

Act 89 report

A report to the State Engineering Association

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Summary

The purpose of this report is to conduct an analysis of the effectiveness and compliance of state agencies with State of Wisconsin Act 89, which requires a cost-benefit analysis when consultant services are used rather than regular state staff. The report compares outsourcing vs. use of state staff for projects and provides a review of state agency benefit-cost reports to see if they are being done to meet the stated intent of Act 89.

This report is sponsored by the State Engineering Association, a bargaining unit of state employees that represents engineers and associated disciplines in several state agencies.

The report includes a description of work done elsewhere, a description of reasons for using consultants and analysis of reports by state agencies submitted to comply with Act 89. For this report, over 350 benefit cost spreadsheets by Wisconsin Department of Transportation were analyzed. Less than 10 reports from other agencies were available for analysis. The reports compare estimated costs before a project starts and no comparisons are made of actual costs once a project is completed. In general, the reports comply with the requirements of Act 89.

An analysis of reports submitted indicates:

- The use of consultants does not save money for the state. Consultant use led to an increase of approximately \$5 million for 362 WisDOT projects examined.
- For design projects use of consultants increases estimated costs in all cases according to the WisDOT procedure.
- For construction projects, use of consultants increases WisDOT costs overall, primarily because of project oversight. Nonetheless, use of consultants can save money in certain categories – for example with construction inspection where private costs can be less than at the state.
- Project oversight appears to be poorly understood and poorly estimated by state staff in the Act 89 spreadsheets (WisDOT).
- In many cases, consultants were used because of lack of state staff to do the project.
- Other agency benefit cost analyses follow different procedures, but show similar results.
- Excessive use of consultants can result in the loss of state control over their projects, can have long term effects on the future engineering workforce in the state and can lead to poor preparation of state staff to manage projects.

Based on this analysis, it is recommended that the Legislative Audit Bureau conduct a state audit of the costs and performance of specific projects. This audit should specifically look at actual costs of projects after project completion

and estimate what the costs would have been if the project were done in-house. The audit should look at all state agencies subject to Act 89 and determine if proper procedures are applied in each situation and if the intent of the law is being followed. In addition, the audit should examine major differences in oversight time estimates between projects and the accounting process and the practice of using consultant staff located on site in state facilities.

The state should also examine how its staff is trained to select and manage consultants; address the questions of how internal projects can be used to build up in-house expertise to oversee projects in the future; and how outsourcing affects student summer jobs and internships.

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Introduction

The purpose of this report is to conduct an analysis of the effectiveness and compliance of state agencies with State of Wisconsin Act 89, which requires a cost-benefit analysis of the use of consultant services rather than regular state staff. The report compares outsourcing vs. use of state staff for projects and provides a review of state agency benefit-cost reports to see if they are being done to meet the stated intent of Act 89.

This report is sponsored by the State Engineering Association, a bargaining unit of state employees that represents engineers and associated disciplines in several state agencies.

Disclaimer: This report is based on reports to the state for consultant and WDOT costs, not actual costs, but estimates. Data used in this analysis primarily uses information from Wisconsin Department of Transportation (WisDOT) projects with limited information from other state agencies. An overall analysis of experience on a wide variety of projects can overlook specific issues on a specific project and affect the conclusions made.

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Background

Act 89

Act 89 was passed in January, 2006 and became law on January 20, 2006. It requires that a cost-benefit analysis be conducted whenever the state considers a contract for services over \$25,000. It defines a cost-benefit analysis as:

“a comprehensive study to identify and compare total cost, quality, technical expertise, and timeliness of a service performed by state employees and resources with the total cost, quality, technical expertise, and timeliness of the same service obtained by means of a contract for contractual services”¹

The act asks for uniform procedures for this analysis in section 3 and lays out the content of the study in section 4. The study should contain a description of the services to be procured, justification of need, justification for not using other state agencies, the scope of work, and why competitive bidding was not used. The law also requires an annual report of consulting projects.

The law has been implemented through administrative rules and guidelines. In the case of the Department of Transportation (WisDOT), these are described in the Facilities Development Manual (Part 8 – 1 – 5) and Rule Trans 515. WisDOT supplies spreadsheets for the analysis for different project types.

Why use Consultants?

There are several reasons why consultants are used. Consultants are hired if they have a unique technical expertise not found in an agency or in a district office and it is not necessary to maintain that skill (for example, lift bridges, safety audits, roundabout design). Consultants are also used if there is insufficient staff to do the job internally, to level out internal workloads or to provide an independent opinion when there is a potential conflict of interest if internal staff was used.

At the same time, there is an argument politically that the private sector is more efficient than state staff in doing work because of competition among consulting firms and that this can reduce costs. Arguments are also made that outsourcing avoids long term commitments to excessive staff size.

An additional argument of some is that the use of consultants can give the state more control of the work and that it is easier to dismiss the consultant for poor performance. Furthermore some feel that state staff is not motivated to take on challenging jobs and that the state can get more responsive work from outside sources.

It is also felt by some that the state needs to work harder to train its people to effectively manage consultant work and that state staff needs to move in the direction of supervising others to do the work, rather than doing it themselves.

There are arguments that work should be done by internal staff. Staff has a long term commitment to the agency and develops unique experience and internal knowledge that is essential to understand the problems the agency faces. For example, staff may have a detailed knowledge of local soil conditions, acquired over years of experience that is essential for design of foundations and pavements. Without such knowledge, costly mistakes could be made that would be difficult to remedy.

In addition, excessive use of consultants can lead to a loss of control over the agency and lack of response to citizen and elected official concerns. This can happen when consultants are hired to manage other consultants. Excessive consultant use can lead to loss of state expertise to effectively check, evaluate and approve consultant work. For example, staff cannot supervise construction inspectors unless they themselves have been inspectors and are fully aware of issues and problems that can occur on a construction site. State staff needs experience on design projects as well in order to review and approve consultant work. A department can quickly lose the experience necessary to protect state investments if there is not an ongoing service in the department².

Also, state staff has less reason to increase the size of projects to increase their income - sometimes called scope creep, which generates more work for consultants. Or as someone once said "never ask a barber if you need a haircut".

Excessive use of consultants can also have a detrimental effect on consulting firms, for example if staff is permanently assigned to state projects or in a state office facility. In these cases, staff is not available to the consultant firm itself for other projects and limits their flexibility to take on other projects and to diversify their client base.

Consultant Selection Process

The selection of consultants for engineering work based on cost raises an ethical issue. It is felt that engineering services should not be selected solely on the basis of lowest cost and that a qualification based selection process should be used. If cost was the only consideration, there is concern that the low bidder might skip important steps in design and jeopardize public health and safety. Cost can be a consideration in selection, but only after a firm has been identified that is fully qualified to do the required work.

This process follows federal law and state regulations which say:

“State of Wisconsin agencies (Division of Facilities Development, Department of Transportation and the Department of Natural Resources) use the QBS [Quality Based Selection] process to select A/E firms. Since

1972, with passage of the Brooks Act, the federal government requires QBS for its A/E services procurement.”

The Brooks Act 92: Congress, H.R.12807, October 27, 1972, 40 U.S.C. 471, et seq. amended to include: Title IX Selection of Architects and Engineers:

POLICY "Sec.902. The Congress hereby declares it to be the policy of the Federal Government to publicly announce all requirements for architectural and engineering services, and to negotiate contracts for architectural and engineering services on the basis of demonstrated competence and qualification for the type of professional services required and at fair and reasonable prices. Public Law 92-582"³

Related Work

There is little formal literature on the benefits and costs of outsourcing state engineering services. Wilmont, Dies and Schneider looked at methodological issues in comparing costs and recommend a process that looks at after the fact actual projects costs vs. simulated costs of the same project after a project is completed. Several examples from Louisiana are given⁴. They indicated that the majority of previous studies have shown that consultants were more expensive than using state staff for design projects. An analysis was conducted on 20 in-house design projects in Louisiana as compared to estimated costs if consultants did the work. It was found that when road design projects were conducted in-house, costs were 65 per cent of simulated consultant costs and bridge projects were 76 per cent of consultant costs. When projects were conducted by consultants, simulated in-house costs would have been 81 or 83 per cent of consultant costs.

Overall, in-house design costs were 77% of consultant costs, including all overhead and fringe benefits. The differences in all results were significant at the 5 % level or lower. The authors cautioned that cost should not be the sole reason for deciding to contract out and that other factors such as peak demand, special expertise and qualifications should be considered ⁵

The division of Budget of the New Jersey Department of Transportation conducted studies of the costs of consultants vs. in-house staff in 2003, following the method suggested in the Louisiana. This study showed that consultant costs were higher in the cases they analyzed. They also recommended better procedures for reporting activities by state employees.⁶

The National Association of State Highway and Transportation Unions looked at studies conducted in a number of states that looked into the costs of outsourcing as reported in the media and elsewhere⁷. The report indicates that contracting out of engineering, design and inspection costs more than performing those functions in-house in over 80% of the studies and that none of the studies showed that state engineers cost more. Numerous media reports are cited of specific instances in various states where outsourcing has led to problems.

The report cautions about the decline in expertise in state agencies (brain drain) to oversee projects. As work is shifted to private firms and state staff is reduced, the states lose their capability to do the work internally which leads to more outsourcing. This leads to problems of potential cost overruns and threats to the public health and safety because of lack of time and lack of experienced personnel to manage projects.

The report suggests greater accountability, oversight and scrutiny in the contracting process and careful analysis when outsourcing is considered. Steps to maintain an experienced and capable workforce in state agencies are urged.

Previous Studies in Wisconsin

In Wisconsin, this issue has been studied by the Legislative Audit Bureau. In a 1990 study by the Wisconsin Legislative Audit Bureau (study 90-9)⁸ comparisons were made between engineering costs in the Department of Transportation as a percentage of project total construction costs for work done in-house vs. that done by consultants. At the time of this study (April, 1990), use of consultants for WDOT work was relatively new, especially for project inspection. The number of design contracts increased from 20 in 1982 to 162 in 1989 and the number of construction supervision contracts increased from zero in 1982 to 79 in 1989. Wisconsin was estimated to have 35% of its work done by consultants as compared to other states with a high of 80% (Arizona and Indiana) and a low of less than 10% (Iowa and Minnesota)

The study concluded that use of consultants were no more costly than if state staff had been used. It was felt this was the case since, at the time, relatively straightforward projects were given to consultants and more complex projects were done in-house. It was expected that in-house costs would be reduced in the future with more complex projects. No widespread difference in quality of work was found. The report cautioned that it was important to maintain in-house expertise in order to ensure proper oversight of consultant work. Additional study was recommended in the 1991-93 biennium. As far as is known, no such studies have been conducted.

As part of a more general review of the management of state highway programs in 1997 the Legislative Audit Bureau stated:

“In an effort to measure engineering performance, the Department has compared the cost of design engineering and engineering oversight of construction projects to total project costs since FY 1993-94. However, these measurements have not demonstrated any trend in engineering efficiency and are insufficient to provide managers with guidance on how to improve performance. Furthermore, these measures show no significant difference between the cost of district staff and the cost of consulting engineers, who provide 40 percent of design engineering and 30 percent of construction engineering.

“We believe a systematic effort is needed to identify the most important cost factors and to track their increases over time, so that managers can direct their cost-control efforts to those tasks that cause inefficiency and increased costs. Additional efforts are needed to determine why one-quarter of project designs require addenda to correct errors before bidding can proceed. With such information, managers in the Department would also be better able to evaluate when contracting with private firms for engineering services would be most cost-effective.

“There are some indications that the quality of engineering services provided by private consultants is not as uniformly high as that provided by state staff, but the procedures established for reviewing engineering quality are not routinely followed. District staff do not always complete evaluations of consultants’ designs once projects are completed. Guidelines for estimating the expected cost of consultant contracts are not always followed by district staff, who rely instead on past experience when beginning detailed contract negotiations. Using these procedures to evaluate consultants, sharing the results among all districts, and strengthening contract-negotiating procedures would enhance the Department’s ability to ensure cost-effective use of consultants.”⁹

The Wisconsin Department of Transportation also conducted a comparison of in-house and contracted work in 2004¹⁰. This study used spreadsheet comparisons of design and construction projects over a four year period. The study compared engineering costs as percent of construction costs and found that overall engineering costs had declined by 25% in spite of an increase in overall program size.

The study concluded that in house costs were lower than consultant costs (21.8% of construction costs for in house services vs. 25.7% for consultants) and that the level of consultant services had exceeded the department’s goal of keeping the portion of work done by consultants below 50%.

These results were disputed by the Department of Administration¹¹. DOA indicated that there would be savings with less consultant use, but they were not as large as DOT stated. The dispute related to how non project costs were considered in overhead calculations.

DOT disputed the DOA findings and provided explanations to indicate how they did their calculations.¹² DOT indicated that their cost data were based on actual project experience rather than estimates of hourly costs and overhead as done by DOA.

Both agencies agreed that in-house staff is valuable to maintain competition for consultant firms, and to provide the expertise to maintain quality and to oversee consultant work.

Analysis of Current Practice in Wisconsin

By far the overwhelming numbers of projects that have had Act 89 reporting have been conducted by the Wisconsin Department of Transportation. For this report, over 350 WDOT reports by WDOT were analyzed. Less than 10 reports from other agencies were available for analysis.

Wisconsin Department of Transportation Procedure

The Wisconsin DOT implements Act 89 with a series of spreadsheets. The process is explained in the Facilities Development manual chapter 8, Section 1, subject 5 and on an internal DOT webpage. Separate spreadsheets are used for different project types. The project types are:

- State Highway Rehabilitation – Design - 3031
- State Highway Rehabilitation – Construction – 3033
- Majors – Design – 3021
- Majors – Construction – 3023
- SE Freeways and Marquette Interchange - 3440-3459
- Other

The spreadsheets estimate the costs of consultant services vs. state services, using the same number of hours for both for various tasks. Different hourly rates are used for consultants and state staff for each of the project types. The rates are determined from looking at previous values for multiple projects and include fringe benefits and overhead. Examples of WDOT spreadsheets are at the WDOT web page and the WDOT Facilities Development Manual, Section 8-1-5¹³.

Oversight costs are added on for the consultant cost calculations. These are costs that are incurred in addition to those needed for an in-house project. Oversight activities include preparation of advertisement for the project, consultant selection process, contract negotiation, contract administration including review and approval of invoices, supervision in excess of that needed on a similar WisDOT staffed project, and consultant performance evaluation.

The comparisons are done before a project is approved and there are no known comparisons of actual cost after project completion. The impacts of change orders, change in scope, etc that occur after a project is approved are unknown.

In addition the forms ask three questions:

- “Does WisDOT perform this type of work in-house? If no, do not make a comparison”
- “Does WisDOT have the expertise necessary to perform this work at a high level of quality?”
- “Can WisDOT perform this work in a timely manner?”

Act 89 requires that the benefit cost analysis consider “total cost, quality, technical expertise, and timeliness”. It appears that these three questions are

aimed at the non-cost factors. An inherent assumption in the WisDOT process is that state staff and consultant staff are comparable in quality and that they will accomplish the tasks in the same amount of time.

Analysis of WisDOT Spreadsheets

Data from 362 projects were looked at using data entered by SEA representatives (234 projects) and myself (128 projects). These were from projects outsourced to consultants as reported to the State Engineering Association between November 5, 2006 and September 2, 2008. Of these, 325 included data comparing costs between consultants and the state staff. The other 37 projects were ones where it was judged that the state DOT does not perform the type of work needed in-house. One project, a Marquette Interchange project with a total value of \$13,000,000 was excluded from the analysis because of its high cost compared to others.

The data included project ID, type of project, cost of project if done by state staff, cost of project if done by consultants and oversight costs. 128 of the projects also recorded the answers to the three questions and any comments given in response to the third question – “Can WisDOT perform this work in a timely manner?”

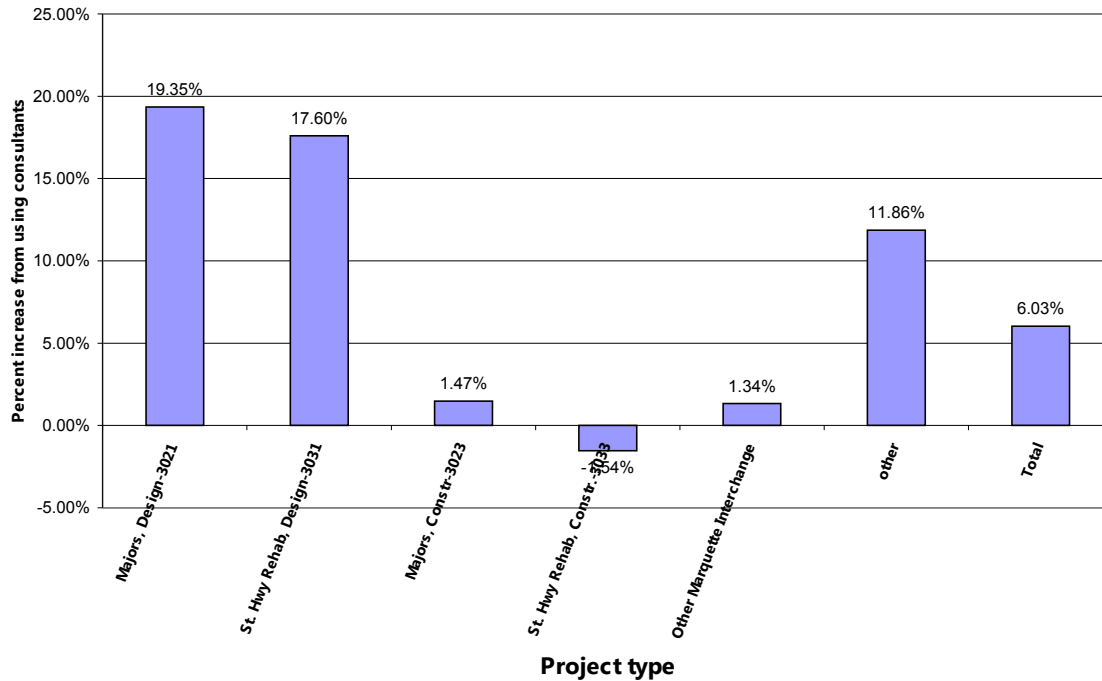
Total Cost Comparisons

Overall these 362 projects represent an estimated cost of \$86,857,712 for consultant work and \$81,987,036 if the work were done by state personnel. The extra cost of using consultants is \$4,937,622 or 6.03%.

Estimated consulting costs ranged from \$12,258 - \$1,395,000 per project, with an average of \$206,297 per project. The oversight costs per project ranged from \$591 - \$107,794, with an average of \$3939 per project. Oversight ranged from 0.25 per cent to 135 per cent of costs with an average of costs 6.41 per cent.

When examined by project type as shown in Figure 1 it was found that use of consultants increased estimated costs by an average of 17.60% and 19.35% for design projects, by 11.86% for other projects, and by 1.34% for the Marquette Interchange project. For construction projects, the costs of consultants are nearly the same as for using state staff (+1.47% and -1.53%)

In all design projects examined (105 projects), use of consultants resulted in a greater estimated cost for design projects than had state staff been used.

Figure 1:**Consultant Cost vs. State Cost by project type**

WDOT Hourly rate comparisons

A comparison was made of the hourly rates used in the spreadsheets by task and by project type.

Three tables and associated charts are given at the end of this report which compares the spreadsheet values for hourly costs of state DOT staff for various categories.

The first set compares the hourly rates for design projects. For design projects the hourly rates for consultants are higher in nearly all categories. CADD, environmental impacts, preliminary and final design, planning activities, project management, R/W plat and utility coordination costs can be substantially more with consultants (a difference in hourly rates greater than \$5.00/hr). Hourly costs of consultants are lower within only a few categories with only operations costs showing an increase greater than \$2.00 per hour. Use of consultants also adds oversight costs at an average rate of \$5.28 per task hour for design of major projects and \$5.75 per task hour for design of rehabilitation projects.

For Construction projects, the cost differences for tasks are more mixed. For construction projects: the hourly rates for construction engineering, materials, operations activities, public involvement, soils and pavements, structures can be substantially less with consultants (>\$5.00/hr). Construction inspection often

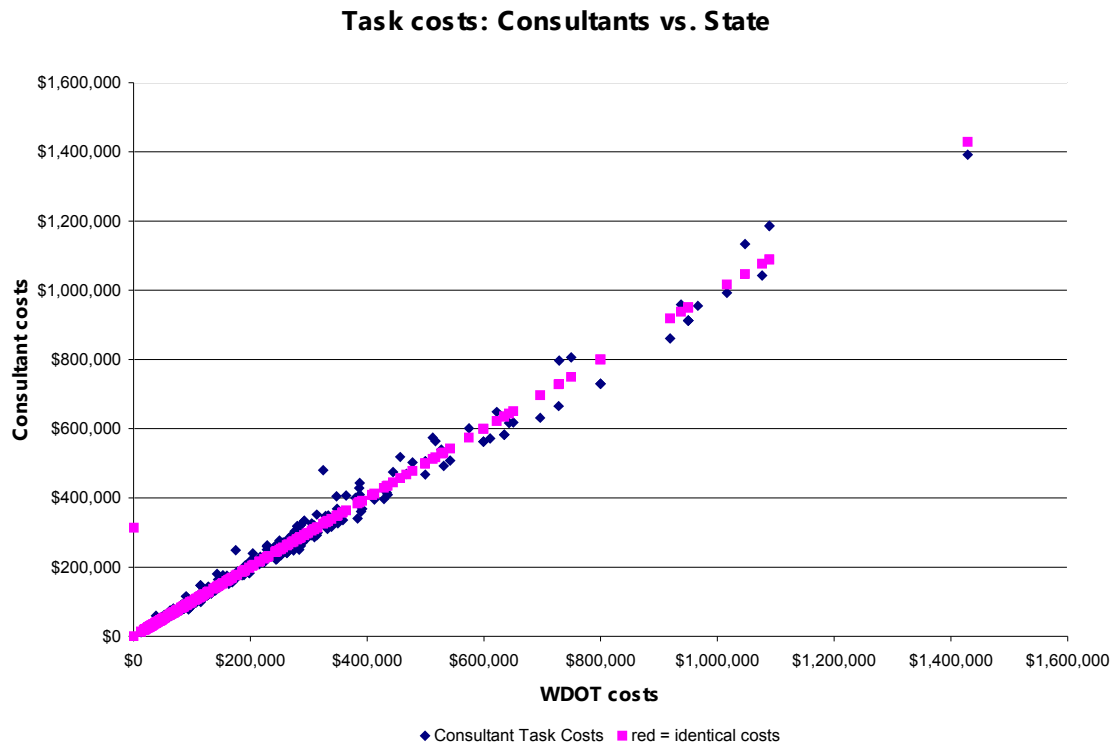
consumes a large portion of the costs for construction projects. These can be 35-60% of costs. It is \$2.66 per hour less to use consultants for major projects and \$6.72 less per hour for rehabilitation projects.

For the Marquette Interchange project and 'other' projects, cost differences vary widely. For the Marquette interchange project (10 projects) state staff costs are substantially less for environmental impacts, operations activities, planning, preliminary design, R/W plat and railroad coordination tasks (>\$5.00/hr). Consultant costs are less if consultants are used for project management, public involvement, real estate and soils and pavements (<\$5.00/hr). Many of the 'other' projects (56 projects) involve surveying work and these costs are comparable for state staff and consultant staff.

WDOT Task costs

Comparisons were made for costs of tasks for consultants vs. state staff. It was found that state staff and consultant costs were nearly the same as shown in Figure 2. This result is not surprising; given the method that assumes equal hours for both.

Figure 2



A more interesting analysis looks at projects that have significantly larger or smaller costs of consultants vs. state staff. This is shown in Figure 3. Here the projects are arranged according to the extra costs of using consultants. The extra costs ranged from a savings of \$57,156 to an additional cost of \$185,451 with an average extra cost of \$14,187.

Those projects where consulting costs are lower (the lowest 30) are shown in Figure 4. In those cases where consultant costs are lower it is mostly because oversight estimates are very low or use of construction spreadsheet and large number of hours for project inspection.

Figure 3

Extra Cost of using consultants

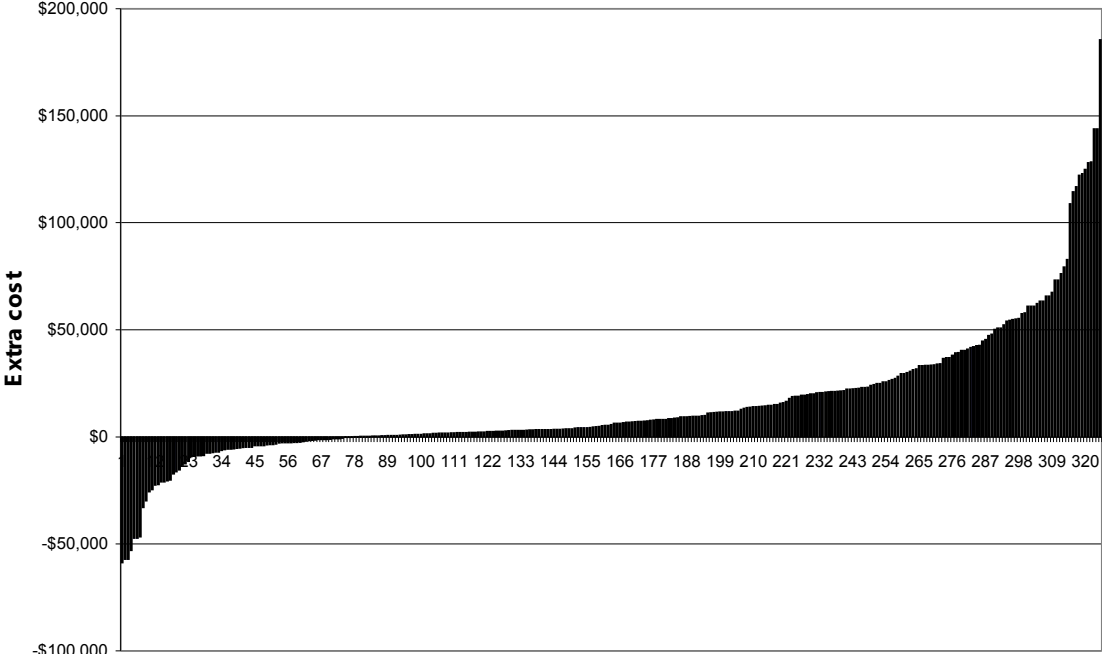


Figure 4

Task and Oversight cost differences -
30 projects with greatest savings from consultant use

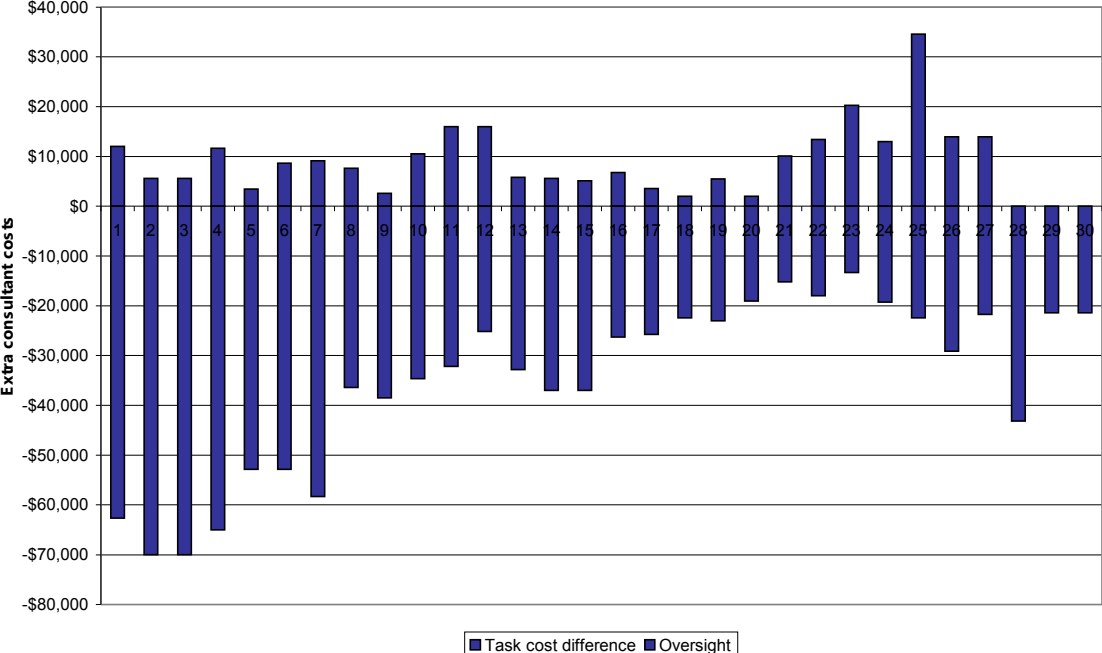


Figure 4 shows the differences in task costs on the bottom bar and the oversight costs on the bar above. The net cost is the difference between the two. In most of the cases the estimated savings occur because estimated oversight costs are very low as compared to other projects.

If oversight costs are underestimated, it tends to make estimated consultant costs look better. As will be described later, some projects appear to substantially underestimate oversight costs

Project costs on the other end, where consultant costs are substantially higher, are shown in Figure 5. In this diagram, the bottom part of the bar is the difference in task costs and the top part is the oversight costs. Where costs are substantially higher for consultants these come about because of the use of 'other' spreadsheet which has higher rates for planning, CADD, environmental impacts.

WisDOT Oversight Costs

A key issue in how WisDOT has implemented Act 89 is in the area of oversight costs. Oversight costs vary widely and often do not follow the recommended portion in the WisDOT guidelines for use of the spreadsheets. Some outliers appear to either underestimate the costs or imply a very limited oversight on the projects.

Figure 6 shows the estimated oversight costs vs. costs of the project if done at WisDOT. As can be seen from the diagram, estimates of oversight costs vary widely and have little relationship to project task costs. For example on one project only \$3,463 oversight was estimated on a \$1.4 million project. This was 41 hours of oversight for 21,600 hours of consultant work including only one hour to evaluate consultant performance and five hours to select the consultant.

There may be very valid reasons for these numbers, but on the surface they imply either inadequate oversight, a poor understanding of the procedure or substantially more cost in reality than was estimated. There is a potential for abuse in this part of the process or at a minimum a lack of proper oversight.

Figure 5

Extra consultant costs,
30 projects with largest extra cost from using consultants

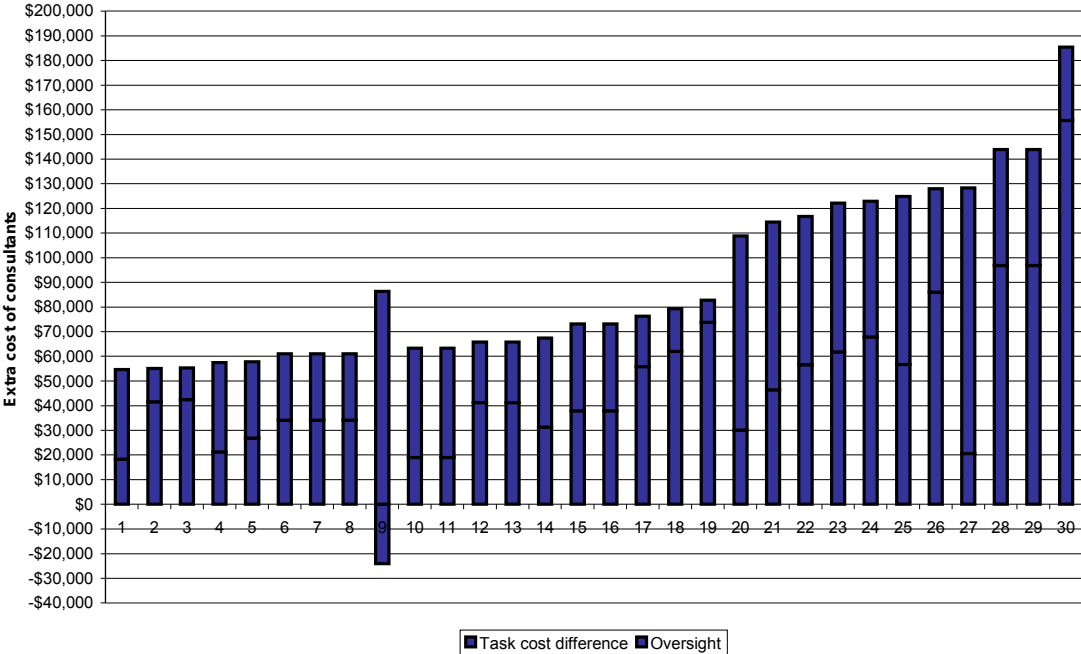
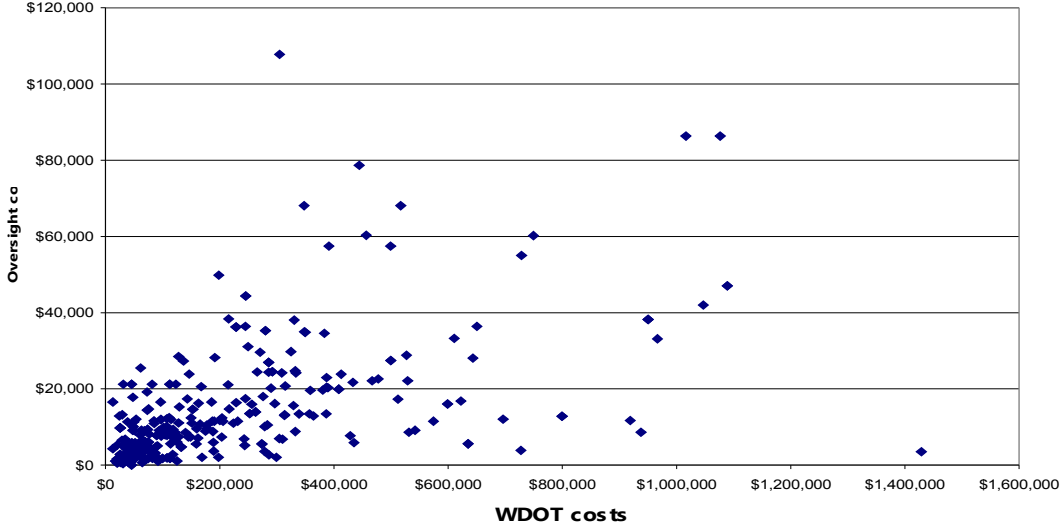


Figure 6

Oversight costs vs WDOT costs



WDOT Reasons for using Consultant

The spreadsheets also give reasons why a consultant was used, often when the cost of the consultant was greater.

Of the 128 projects where this was looked at, in all but 10 use of a consultant was because of insufficient state staff. Some quotes from the reports:

- “Due to Staff commitments on other projects, consultant participation is needed to complete project in a timely manner”
- “Limitations of available staff require the hiring of a consultant.”
- “The amount of staff time required to complete these tasks is not available given the size of our planning staff and the availability based on workload to perform these tasks.”
- “WisDOT could not create the product in a timely manner”.
- “Due to staffing shortages we are unable to deliver the tasks in the tight time frame given.”
- “Adequate staffing resources are not available to meet the required project commitments.”
- “WisDOT does not have the staff necessary to complete a project of this magnitude in the time frame needed.”
- “WisDOT does not have the staffing necessary to complete this in the necessary time frame”
- “WisDOT does not have resources to deliver this project on its current time line”
- “Not enough staff to complete this task”
- “Shortage of experienced position to staff all available work”

Other Consequences

Excessive use of outside sources for engineering services can have other effects that are not directly tied to individual projects. **Loss of project control from insufficient oversight can have long term consequences.** In particular, the use of consultants for project inspection needs to be carefully monitored, since actions of inspectors can directly affect construction costs and profitability. Project inspection in particular is vulnerable to potential abuse and conflict of interest and there could be situations where inspectors fail to fully represent the project owner (state).

In addition, many new engineers go into the profession because they want to design and build projects, not manage consultants. This can lead to a loss of morale by state employees and their departure from state service to work as a consultant, often at a higher rate of pay. **The ability of the state to maintain quality projects can suffer if there is insufficient staff with engineering experience on such projects.** This can only be obtained by having a set of projects done in-house to provide experience and background for permanent staff.

Thirdly, the use of consultants can have an effect on the future of the profession by leading to a lack of summer jobs and internships for engineering students. For many years the state provided a large number of summer jobs for engineering students, typically as construction inspectors and survey crew members. These jobs served to introduce students to careers as engineers and likely had an effect of increasing the retention of students in engineering programs. As these jobs are turned over to permanent employees of consulting firms, there are fewer chances for students to gain this experience. **In the long run, the pool of future engineers for the state and for consulting firms can be jeopardized.**

These effects cannot be dealt with in the benefit cost process of Act 89, but are important and should not be overlooked.

Other agency procedures

There has been limited reporting of Act 89 activity by agencies besides WisDOT. Only three projects by the Wisconsin Department of Natural Resources (DNR), three by the Department of Administration and one each by the Departments of Justice and Commerce were available. Each agency followed a procedure as given by the Department of Administration¹⁴.

The three DNR projects used a detailed procedure that detailed indirect costs and project monitoring expenses. The reports indicate a total cost of \$1,125,631 if done by state staff and a cost of \$1,010,603 if done by consultants or a savings of \$115,028 by outsourcing. It is stated that the DNR does not have sufficient staff to do the projects. However, different hour totals are used for state staff than consultant staff. For example, in the most costly project, state hours are considerably higher than consultant hours to do the same work. It was assumed that the state would hire permanent staff to do the work.

Three Department of Administration projects from the Office of Justice Administration were available. They used the same procedure as the DNR. These dealt with computer services and communications systems. Project costs totaled \$691,735 for contracting vs. \$322,563 if performed by state staff or an extra cost of \$369,172 or 114%. For the largest of these projects, use of contractors was justified because the state did not have the "entire necessary infrastructure, personnel or expertise required to provide this specialized service and meet all of the other needs of the state"¹⁵. Hourly rates for consultant services were significantly higher than for state personnel.

The Department of Justice procedure was used for one submittal to hire expert witnesses for legal cases and an argument was made that outsiders were needed to prevent the appearance of bias by state employees. An overall limit of \$100,000 was requested with no expert witness to exceed \$25,000. The Department of Commerce report was used for the purpose of hiring contractors to be building inspectors in the state. They indicated there was insufficient staff

in the state to provide the services. A cost analysis indicated an overall savings if contractors were used.

Conclusions

Based on the analysis, the following conclusions can be made:

- A comprehensive review by state auditors has not taken place for many years in spite of major changes in the role of consultants in state projects.
- Procedures used by state agencies do not document actual experience, i.e. what happened after projects, and what true costs were as compared to hypothetical costs of an internal project
- The overwhelming numbers of projects available for analysis were State DOT projects. The extent of compliance to Act 89 by other agencies is unknown.
- The use of consultants does not save money for the state. For example this led to an increase of approximately \$5 million for 362 WDOT projects examined.
- Consultant costs are between 1.54% lower and 19.35% higher than estimated state staff costs for WDOT projects.
- For design projects use of consultants increases costs in all cases according to the WisDOT procedure.
- Use of consultants increases costs overall for construction projects, primarily because of project oversight. Nonetheless, use of consultants can save money in certain categories – for example with construction inspection where private costs can be less than at the state.
- Project oversight appears to be poorly understood and poorly estimated by state staff (WisDOT).
- In many cases, consultants were used because of lack of state staff to do the project. Reductions in staff to use outside firms leads to a self fulfilling prophecy. Staff size is reduced and then there is a need to add outside staff to perform the same role.
- Excessive use of consultants can result in the loss of state control over their projects, can have long term effects on the future engineering workforce in the state and can lead to poor preparation for project management by the state.
- There is no consistency of methods used by different agencies.

Recommendations

Based on the analysis to date the following recommendations are made:

- There should be a state audit of the costs and performance of specific projects by the Legislative Audit Bureau. This audit should specifically look at actual costs of projects after project completion and estimate what the costs would have been if the project done were in-house. (following procedures recommended by Wilmot, Dies, and Schneider in Transportation Research Record 1654)
- The audit should look at all state agencies subject to Act 89 and determine if proper procedures are applied in each situation and if the intent of the law is being followed.
- The audit should examine major differences in oversight time estimates between projects and the accounting process. Specifically the audit should look at the costs of using consultant staff located on site in state facilities and how overhead is calculated when consultant staff are housed at state offices.
- Other questions to address are: The state has to sign off on designs, i.e. approve them. Does this remove risk for consultants and how does this affect the liability costs of the consultants? Is there any information on the match between consultants put on the short list vs. those actually chosen to do the projects? How does the use of subcontractors affect costs, overhead charged on overhead
- The state should examine how their staff is trained to select and manage consultants and address the questions of how internal projects can be used to build up in-house expertise to oversee projects in the future and how outsourcing affects student summer jobs and internships.
- The State Engineering Association should continue to monitor reports from state agencies in a spreadsheet to update results over time.

Table 1: Comparison of hourly costs for design projects

EngineeringTasks	3031 State Hwy Rehab - Design			3021 Majors - Design		
	WDOT Ave cost/hr	Consultant Ave cost/hr	Difference cons - WDOT	WDOT Ave cost/hr	Consultant Ave cost/hr	Difference cons - WDOT
CADD	\$63.16	\$60.84	(\$2.32)	\$61.75	\$68.01	\$6.26
Environmental Impacts	\$69.51	\$80.73	\$11.22	\$66.73	\$83.70	\$16.97
Final Design	\$71.82	\$74.88	\$3.06	\$72.50	\$83.70	\$11.20
Operations Activities	\$79.01	\$76.25	(\$2.76)	\$84.88	\$82.50	(\$2.38)
Planning Activities	\$51.54	\$76.25	\$24.71	\$79.46	\$82.50	\$3.04
Preliminary Design	\$72.00	\$75.77	\$3.77	\$74.96	\$83.49	\$8.53
Project Management	\$81.35	\$96.84	\$15.49	\$81.74	\$94.54	\$12.80
Public Involvement	\$78.16	\$81.86	\$3.70	\$81.56	\$86.99	\$5.43
R/W Plat	\$64.83	\$71.27	\$6.44	\$64.86	\$80.89	\$16.03
Railroad Coordination	\$74.69	\$76.25	\$1.56	\$76.41	\$82.50	\$6.09
Real Estate	\$65.72	\$66.78	\$1.06	\$69.96	\$82.50	\$12.54
Soils and Pavements	\$76.50	\$76.32	(\$0.18)	\$65.69	\$79.33	\$13.64
Structures	\$70.84	\$81.76	\$10.92	\$74.49	\$78.32	\$3.83
Surveying and Mapping	\$60.90	\$64.39	\$3.49	\$59.92	\$67.48	\$7.56
Utility Coordination	\$65.01	\$79.96	\$14.95	\$66.43	\$85.29	\$18.86
Task Totals	\$69.38	\$74.53	\$5.15	\$72.09	\$81.45	\$9.36
Oversight cost/task hr.		\$81.35	\$5.75		\$86.88	\$5.28

Figure 7

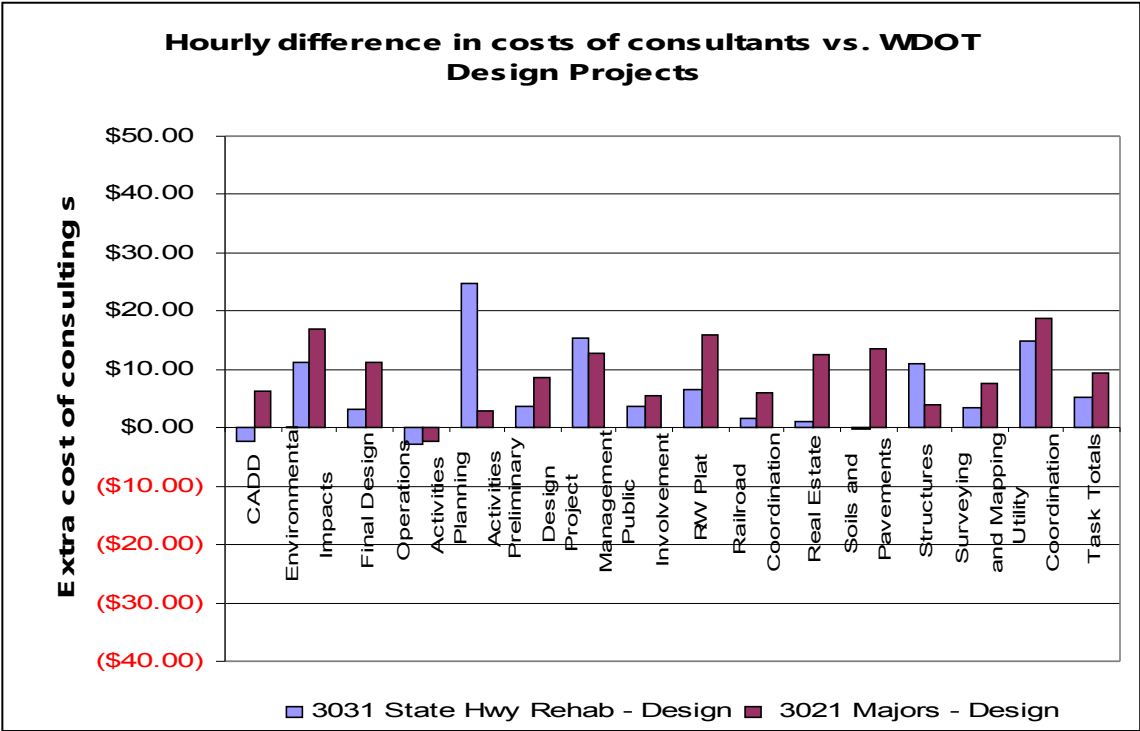


Table 2: Comparison of hourly costs for construction projects

Engineering Tasks	3031- Majors Construction			3033- Rehab-Construction		
	WDOT Ave cost/hr	Consultant Ave cost/hr	Difference WDOT-Cons	WDOT Ave cost/hr	Consultant Ave cost/hr	Difference WDOT-Cons
Construction Contract Admin	\$67.88	\$74.12	\$6.24	\$66.50	\$66.48	(\$0.02)
Construction Engineering	\$71.10	\$65.71	(\$5.39)	\$73.10	\$69.59	(\$3.51)
Construction Inspection	\$68.88	\$66.22	(\$2.66)	\$71.41	\$64.69	(\$6.72)
Construction Materials	\$75.01	\$59.87	(\$15.14)	\$68.63	\$62.21	(\$6.42)
Environmental Impacts	\$72.59	\$71.99	(\$0.60)	\$74.40	\$85.22	\$10.82
Operations Activities	\$84.84	\$68.74	(\$16.10)	\$81.60	\$67.60	(\$14.00)
Project Management	\$84.49	\$86.01	\$1.52	\$87.07	\$85.81	(\$1.26)
Public Involvement	\$93.84	\$76.70	(\$17.14)	\$85.00	\$75.28	(\$9.72)
Railroad Coordination	\$65.92	\$68.74	\$2.82	\$65.70	\$67.60	\$1.90
Real Estate	\$67.17	\$68.74	\$1.57	\$68.33	\$67.60	(\$0.73)
Soils and Pavements	\$79.16	\$68.74	(\$10.42)	\$80.00	\$67.60	(\$12.40)
Structures	\$81.17	\$68.51	(\$12.66)	\$81.83	\$67.64	(\$14.19)
Surveying and Mapping	\$63.26	\$59.30	(\$3.96)	\$61.88	\$62.01	\$0.13
Utility Coordination	\$69.21	\$68.74	(\$0.47)	\$67.50	\$73.89	\$6.39
Task Totals	\$69.92	\$67.02	(\$2.91)	\$70.82	\$67.31	(\$3.51)
Oversight cost/task hr.		\$84.49	\$1.96		\$87.07	\$5.32

Figure 8

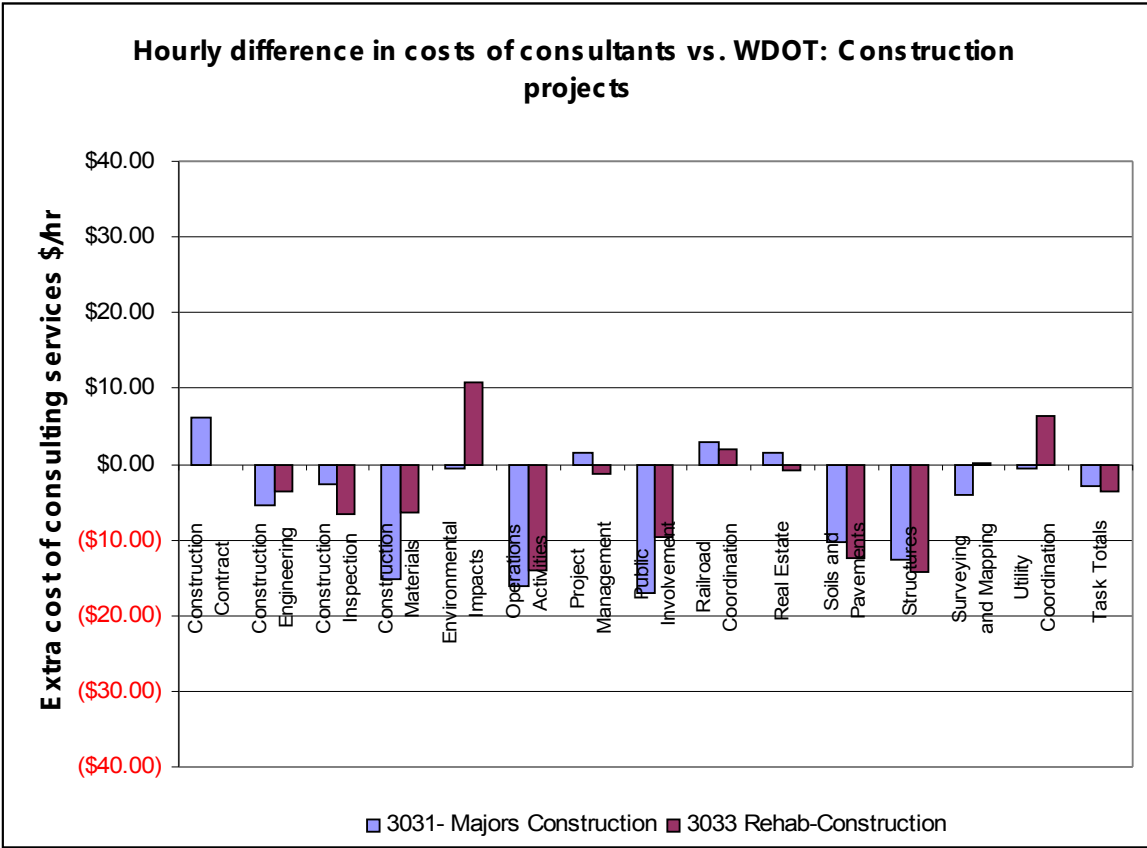
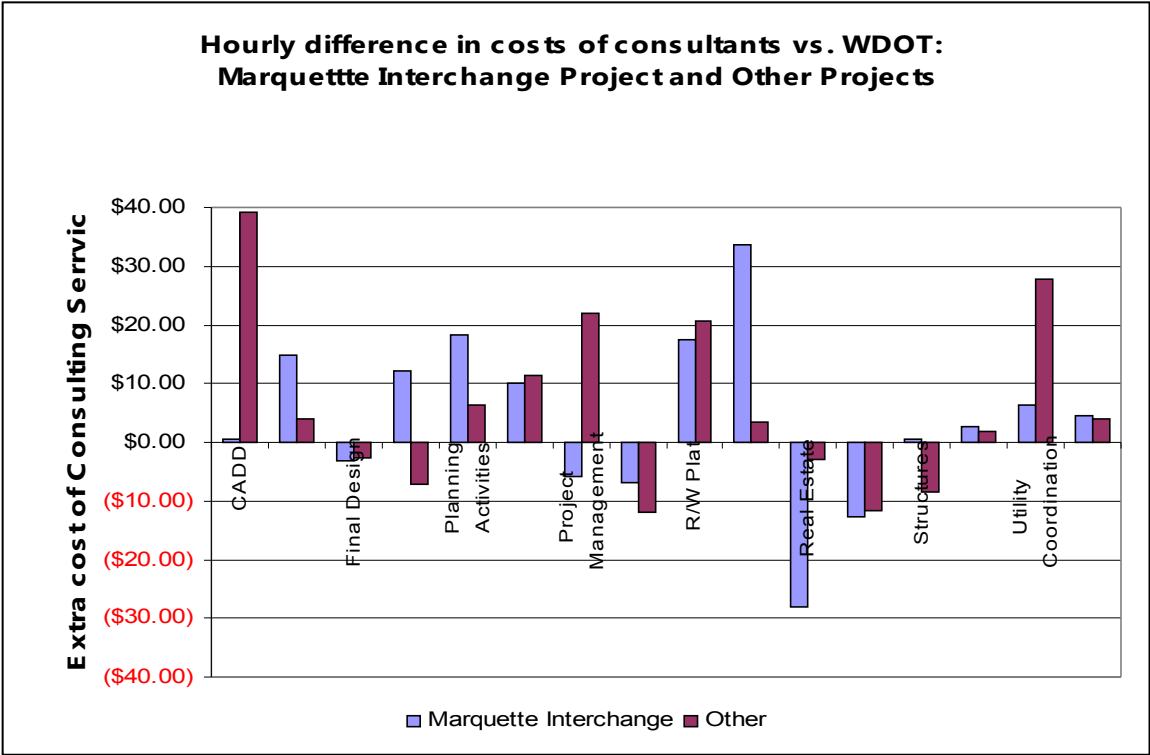


Table 3: Comparison of hourly costs for Marquette Interchange and other projects

Engineering Tasks	Marquette Interchange			Other		
	WDOT Ave cost/hr	Consultant Ave cost/hr	Difference cons - WDOT	WDOT Ave cost/hr	Consultant Ave cost/hr	Difference cons - WDOT
CADD	\$64.61	\$65.19	\$0.58	\$60.61	\$99.74	\$39.13
Environmental Impacts	\$86.11	\$100.81	\$14.70	\$73.88	\$77.80	\$3.92
Final Design	\$83.11	\$79.93	(\$3.18)	\$72.48	\$69.74	(\$2.74)
Operations Activities	\$89.13	\$101.23	\$12.10	\$82.25	\$75.08	(\$7.17)
Planning Activities	\$83.03	\$101.23	\$18.20	\$68.61	\$75.08	\$6.47
Preliminary Design	\$72.04	\$82.01	\$9.97	\$70.50	\$81.89	\$11.39
Project Management	\$88.44	\$82.66	(\$5.78)	\$85.51	\$107.37	\$21.86
Public Involvement	\$92.26	\$85.36	(\$6.90)	\$88.44	\$76.53	(\$11.91)
R/W Plat	\$64.17	\$81.60	\$17.43	\$62.36	\$83.11	\$20.75
Railroad Coordination	\$67.63	\$101.23	\$33.60	\$71.51	\$75.08	\$3.57
Real Estate	\$80.45	\$52.39	(\$28.06)	\$64.22	\$61.29	(\$2.93)
Soils and Pavements	\$82.97	\$70.16	(\$12.81)	\$80.36	\$68.60	(\$11.76)
Structures	\$77.19	\$77.61	\$0.42	\$79.59	\$71.18	(\$8.41)
Surveying and Mapping	\$68.28	\$70.87	\$2.59	\$62.27	\$64.04	\$1.77
Utility Coordination	\$80.78	\$87.07	\$6.29	\$67.45	\$95.26	\$27.81
Task Totals	\$75.08	\$79.45	\$4.37	\$63.76	\$67.62	\$3.86
Oversight cost/task hr.		\$87.92	\$6.83		\$83.29	\$14.74

Figure 9



End Notes

¹2005 Wisconsin Act 89, section 2 (16.70 3g)

²Wilmot, C. G, H., Dies, D. R. and Schneider, H., “In-House Versus Consultant Design Costs in State Departments of Transportation” **Transportation Research Record 1654**, 1999, p 159

³ <http://www.qbswi.org/> also see The American Council of Engineering Companies of Wisconsin (ACEC WI) and AIA Wisconsin, Wisconsin Quality Based Selection manual <http://www.qbswi.org/docs/A-EQBS.pdf> , January, 2003

⁴ Wilmot, C. G, H., Dies, D. R. and Schneider, H., *op.cit.* pp 153-160.

⁵*Ibid*, p 158

⁶ Division of Budget, Bureau of Program Analysis, New Jersey Department of Transportation, “Advisability Study, FY 2004, Design Projects – In-house vs. Consultant Costs, October, 2003

⁷ Kusnet, David, “Highway Robbery II – the Many Problems with Outsourcing Design Engineering, Inspection and Supervision of Federally-Funded Transportation Projects” report of the National Association of State Highway and Transportation Unions, May 2007, <http://www.nashtu.us/download.htm>

⁸ “An Evaluation of Use of Engineering Consultants in the Department of Transportation” Report 90-9 of the Legislative Audit Bureau, April, 1990.

⁹ From: Legislative Audit Bureau Report 97-4 Management of the Highway Program, Department of Transportation, <http://www.legis.state.wi.us/lab/reports/97-4summary.htm>

¹⁰ WisDOT and Division of Transportation Districts Engineering Cost Comparisons, April 20, 2004, attached to a letter to the State Engineering Association November 11, 2004

¹¹ Sarah Justus “ Analysis of Proposal to Increase Ratio of State Staff to Consultants in Highway Improvement Process”, letter to David Schmiedicke, October 1, 2004

¹² DOT response to DOA Analysis of DOT Engineering Cost Analysis November 19, 2004

¹³“Cost-Benefit Analysis” State of Wisconsin Facilities Development Manual, Section 8-1-5, October 25, 2007

¹⁴ Wisconsin Dept of Administration Cost Benefit Analysis Financial Information <http://vendornet.state.wi.us/vendornet/doaforms/CBAInstructions.doc>

¹⁵ Letter to Wisconsin State Engineering Association from Wisconsin Office of Justice Assistance, May 12, 2008