projects actually included in the pilot program. This analysis is presented below.

Pilot Program Projects Overview

WisDOT's Consultant Management Office originally identified 21 projects to be included in the pilot effort. During the evaluation study it came to light that, on three of the projects, the Region never executed a contract with the design firms and thus were not actually part of the pilot program. In another instance, repeated attempts were made to contact both the design firm and the consultant construction services firm and there was no response from either firm. It was assumed that no contract had been executed with the design firm and that this project was not part of the pilot either. In addition, one local program project was designed by the local unit of government and not by a consultant design firm. Thus it could not be involved in the pilot program (i.e. a Transparency type contract could not be entered into with the local unit of government) and the final number of projects actually in the program was reduced to 16. A list of those projects is provided in Table 2.

Table 2: Projects That Make Up the Transparency Pilot Program

| Project # | Project ID | Region | County | Highway # | Limits | State/Local |
|-----------|------------|--------|------------|-----------|---------------------------------------|-------------|
| 1 | 9195-07-70 | NC | Vilas | STH 17 | Phelps-CTH A, St. Louis Rd-CTH A | State |
| 2 | 4322-08-71 | NE | Manitowoc | STH 67 | STH 32/57-CTH AA | State |
| 3 | 4065-12-71 | NE | Winnebago | STH 114 | Tayco Street-Racine Street | State |
| 4 | 1120-11-72 | NE | Winnebago | USH 41 | Fountain/Snell overpass | State |
| 5 | 1120-11-73 | NE | Winnebago | USH 41 | USH 45 Furneau, Snell, Stillman | State |
| 6 | 1066-02-72 | SW | Dane | IH 94 | Badger Interchange - Koshkonong Creek | State |
| 7 | 1390-04-75 | SW | Jefferson | STH 26 | High Road-CTH T | State |
| 8 | 6145-00-75 | SW | Sauk | USH 12 | Dell Creek Bridge & Apps | State |
| 9 | 2475-08-70 | SE | Washington | STH 145 | Bridge over USH 41 | State |
| 10 | 2140-00-70 | SE | Ozaukee | STH 181 | Mequon Rd-Pioneer Rd | State |
| 11 | 1330-14-70 | SE | Washington | Union St | Main St-Wilson Ave | State |
| 12 | 9455-03-70 | NC | Oneida | CTH J | CTH E-STH 70 | Local |
| 13 | 4538-01-71 | NE | Brown | CTH KB | Bohemia Dr-CTH R | Local |
| 14 | 5033-00-70 | SW | Dane | CTH N | Yahara River Bridge & Apps | Local |
| 15 | 5233-00-71 | SW | Lafayette | CTH H | Fever River Bridge & Apps | Local |
| 16 | 8750-00-70 | NW | Douglas | CTH A | Business 53-1200' N of Long Lake Rd | Local |

The distribution of state and local projects across the Regions involved in the pilot program is shown in Figure 2. The goal of having 2 to 3 state and 2 to 3 local projects in each Region was not achieved, nor was the goal of having a mix of projects in each Region. However, there was at least one project in each Region and a reasonable mix of state and local projects statewide. There was also a good distribution of project size, based upon construction award amounts, as shown in Figure 3. No data was available as to whether the projects provided a good mix of bridge and roadway projects. There were 13 different design firms, 15 consultant project management firms, and 12 different prime contractors involved in the 2009 Transparency Effort. WisDOT used in-house staff for construction project management on one project. A list of all firms involved in the Transparency Effort by project is provided in Appendix A.

Figure 2: Regional Distribution of Projects That Make Up the Transparency Pilot Program

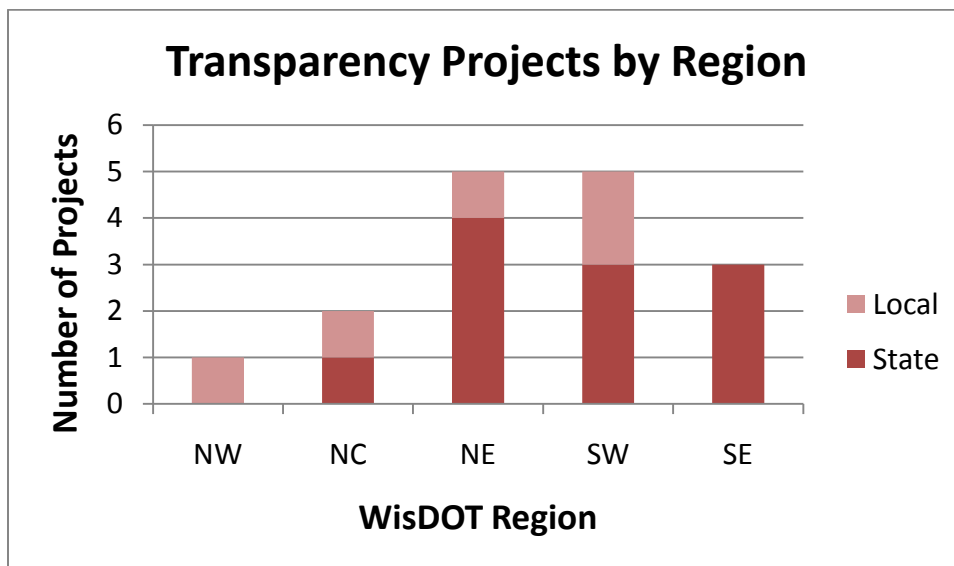
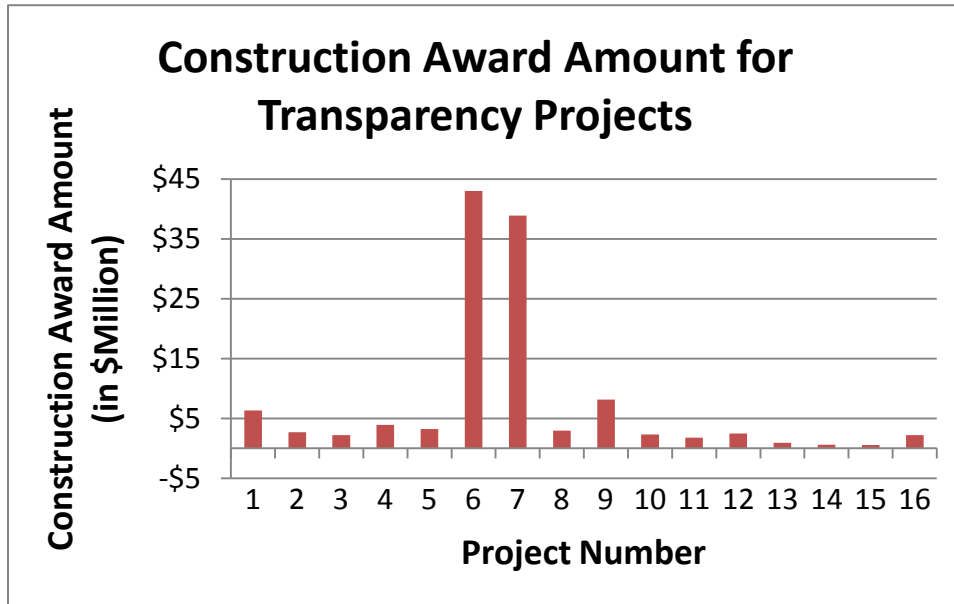


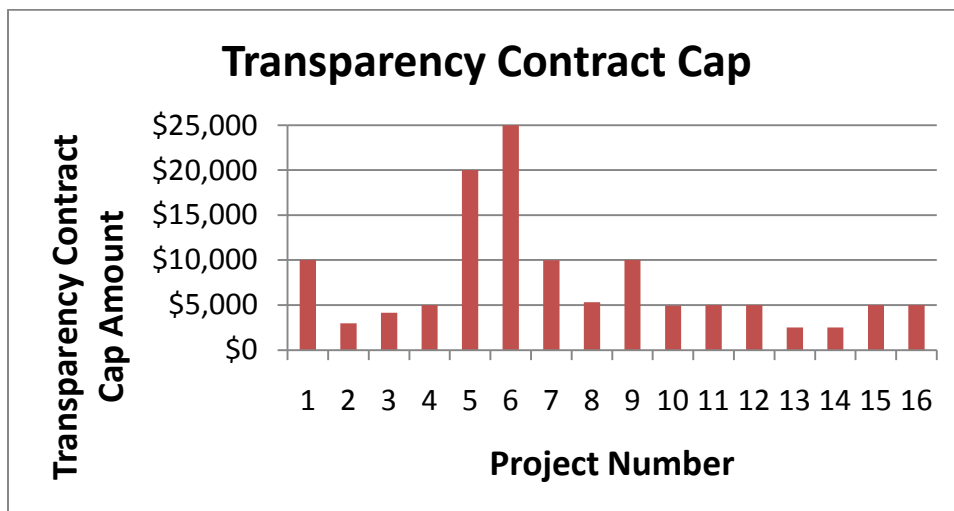
Figure 3: Construction Award Amounts for Transparency Pilot Projects



The total value of the awarded construction contracts for the 16 projects was \$122,236,831.

As recommended by the Transparency Workgroup, contract limits for the consultant design engineers' services during construction were capped based upon the construction contract amount. The capped amount for each project is shown in Figure 4.

Figure 4: Dollar Caps for Transparency Contracts

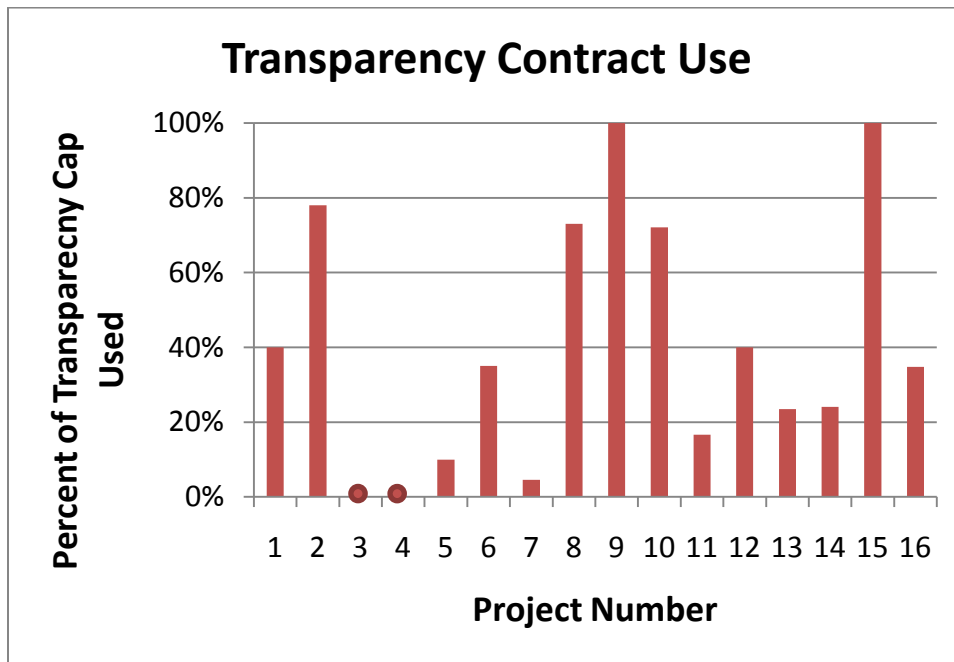


The total amount of design contract available for the 16 pilot projects was \$122,387.42. If all the Transparency Effort projects had spent the maximum design amount available to them it would

have represented 0.10% of the total construction let costs. The project construction let amount and the Transparency design capped amount are also provided in Appendix A.

Overall, the total amount spent for design services during the Transparency Effort was \$53,689.89 or 43.9% of total Transparency contract cap amount and 0.04% of the total contract let amount. The amount spent by each project is shown as a percent of the capped amount in Figure 5.

Figure 5: Percent Use of Transparency Contracts



Two of the projects spent the maximum amount available and two did not utilize the transparency contracts at all. The rest varied between 5% and 78%. This seems to indicate that the availability of the design consultant to the construction Project Leader was not overly used and that the capped amounts were reasonable. Note, Project 6 originally was assigned a Transparency contract cap amount of \$15,000 but the contract was amended to increase this to a maximum of \$25,000 once the original contract amount was reached.

All of the pilot program projects were to utilize a Request for Information (RFI) submittal form and submittal log to assist in tracking the consultant designers' involvement. Of the 16 projects, 11 actually did use a RFI process. In some instances the contractor prepared the RFI and in others the consultant project leader prepared the written RFI based upon the contractors questions.

Transparency Workgroup Members

All six members of the Transparency Workgroup were surveyed by telephone interview. The surveys focused on program background, goals for the effort, and measures of success. The responses to questions concerning the history and creation of the program were incorporated into the Background section of this report. All respondents indicated that there were no formal goals or measures of success identified for the Transparency Effort. However, individually they did provide what they felt were goals of the program and what they considered as a success. Those are summarized as follows:

Program Goals:

- Have consultant administered construction projects be perceived by contractors to be the same as DOT managed projects.
- Resolve field design questions and problems quicker resulting in faster decision making during construction.
- Foster communication between the designer and on-site engineers so that information about the intent of the design can be shared quickly.
- Create a tool to make construction projects more efficiently run.
- Develop a mechanism to compensate designers so they are not forced to choose between working on billable and non-billable projects and will have an incentive to provide responses to contractor questions timely.
- Identify the best method for contracting with design firms for consulting on construction projects.
- Develop a program that has minimal cost and does not add substantially to the construction delivery costs.
- Address consultant industry concerns regarding responsibility and liability when decisions are made by the consultant construction contract manager and did not involve the consultant designer.

As stated before, there were no established goals for the transparency effort, but the first three in the above list were articulated by all of the Transparency Workgroup members and can be taken to be the primary goals of the program.

Measures of success:

- Construction Project Leaders respond positively to the communications improvements.
- Construction Project Leaders indicate decision making was faster compared to projects they have been involved with in previous years.
- There was an efficiency gain in construction project management.
- The designer was contacted with questions and timely answers were provided.
- The contractors feel there has been an improvement.
- Having the designer under contract makes the consultant construction Project Leader more willing to ask the designer questions.

There was no consistently mentioned measure of success among the Transparency Workgroup members, but those that were mentioned were used as a guide in conducting this evaluation and drawing conclusions.

Contractors

All of the contractors of the originally identified 21 potential pilot projects were contacted and surveyed. The interviews were conducted before it became known that not all 21 of the identified potential projects were actually in the pilot program. Survey results presented here are based solely on the responses from the 16 pilot projects. In all cases, survey respondents were the contractor's representative on the project and were actively involved in prosecution of the work and management of the project.

In only 3 of the 16 projects was the contractor even aware that the project was part of the transparency effort. In those cases, the contractor was notified as part of the preconstruction meeting. This finding is not particularly unusual, since the goal of the transparency effort was to provide the consultant construction project leader access to the designer so that field decisions could be made in a timely manner. As a result, there was no specific reason that the contractor would need to be involved or to know.

Written RFI's were required to be submitted by the contractor on 7 of the projects. There were no specific questions asked about the use of RFI's, but some of the respondents volunteered opinions about the process. Those ranged from liking it because it provided documentation and of paper trail of decisions, to those that disliked it because of all the paperwork. One contractor cited the amount of increased work due to the need for submitting numerous RFI's on seemingly simple questions.

When asked if they received timely responses to their questions, on 14 of the projects the contractors did feel they received timely answers to their questions and felt there was no impact on the project due to delays in receiving needed decisions. On two of the projects there were delays in getting decisions that impacted the project. One project suffered schedule impacts due to delays in getting answers and on the other there were cost impacts for rework. RFI's submittals from the contractor were required on the project where schedule delays resulted but not used on the other project.

Contractors were asked if they felt the Transparency Effort should continue in the future and 9 of the contractors responded yes that it should. Of those that responded yes, 3 qualified it by saying it is particularly needed on complex projects or where new concepts are being tried. One contractor responded that the program should not be continued because answers on their project were provided timely and there was no need to have them expedited with a special program like the Transparency Effort. Contractors on 5 of the projects responded that continued use of the transparency program depended on the project. They were in favor of continuing the program for complex and difficult projects but not for simple, straight-forward projects.

Design Consultants

All 16 of the pilot project consultant design firms were interviewed. The design firms were contracted for their consultation services, through either a direct contract between the designer and WisDOT or through a contract between the construction services consultant with the design consultant as a subcontractor. Table 5 provides a breakdown of each contract type used.

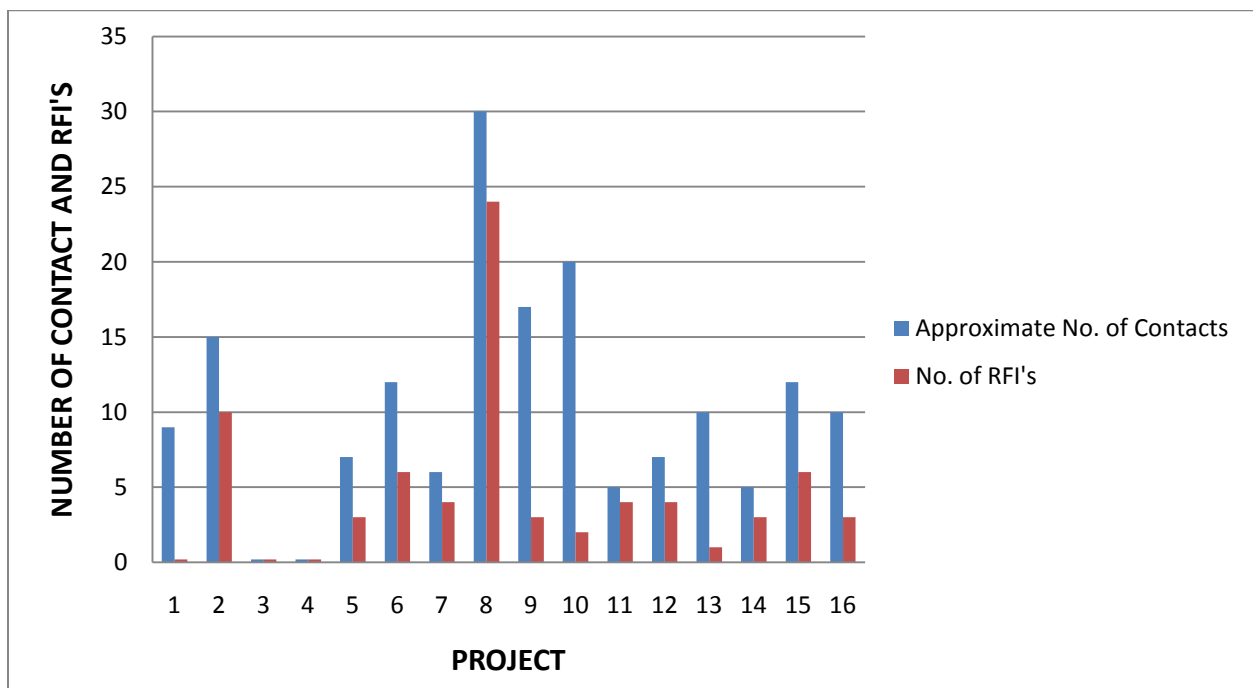
Table 5: Contract Types Used To Retain Design Firms

| Contract Type | Number of Contracts |
|---|---------------------|
| 2-Party | 4 |
| Work Order to Preexisting Master Contract | 5 |
| Subcontract to Construction Consultant | 7 |

When asked what contracting method the design firm would prefer be used in the future, there was no clear preference. Most responded that the method used on their project worked fine. One firm did comment that they thought an amendment to the existing design contract would be another possible method.

On two of the projects, the design firm was not contacted by the construction services consultant at all. On the remaining 14 projects, there were more contacts and questions asked than RFI's submitted. Presumably the design firms responded to the non-RFI questions with no compensation, since the Transparency Effort was to utilize RFI's to document the design consultants' work. However, this was not asked in the interviews and not verified. The number of contacts made and number of actual RFI's generated for each project is shown in Figure 5.

Figure 5: Number of Design Firm Contacts and RFI's



When asked how long it took to respond to an RFI, the majority of the firms said they were able to respond to the question on the same day the RFI was submitted, generally within a couple of hours.

The types of questions asked of the design firm (either from a contact question or an RFI) from the construction consultant Project Leader are shown in Table 6, with “design clarifications” and “redesign due to field changes” by far the most common reasons for contacting the designer. Note: Table 6 identifies the number of projects where that category of question was asked, but does not represent the number of times the question may have been asked.

Table 6: Types of Questions Asked of the Consultant Design Firms

| Type of Questions Submitted | Number of Projects |
|---|--------------------|
| Design clarifications | 12 |
| Redesign due to field conditions | 10 |
| Redesign due to change in scope | 2 |
| Redesign due to constructability issues | 2 |
| Information on plan quantities | 1 |

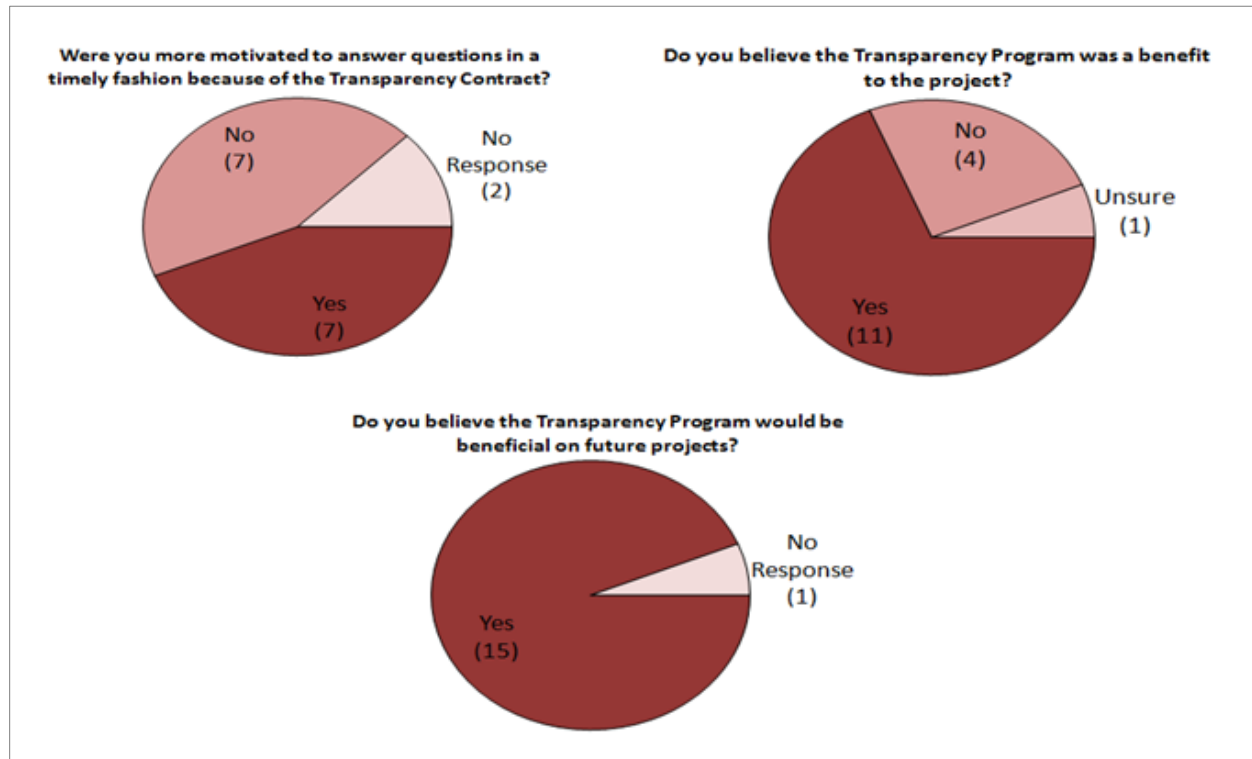
When asked if they, as designers, felt they were being asked questions that could have been answered by the field construction staff, the majority responded “no”. Several did note that there seemed to be more clarification type questions being asked on the pilot projects, however, which they felt was good because it gave construction staff a better understanding of the project. On 3 of the projects, the designers felt that they were getting questions that could have been answered by the construction management staff.

All of the design firms that got questions from the field stated they would have handled the questions directed to them anyway, regardless if the project was in the transparency effort or not. Though a few clarified that that was true for the design clarification type questions and it may not have been the case for redesign type requests.

There was an even split as to whether the designers felt they were more motivated to answer questions in a timely fashion because of being compensated through the transparency contracts. Of the firms that got questions from the field, 7 said they were more motivated to answer faster due to the compensation and 7 said they were not.

The majority of the designers felt the transparency effort contracts did provide a benefit to the project and that it would be a benefit to future projects if the program was continued.

Figure 6: Responses from Consultant Design Firms

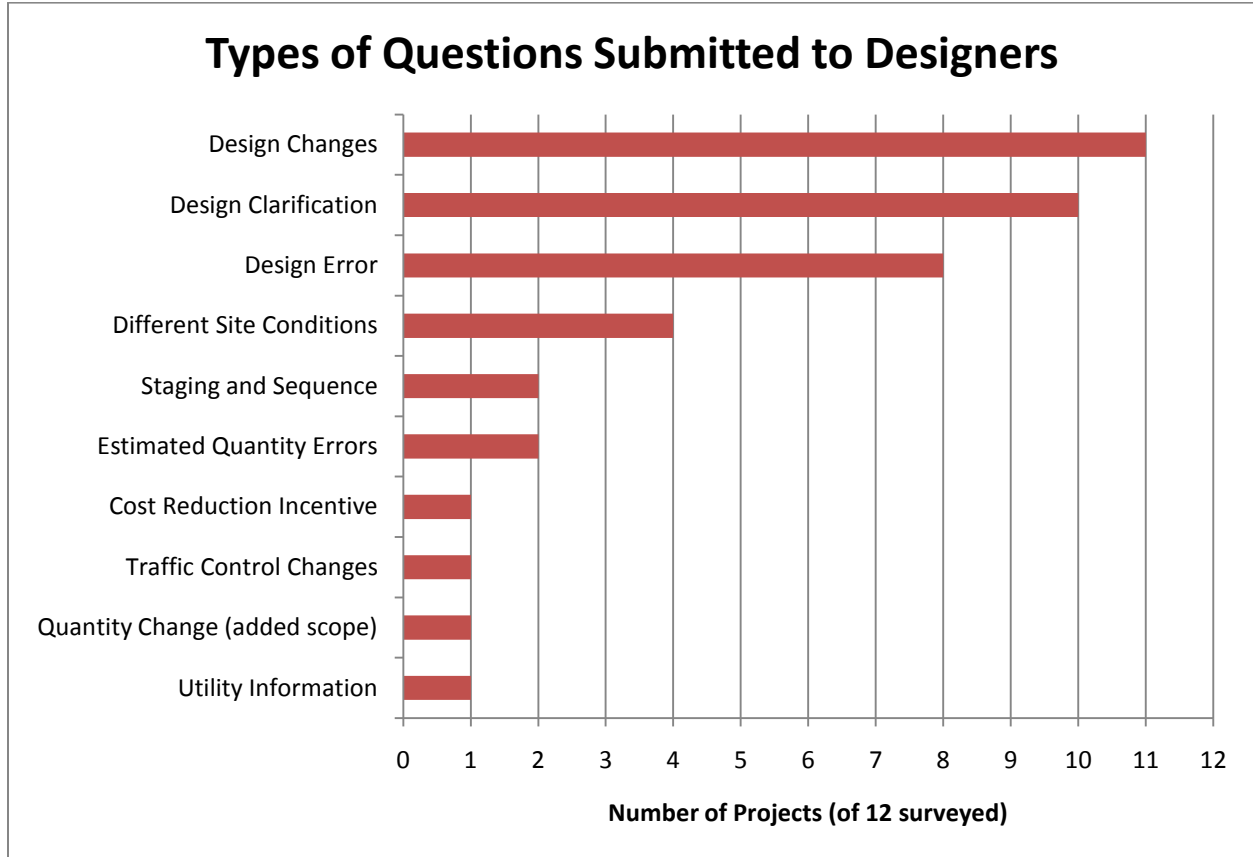


Consultant Construction Project Leaders

Only 12 of the 16 Construction Project Leaders responded to the study survey regarding their experiences having a project in the transparency pilot program. Those that responded had a large amount of project management experience, with individuals having from 8 to 22 years experience doing this type work, with the average for the group being 14.4 years. The amount of experience of being a project leader was asked to see if more experienced personnel had less need for and might make less use of the transparency contracts, however, no such correlation was found. When asked if they, as project leaders, were more likely to seek input from the designer because the transparency contracts existed, 5 responded "yes" while 7 said "no" it was not a factor. Those that responded "no" said they would have contacted the designer and asked the questions they did regardless.

The Project Leaders were asked to categorize the types of questions they submitted to the designers. Those are summarized in Figure 7.

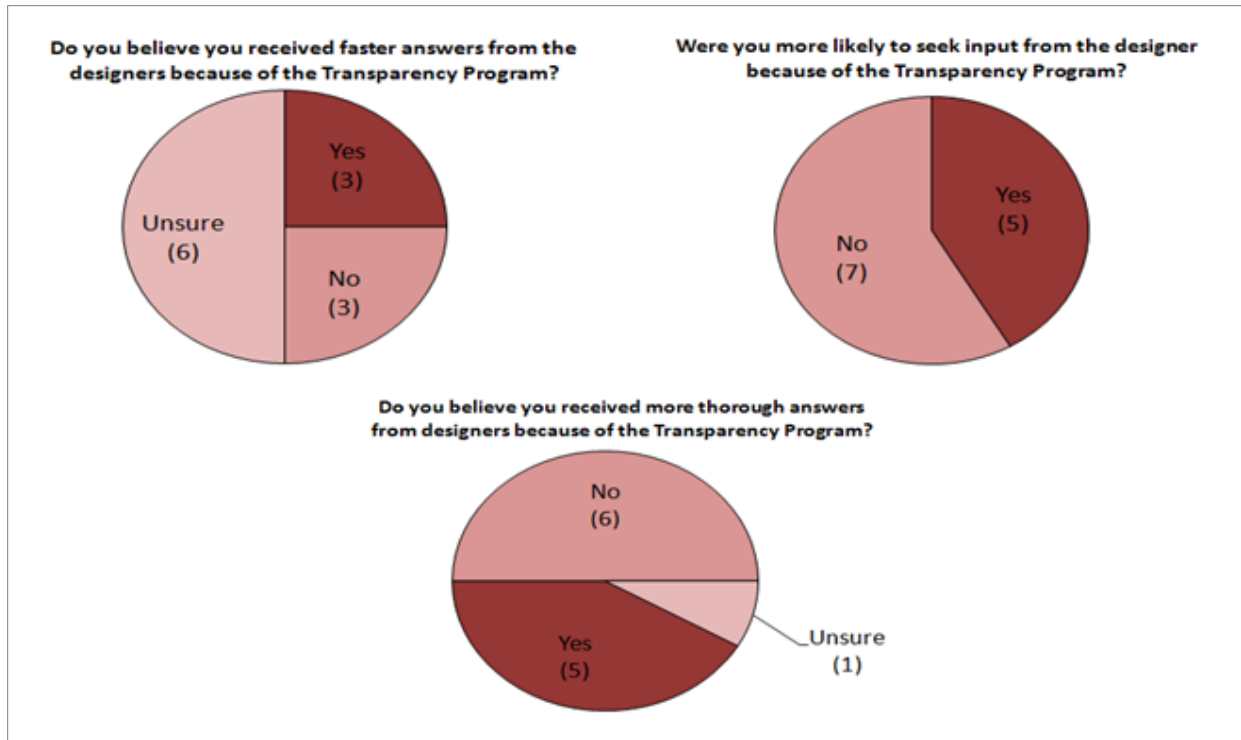
Figure 7: Types of Questions Submitted to Designers



Design change and design clarification questions were most commonly asked, which is similar to what the consultant design firms said as well. However, it is interesting to note that the construction project leaders felt they had to ask questions due to design errors on 8 of the projects. The designers were not asked if they felt design errors were the basis of the questions from the field, so there is no way to verify if there were actually errors or just a perception by field staff.

When asked if they, as project leaders, were more likely to seek input from the designer because of transparency program, results were mixed. About half of the respondents indicated that they were more likely to contact the designer, while slightly more than half said they would have contacted the designer with their questions regardless of the project being in the program. The majority of the consultant project leaders felt that they did not get answers faster from the designer because of the program and they were evenly split as to whether they felt they got more thorough answers because the designer was being compensated for their services. Figure 8a summarizes the responses to these questions.

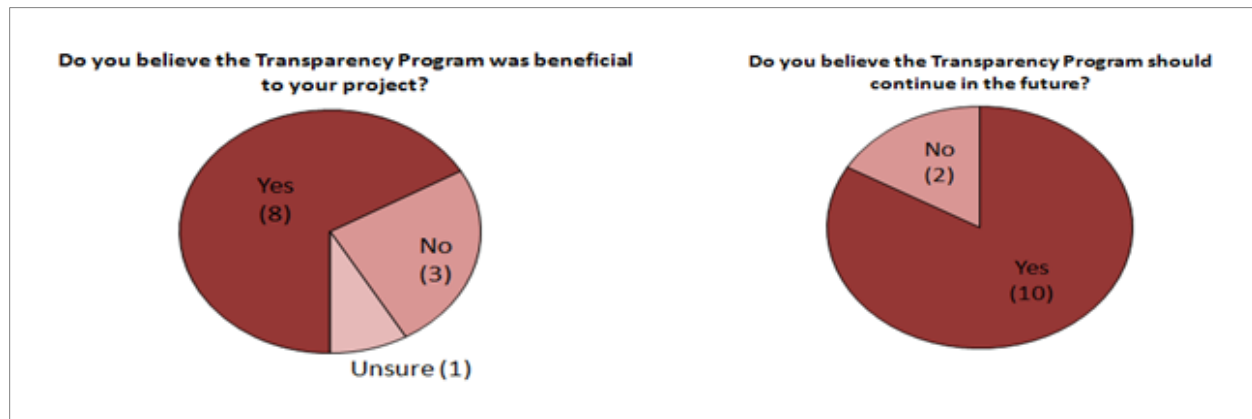
Figure 8a: Consultant Project Leader Survey Responses



The overwhelming majority of the consultant construction project leaders said they had no concerns about having the design consultant as a subconsultant on their construction services contract as part of the transparency program. Only one respondent stated that they had a concern with this contractual arrangement. The concern dealt with risk and liability should something happen as a result of changes made to the design during construction. With both the consultant construction services firm and the design firm operating under the same contract, there could be legal complications and questions regarding assigning responsibility. This respondent felt strongly that the two firms should have separate contracts with WisDOT.

Most of the consultant project leaders felt that the transparency program was beneficial to their project and the majority felt the transparency effort should continue in the future. The results to these questions are shown in Figure 8b. Those that answered that the program should continue in the future, but felt it did not help their particular project, seemed to feel that their projects were not complicated enough to warrant use of the program. The majority of consultant services firms stated that they felt that, in the future, the transparency effort should be reserved for only the more difficult and complex projects.

Figure 8b: Consultant Project Leader Survey Responses (cont.)



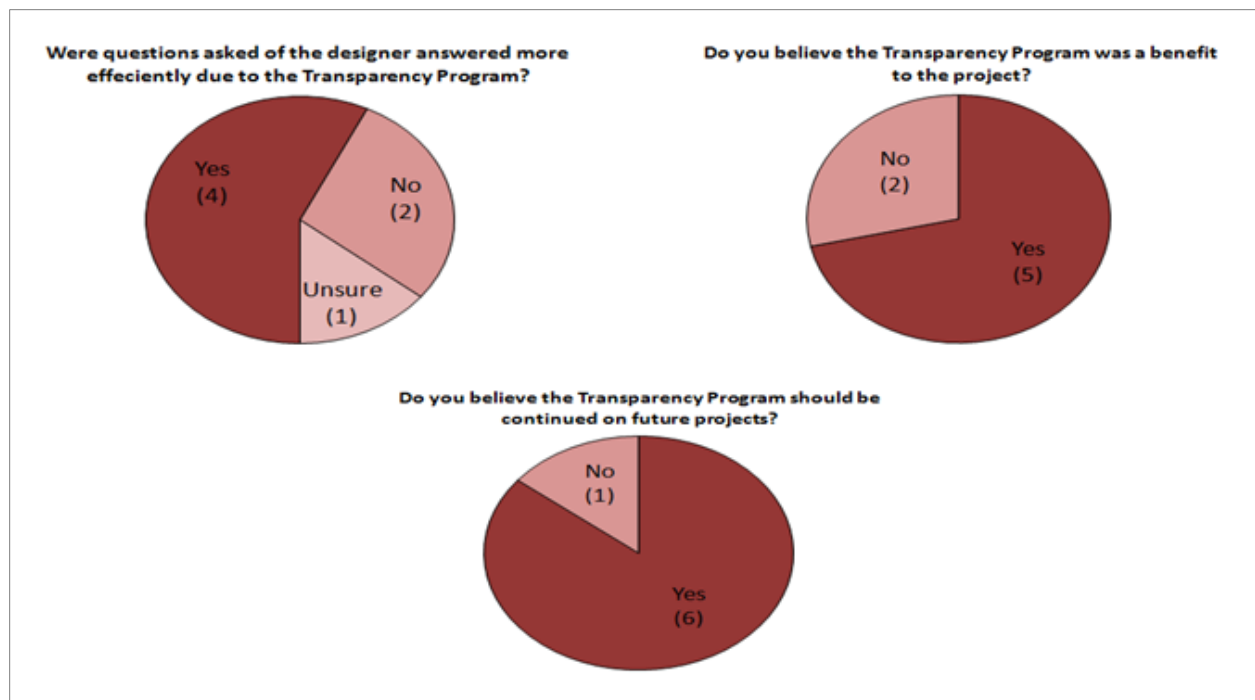
WisDOT Project Managers

All of the WisDOT Project Managers that had projects involved in the Transparency Effort were contacted as part of this study. Only 7 of the 13 (3 Project Managers had two Transparency projects) responded to requests for interviews and results of those interviews are summarized below.

Generally transparency contracts for the consultant design firms were in place prior to the contractor starting construction work. Three of the Project Managers stated that the contracts were developed prior to the construction letting, three had them developed after the letting but before the contractor started work, and one was developed after the contractor started work.

Generally the Project Managers felt that questions asked of the designer were answered more efficiently due to the transparency effort and the majority felt the transparency effort was a benefit to the project. The majority also felt that the transparency program should be continued in the future. Project Manager's responses are summarized in Figure 9.

Figure 9: WisDOT Project Manager Survey Responses



OBSERVATIONS AND CONCLUSIONS

Based upon the results of the surveys and interviews of contractors, consultant designers, consultant construction project leaders, and WisDOT Project Managers on projects that were involved in the Transparency Pilot program, and the Transparency Workgroup members, several observations and conclusions can be drawn.

1. The Transparency Effort pilot program was a success. Though not as many projects were included in the initial effort as first envisioned, there was representation from all the Regions, a mix of WisDOT and local projects, and a variety of contractual methods tried for engaging the design consultants. There were a sufficient number of projects, design firms, consultant construction services firms and contractors involved to draw conclusions about the program and make recommendations regarding future implementation.
2. Communications between the consultant project leaders and the consultant design firms seems to be improved on the projects in the Transparency program. There was some evidence that design firms were more motivated to answer questions from the field in a more timely fashion due to the transparency contracts and a feeling by the consultant project leaders that they did get faster answers. The consultant design firms also seemed to think they were getting more plan clarification type questions than normal on the

Transparency program projects, and many of the consultant project leaders stated they were more motivated to ask questions of the design firm because of the Transparency program. However, the consultant project leaders said they would have forwarded their critical questions to the designer regardless of the Transparency program, and the design consultants stated they would have answered the questions even without the Transparency program.

3. Not all questions submitted to the design firms were in the form of a Request for Information (RFI), but critical questions were. Use of an RFI to document all substantive questions, when they were submitted, the response, and the time of the response should continue. However, questions asked of the designer by the construction Project Leader with an RFI should be distinguished from questions asked by the contractor to the construction Project Leader with a RFI. For that reason, we feel that questions being submitted to the design firm should be on a comparable, but different form, called a Design Information Request (DIR). A similar form and process has been used successfully on several large projects in WisDOT's Southeast Region and we think the Transparency program would benefit from using that process. The CMSC Study Team has modified the current WisDOT form and provided a suggested DIR form for use in future Transparency efforts in Appendix C.
4. Costs for the Transparency effort were reasonable and there was no evidence that the contracts were abused. Total amount spent on the Transparency contracts equated to 0.04% of the total construction let amount. Most of the projects did not use the full contract amount available to them, but this may have been due to the feeling that many of the projects in the pilot program were rather straight-forward. A few of the participants in the pilot effort expressed concern that use of Transparency type contracts for designers to consult on construction projects would lead to them being compensated for redoing poor quality work or for doing work that should have been included in the original design contract. Others questioned the appropriateness of inquiries, feeling that field staff should only be asking the design team questions when design expertise would be advantageous in solving the problem more quickly, and that a Transparency contract should not relieve the consultant Project Leaders of their duty to respond to construction related questions most appropriately handled in the field.

While we found no evidence of either of these situations in the pilot projects, we think that a process should be established where the WisDOT Project Manager reviews all DIR's that were submitted to the design firms. This review should be after the fact and not part of the submittal/answer process so as not to delay answers getting to the field. By reviewing the DIR's submitted by the consultant construction Project Leader, WisDOT can monitor the types of questions being asked to determine if they were appropriate or if the time spent on answering the questions by the design firm qualified for additional compensation under the Transparency contract. The types of questions that seem to warrant additional compensation include redesign efforts for changed conditions or changes in scope, evaluation of Cost Reduction Incentive proposals, alternative designs to facilitate construction and attending project Progress Meetings. Routine, straight-forward plan clarification type questions are important, but seem to be generally

handled in a timely fashion and are felt to be within the scope of the original design contract. WisDOT does not compensate for additional costs due to changes necessitated by errors and omission in the drawings and specifications. Having DIR's reviewed by a Project Managers would provide another set of eyes to assist in identifying those situations and whether the design consultant failed to meet the standard of care required in the contract. Additional guidance in the Construction and Materials (C&M) Manual should be developed to assist consultant construction Project Leaders in identifying which type questions are appropriate to ask the designer and which are the responsibility of the field staff to figure out. Similar guidance could also assist consultant design firms in identifying which issues are appropriate to charge to the Transparency contracts and which ones are not.

5. The Transparency contracts for engaging the design firms were capped at amounts generally following the guidelines recommended by the Transparency Workgroup based upon the construction projects let cost. Only two of the projects spent the maximum contract amount, and overall only 43.9% of the total cap amount was spent. It is recommended that the originally proposed cap amounts continue to be used as a guideline for establishing future contract amounts. Project teams, however, should have the discretion to increase this amount if they feel their project has unique circumstances that may warrant more involvement by the designer. Also, to insure that the Transparency contracts are in place in sufficient time for construction, it is suggested that the PS&E estimate be used in setting the Transparency contract amounts. WisDOT should continue to monitor contract usage over time to see if these cap guidelines should be modified.
6. The timing of the Transparency contract is important. Most questions from field staff are discovered during review of the plans and contract documents in preparation for the start of construction. It is important that the Transparency contract be in place to ensure that the design consultant is available to address design related questions during the preconstruction review phase of the project.
7. All of the contracting methods used for retaining the design consultant firms for providing consulting services to the construction staff and consultant construction Project Leader (Transparency contracts) seemed to have worked fine. There was no preference expressed for one method over another. However, it appears there could be the potential for problems in assigning responsibility and liability should something occur during construction when the design consultant is a subconsultant to the construction services consultant. For that reason, we suggest the department contract directly with the design consultant firms through either two-party contracts or work orders to master agreements until the contractual risks are better understood.
8. There is consensus that the Transparency Effort benefited the projects in the pilot program, though the amount of benefit appears to have varied within the projects selected for the program. Many of the contractors and consultant Project Leaders felt their projects were straight-forward and there were not a lot of complexities that required extensive input from the designers. The Transparency program would benefit from a more rigorous analysis and review of projects to determine which projects would most

benefit from utilizing Transparency type contracts in the future. The research team suggests that a process similar to the one outlined in Appendix D could be utilized by the Regions to perform this analysis.

9. The Transparency Effort was established to improve communication on construction projects and provide access to the consultant designer by the consultant construction project leader. However, restricting the effort to one-way transfer of knowledge sharing misses an opportunity within the program. Along with being available to answer questions, designers should be encouraged to ask questions of the construction staff. Being involved during construction provides a designer to gain experience with the means and methods used to construct the designs they developed which can lead to improved designs in the future. Also, WisDOT should have all DIR's collected in a central location and reviewed for trends and reoccurring problem areas. These can then be shared with the design community at large to improve the overall design process.
10. There was widespread agreement by those involved with projects in the pilot effort that the Transparency Program should continue in the future and WisDOT should develop a strategy to implement the program. That strategy should include both a way to inform the construction community of its existence, benefits and intentions as well as a standardized process so that the Regions can efficiently put the contracts in place. The Facility Development Manual (FDM) seems a logical place to highlight the program. A process that has standardized contractual language would be of benefit as projects could potentially be identified late and an expedited contractual procedure would help.
11. The Transparency Program should be continued, but expansion should be done in a deliberate and premeditated fashion so as to build support and better document the costs and benefits. The next Transparency Effort should strive to involve from 7 to 10 of the most complex construction projects in each Region. That level of program represents approximately 10% of the projects built by the department in a year. Costs can be estimated to be from 0.05% to 0.1% of the total construction let amount based upon usage found in the Pilot program.
12. With this evaluation study we were able to draw conclusions about the Transparency Effort pilot program, but as part of the investigation we were able to identify some improvements that could be made should WisDOT undertake another trial effort of a new process or program. When a pilot program is launched, it is important that there be a clear understanding and statement of what is to be accomplished. Metrics should also be developed as the pilot program is created and the program should be standardized in a way that allows projects to be compared to one another and the benefits of the program to be measured.

RECOMMENDATIONS

Based upon the results of this study, the following recommendations are made:

- The Transparency Program should continue. Communications between the consultant project leaders and the consultant design firms seems to have been improved on the pilot projects and there is sufficient qualitative data that there is value in the program and that future construction projects would benefit from having design firms compensated for providing consulting services to construction project managers in the form of more thorough and quicker responses.
- The design consultant should be engaged by WisDOT through either a 2-Party direct contract or work order to a Master Agreement. The practice of retaining the design firm through a subcontract to the consultant construction services contract raises questions over assigning responsibility and liability should problems occur.
- Regions should be better informed of the Transparency Program's existence and benefits. Standardized contract language and scopes of work should be developed for the Facilities Development Manual (FDM) so that Regions can quickly and efficiently put contracts in place. Construction project personnel, including contractors, should be informed that the design firm is under contract to provide support to the field personnel and encouraged to use the program when needed.
- Projects that utilize a Transparency contract should be more selectively identified by the Region. Not all projects need such a contract and it should be reserved for the more complex projects. A suggested evaluation technique is provided in the report. Timing of the contract is important, as most of the questions from the field staff are discovered during review of the plans and contract documents in preparation for starting work. The Transparency contract should be in place well before the project Preconstruction Meeting to ensure that the designer is available to address design related questions.
- Transparency contracts should be capped based upon the PS& E estimate amount or construction let cost. The amounts suggested by the Transparency Workgroup are sufficient, but project teams should have the ability to exceed this amount based upon the complexities of their projects.
- Projects in the Transparency Program should use a Design Information Request (DIR) form to document questions going to the design firm so that there is no confusion with any RFIs that may come from the contractor to the construction Project Leader. A suggested draft form is provided in the report.
- Project Managers should subsequently review DIR forms after they have been answered to insure that the program is not abused and design consultants are not being compensated for answering questions that should be answered by the consultant Project

Leaders or been answered as part of the initial design contract. Also such a review would assist in determining if any errors and omission issues should be raised.

- The Transparency program should be continued, but expansion should be done in a deliberate and premeditated fashion so as to build support and better document the costs and benefits. For the 2011 construction season the Transparency Program should strive to involve from 7 to 10 of the most complex construction projects in each Region. That level of program represents approximately 10% of the projects built by the department in a year. Costs can be estimated to be from 0.05% to 0.1% of the total construction let amount based upon usage found in the Pilot program.

APPENDIX A

| Project Number | Design Firm | Transparency Cap Amount | Construction Contractor | Construction Award Amount | Construction Management Firm |
|-----------------------|---------------------------|--------------------------------|--|----------------------------------|---|
| 1 | OMNNI Associates | \$10,000.00 | Musson Bros., Inc. | \$6,330,465.85 | REI Construction, LLC |
| 2 | Mead & Hunt, Inc | \$2,990.00 | Vinton Construction Company | \$2,705,950.05 | WisDOT |
| 3 | Gremmer & Associates, Inc | \$4,162.11 | Vinton Construction Company | \$2,224,711.43 | KL Engineering, Inc |
| 4 | EMCS, Inc | \$5,000.00 | James Peterson Sons, Inc. | \$3,900,000.00 | CTE, Inc |
| 5 | CH2M Hill, Inc | \$20,000.00 | Integrity Grading and Excavating, Inc. | \$3,221,080.10 | Kapur & Associates, Inc |
| 6 | Ayres Associates | \$25,000.00 | Zignego Company, Inc. | \$43,000,000.00 | Bloom Companies, LLC |
| 7 | KL Engineering, Inc | \$9,973.00 | Ames Construction, Inc. | \$38,897,318.09 | CGC, Inc |
| 8 | Bloom Companies, LLC | \$5,316.00 | Edward Kraemer & Sons, Inc. | \$2,967,570.59 | BT Squared |
| 9 | R.A. Smith National | \$10,000.00 | Musson Bros., Inc. | \$8,150,396.96 | Graef, Anhalt, Schloemer & Assoc, Inc |
| 10 | Strand Associates, Inc | \$4,946.31 | Stark Asphalt, a division of Northwest Asphalt | \$2,328,906.17 | DAAR Engineering, Inc |
| 11 | MSA Professional Services | \$5,000.00 | Ptaschinski Construction, Inc. | \$1,775,180.60 | Earth Tech |
| 12 | Becher-Hoppe | \$5,000.00 | Pitlik & Wick, Inc. | \$2,487,654.01 | NWBE, Inc |
| 13 | AECOM | \$2,500.00 | Vinton Construction Company | \$907,583.88 | R.A. Smith National |
| 14 | Strand Associates, Inc | \$2,500.00 | Concrete Structures, Inc. | \$600,774.94 | Community Engineering & Building Services |
| 15 | MSA Professional Services | \$5,000.00 | Edward Kraemer & Sons, Inc. | \$559,492.52 | IIW Engineers & Surveyors, P.C. |
| 16 | AECOM | \$5,000.00 | Hoffman Construction Company | \$2,179,746.46 | Short Elliott Hendrickson, Inc |

APPENDIX B

Transparency Workgroup Interview Questions

1. Can you give us some background as to the beginnings of the Transparency Effort?
2. From your perspective, what were the main goals of the transparency effort?
3. Were you involved in the selection of the pilot projects?
4. What would you consider a success for the Transparency Effort?
5. Were you involved with any of the pilot projects?
6. Have you heard any feedback about the effort?
7. Is there anything else you would like to tell us that you think might help in the evaluation of the program?

Contractor Interview Questions

1. Were you aware this was a pilot project in the Transparency Effort?
2. Were you required to submit RFI's?
3. How many RFI's do you estimate have been submitted?
4. Do you know if the RFI's were forwarded to the Design Consultant?
5. Was the input from the designer timely?
6. Did the answers help reduce impacts to the project?
7. Do you think having access to the designer reduced the time to get a decision?
8. Were you given access directly to the designer?
9. Do you feel this was useful to have the designer available to the project leader?
10. Do you feel the Transparency Program should continue?

Consultant Construction Project Leader Survey Questions

1. How many years have you been employed in the Construction industry?
2. How many years of experience do you have as a project manager?
3. How many years have you worked for this company?
4. Can you please provide a 2-3 sentence description of the scope of this project?
5. Do you believe you were more likely to seek input from the designer because of the program?
6. Approximately how many times did you contact the project designer?
7. Did you use the standardized RFI form?
8. Were all RFI's submitted to you by the contractor passed along to the designer?
9. What was the nature of your questions for the designer? (Choose all that apply.)
 - Design changes
 - Design clarification
 - Design error
 - Cost reduction incentive
 - Traffic control changes
 - Staging and sequence
 - Quantity change (added scope)
 - Different site conditions
 - Other _____
10. Do you believe you received quicker answers to your questions because the designer was under contract during the construction phase?
11. Do you believe you received more thorough answers to your questions because the designer was under contract during the construction phase?
12. Was the designer available when needed?
13. Did the design leader assign appropriate staff to the request?

14. Did the designer minimize the amount of time billed to the transparency contract?
15. Do you have any concerns about taking on a design consultant as a subconsultant to the consultant project manager contract?
16. What was the total amount of change orders on this project (in dollars)?
17. Were any changes related to design and if so, how much (in dollars)?
18. Were you the project leader for any other projects that were happening at the same time as this project? (What was your workload?)
19. Are there any unresolved claims on the project?
20. Do you believe the transparency effort was beneficial to this project?
21. Do you think the transparency effort should continue?
22. What improvements should be made pertaining to the transparency process if the effort is continued?
23. If the Transparency Effort were to be implemented on only select projects, what types of projects or project criteria would you suggest for future applications?
24. Would you please send copies of your submittals and responses as well as the RFI log?
25. Are there other comments about the Transparency Effort you would like make?

Consultant Design Firm Survey Questions

1. What contract type was used to provide design consultant services during the construction process (subconsultant to the construction contract administration consultant contract via contract amendment, direct 2-party contract between WisDOT and the design firm, Work Order authorizing designer involvement when a preexisting Master Contract with the design firm was in place, or other)?
2. Did the construction contract administration staff make use of the Transparency Effort contract?
3. Which contract type would you have preferred?
4. What was the cap (in \$) for design consultant involvement during construction?
5. How much of this cap was used?
6. Was the contract cap of adequate size for this project?
7. How many RFIs did you receive?
8. How long did it take to answer each RFI?
9. Were all the questions you got in the form of an RFI?
10. How many times were you contacted during construction (include RFIs and other contracts/questions you received)?
11. What kinds of questions did you receive (e.g. Cost Reduction Incentive proposals, design clarifications, redesigns due to change in scope, redesign due to change in field conditions, etc.)?
12. Would you have handled these questions anyway (if the project was not included in the Transparency Effort)?
 - a. Did you handle any questions that you thought should have been handled by the field staff?
13. Did the RFIs impact the project scope? If so, how?
14. Was differing site conditions (conditions different than those anticipated during design) an issue on this project?
15. Were you more motivated to answer questions in a timely fashion because of the Transparency Effort?

16. Have you experienced any claims/disputes related to this project?
17. Did the extension of the contract to include compensation for work during the construction phase impact how overhead costs were determined? If so, how?
18. In your opinion, did the effort provide a benefit for this project?
19. Do you believe the Transparency effort would prove beneficial in future projects?
 - a. If so, are there any improvements to be made to the Transparency effort for future use?
20. Do you foresee any problems with a wider implementation of this program?
21. Are there other comments that you feel might help our research effort?

WisDOT Project Manager Survey Questions

1. Was a Transparency Contract (i.e. contract to compensate the designer for involvement in the construction phase) written for this project? If no, why not? Please be specific.
2. At approximately what point during the project was the contract written (before the project was let, after the project was let but before the contractor started working, 20% through construction,...)?
3. Was the use of standardized RFI's required on this project?
4. In your opinion, were questions asked of designer answered more efficiently due to the Transparency Effort?
5. Were there any claims/disputes related to this project?
6. Were you involved in facilitating the question asking process between the construction consultant and the designer consultant? If so, how?
7. Do you believe the Transparency Effort was of benefit to this project?
8. Do you believe the Transparency Effort should be continued in future projects?
9. If the Transparency Effort is continued, are there any improvements you feel should be made?

APPENDIX C

Design Information Request (DIR)

| | |
|--------------------|--|
| Project ID: | Project Name |
| Date: | DIR Number (Assigned By Project Leader) |

| | | |
|-----------|---|--|
| TO | Method Sent: <input type="checkbox"/> FAX <input type="checkbox"/> E-Mail <input type="checkbox"/> Mail <input type="checkbox"/> Delivered | Additional Support Documents: <input type="checkbox"/> Are Attached <input type="checkbox"/> Are Not Attached |
|-----------|---|--|

| |
|----------------------|
| Submitted By: |
|----------------------|

| |
|--------------------------------|
| Description of Request: |
|--------------------------------|

| | |
|--------------------------------|--------------------------------|
| Date Response Required: | Date Response Received: |
|--------------------------------|--------------------------------|

| |
|-----------------------|
| Response From: |
|-----------------------|

| |
|------------------|
| Response: |
|------------------|

| |
|---|
| Basis of Payment: <input type="checkbox"/> None, incidental to design contract <input type="checkbox"/> By Transparency Contract |
|---|

| | |
|--|--------------|
| Reviewed by WisDOT Project Manager: | Date: |
|--|--------------|

| | |
|--|-----------------------------|
| Project Manager Comments: Request Appropriate: <input type="checkbox"/> Yes <input type="checkbox"/> No Agree with Basis of Payment: <input type="checkbox"/> Yes <input type="checkbox"/> No | Additional Comments: |
|--|-----------------------------|

APPENDIX D

Construction Project Complexity Index

(Construction issues that could require design input)

[1: Not likely to occur; 2: Could occur; 3: Likely to occur] Circle one number per issue

Total is sum for each issue group

| Problem/Issue/Situation | Assessment | | | Total | |
|---|------------------|---|---|--------------|--|
| Project Type | Potential | | | Total | |
| Project Size (≤\$1M = 1; \$1M - \$5M = 2; \$5M - \$10M = 3; ≥ \$10M = 4) | 1 | 2 | 3 | 4 | |
| Project is in urban area | 1 | 2 | 3 | | |
| Project involves numerous bridges, retaining walls or noise walls | 1 | 2 | 3 | | |
| Project contains a movable bridge (no = 0; yes = 4) | 0 | | | 4 | |
| Project is built under traffic | 1 | 2 | 3 | | |
| Project involves storm sewer construction | 1 | 2 | 3 | | |
| Utility Coordination | M | | | Total | |
| Utilities present and must be accommodated in the work zone | 1 | 2 | 3 | | |
| Unknown or unanticipated discovery of utilities | 1 | 2 | 3 | | |
| Relocation of utilities required in work zone | 1 | 2 | 3 | | |
| Coordination of work activities with utilities | 1 | 2 | 3 | | |
| Differing Site Conditions | M | | | Total | |
| Unsuitable subgrade material | 1 | 2 | 3 | | |
| Groundwater | 1 | 2 | 3 | | |
| Hazardous materials | 1 | 2 | 3 | | |
| Man-made buried objects | 1 | 2 | 3 | | |
| Unstable slopes or excavations | 1 | 2 | 3 | | |
| Archeology sites | 1 | 2 | 3 | | |
| Site Conditions | M | | | Total | |
| Inadequate staging areas | 1 | 2 | 3 | | |
| Erosion and sediment control | 1 | 2 | 3 | | |
| Disruption to local traffic and business operations | 1 | 2 | 3 | | |
| Complex traffic control plan | 1 | 2 | 3 | | |
| Noise, vibration, and dust impacts on adjacent properties | 1 | 2 | 3 | | |
| Schedule and Operations | M | | | Total | |
| Difficult construction operations | 1 | 2 | 3 | | |
| Complex staging and sequencing | 1 | 2 | 3 | | |
| Shortages or delayed delivery of materials | 1 | 2 | 3 | | |
| Expedited schedules or night/week-end work | 1 | 2 | 3 | | |
| Extreme weather conditions or seasonal effects | 1 | 2 | 3 | | |
| Design and Contractual Issues | M | | | Total | |
| Constructability of plan | 1 | 2 | 3 | | |
| Sensitive environmental features | 1 | 2 | 3 | | |
| Unique special provisions | 1 | 2 | 3 | | |
| Use of new materials or new construction techniques | 1 | 2 | 3 | | |
| Potential for Cost Reduction Incentives | 1 | 2 | 3 | | |
| Potential for changes in scope | 1 | 2 | 3 | | |
| Extensive coordination with 3 rd Parties | 1 | 2 | 3 | | |

OVERALL TOTAL (Complexity Index)

If Complexity Index exceeds 45 consider use of a Transparency Contract