

REVIEW OF THE

INDEPENDENT REVIEW PANEL'S FINAL REPORT DATED DECEMBER 28, 2011

Concerning the

WATER SYSTEM IMPROVEMENT PROGRAM

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Prepared for the

San Francisco Public Utilities

Revenue Bond Oversight Committee

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1. EXECUTIVE SUMMARY

San Francisco's Water System Improvement Program (WSIP) is one of the largest and most complex construction projects ever undertaken by the City and its Public Utilities Commission (SFPUC). To ensure that WSIP is managed in the best possible manner, the WSIP management and San Francisco Revenue Bond Oversight Committee (RBOC) retained a panel of construction management industry experts (the Independent Review Panel, IRP) to review the Program. Such review panels are not unusual for such programs, even though the underlying agency may have retained an outside program manager.

For this study, the SFPUC directed that the focus was to be only on WSIP's construction phase, not on any pre-construction or post-construction phases. Their findings and recommendations are summarized in a December 28, 2011 report. The RBOC also retained this writer to work with the IRP to fully define and prioritize issues to be reviewed; review the work of the Panel; and submit a report to RBOC on findings and recommendations. This report summarizes my findings and recommendations.

Key observations about the IRP report and its recommendations to the RBOC are:

1. The IRP report does not include an evaluation of WSIP's cost- and schedule-to-complete.
 - a. To fulfill its obligations as I understand them, RBOC needs this information. Therefore RBOC may wish to commission a follow-up study that evaluates WSIP's expected final cost and schedule. A thorough study would require examination of the construction and post-construction phases, not just the construction phase.

2. Some IRP 'Headline' evaluations of WSIP are unclear, perhaps contradictory to the details later explained in the report. Many are focused extensively (or exclusively) on the WSIP's project management processes, not on the application and compliance with those processes.
 - a. As one example, the report says that SFPUC is mitigating and predicting risk "very effectively". Later in the same section the report states "How risk is included in schedule forecasting is not as clear."
 - b. The RBOC may wish to commission a follow-up study that examines actual compliance with those processes. If variances are found, mitigation measures should be evaluated.

3. I agree with the IRP's eight recommendations, especially:
 - a. A Cost- and Schedule-to-Complete analysis needs to be performed to check the forecast of overall WSIP cost and schedule performance.
 - b. The current Contract Summary reporting should be revised to better reflect the actual schedule change management process being used and to establish a policy for what change orders and trends are to be considered for identifying program performance problems for both cost and schedule.
 - c. Procedures and lessons learned in WSIP should be applied to future programs such as the SSIP, including consideration of 1) other delivery approaches such as Design/Build, Construction Manager-at-risk and Integrated Project Delivery, and 2) contract with construction contractors to perform Constructability Reviews.

4. I also believe and recommend several 'dashboard' reporting devices that may be helpful to better communicate WSIP's progress.
 - a. A Cost Performance Index and Schedule Performance Index graph and a Total Float Consumption graph are discussed herein.

2. BACKGROUND

The San Francisco Public Utilities Commission (SFPUC) is presently constructing the \$4.6 Billion Water System Improvement Program (WSIP). This size and complexity, combined with the region's essential water supply needs and seismic vulnerability, make WSIP a critically-important and critically-visible project. To assure ratepayers that the Program is being managed properly, the WSIP retained four senior industry executives to serve as an Independent Review Panel (IRP). Conducting such an independent review occurs quite frequently on large projects, even though an agency (e.g. SFPUC) already has retained a professional program or construction manager (e.g. Parsons) to assist in planning and controlling.

This IRP performed a Phase 1 review in October-November 2010, submitting a report dated January 31, 2011, responding to eight questions formulated by WSIP senior management. That same panel was then reconstituted in October 2011 to conduct a Phase 2 report on behalf of the Revenue Bond

Oversight Committee (RBOC).¹ It was staffed by knowledgeable and experienced people who represented owner, contractor, CM and design professional backgrounds. They worked hard and after preparing at least two draft reports, submitted a lengthy and thorough final report on December 28, 2011.

After following the SFPUC's request-for-proposal process for consultant selection, RBOC retained this writer to oversee and comment upon the IRP's Phase 2 work and report.

RBOC's instructions to me were:

"As we have discussed and consistent with your scope of work, we would like your final report to be a commentary on the IRP's major findings and recommendations as well as their review approach (statement of facts, comparisons with other agencies or norms, etc.,) or any omission that you believe should have been addressed or topic that, in your opinion, was inadequately explained. The report should be simple and brief; essentially you either agree with a section or you substantiate your area of concern. It is also suggested that, where appropriate, you note professional differences of opinion when the facts do not clearly support one report's conclusions over another...to the extent your final report directly or indirectly touches upon these comments/criticisms, your report should cite and address such comments/criticisms ... RBOC expects some professional disagreement over the IRP's findings and recommendations, however any disagreement needs to be rigorously defended."

To fulfill these contractual obligations, this writer

- worked with the RBOC in a public meeting to define and shape its interests into three general areas (Change Management, Risk Management and Soft Costs);
- worked with the IRP and in particular IRP Chair Gary Griggs to develop detailed questions that complied with RBOC's three general areas of interest. See Appendix A;
- reviewed numerous WSIP project management documents, reports, business processes;
- reviewed the IRP's Phase 1 report and other consultant reviews;
- participated in a number of conference calls with RBOC, IRP and Parsons representatives;
- attended most of the onsite meetings the IRP conducted with WSIP personnel. See Appendix B;

¹ RBOC was established by Proposition P in November 2002. It represents regional and city ratepayers and is charged with examining whether bond proceeds are appropriately expended for authorized capital improvements.

- attended subsequent RBOC meetings during which time Gary Griggs presented the Panel's preliminary results;
- reviewed and selected various project management literature to include into this report;
- performed various mathematical calculations on WSIP cost and schedule metrics;
- reviewed the Budget and Legislative Analyst Report, dated October 17, 2011²;
- reviewed the IRP's October 28, 2011 draft report;
- reviewed WSIP November 21, 2011 comments on the IRP draft report;
- submitted my draft report to WSIP management and the IRP for their review;
- reviewed IRP's December 5, 2011 draft report;
- reviewed IRP's December 28, 2011 final report;
- reviewed SFPUC's December 19, 2011 responses to IRP's and my draft reports;
- finalized this report; and
- attended a number of RBOC meetings to present my findings.

Though the review time was short and not all WSIP managers and contractors were interviewed, I believe this methodology gives a reasonably good glimpse into the WSIP's standing.

The next section of this report reviews the key IRP's findings and recommendations and my evaluation of the IRP's position on such. When I do not comment upon an IRP finding or recommendation, it is because I wholly or generally agree with the finding and recommendation or do not believe that it is significant to the overall status and performance of the WSIP. This keeps this report brief and to the point.

3. IRP FINDINGS & RECOMMENDATIONS

3.1 Change Management

CM Question #1: Are COs in excess of the cost and schedule contingencies provided? *IRP answer: In total, the cost-related change orders appear to be within the specified contingencies and schedule-related change orders appear to exceed the contingencies as reported.*

² The data and conclusions of this Analyst's report generally conformed to the data and conclusions of the IRP's Phase 2 report and this present analysis.

The IRP reports that as of September 25, 2011, WSIP has incurred \$49.6 million (3.1% of the Program's Construction contract value) change on the Regional Projects.³ This figure represents only the change orders that have been approved or are pending.⁴ IRP also reports that per SFPUC's October 3, 2011 Multi-Project Change Reasons Report, regional project change orders amount to \$66.2 million, 4% of construction contract value. This latter value represents approved, pending and potential change orders.

The IRP report states that

“...the Regional projects appear to be within their contingency based on a 41% completion status.”⁵

The report does not explain the basis for this statement. The IRP should explain that basis and consider citing any relevant published information. One published source of information is shown in Figure 1 below. It indicates troubling trends for the WSIP:

³ WSIP change orders are characterized as approved and pending (the change has been approved or is in process of being approved) or potential (contractor has filed a CO request and the SFPUC is reviewing its merits), depending upon their stage of development, review and approval. Trends are potential risks that SFPUC believes may eventually occur and evolve into change orders. They are used for early identification of possible future changed condition well in advance of the formal change order process.

⁴ The SFPUC apparently prefers to focus only on approved and pending change orders. It states in its December 19, 2011 comments to the IRP's December 5, 2011 report: “the use of both potential change orders and trends in the assessment means that the percentage contingencies as used in the Report reflect the future (projected) state of the program at a later percent completion and not at the 41% completion as of September 25, 2011...***The actual use of cost contingency as of September 25, 2001 at 41% completion would be more realistically represented by a calculation based on only approved and pending change orders....[emphasis added]***”. I disagree. Using only approved and pending change orders is overly conservative and ignores potential change orders which a contractor has submitted as of the 41% point. These potential change orders may not be fully granted to the contractor, but it is probable that some portion of them will ultimately be granted. Hence a figure based only on approved and pending would likely underestimate WSIP's final cost and schedule results.

⁵ In a December 19, 2011 communication to this writer, the SFPUC states that the overall WSIP is 41% complete but the regional portion of the Program is 44%.

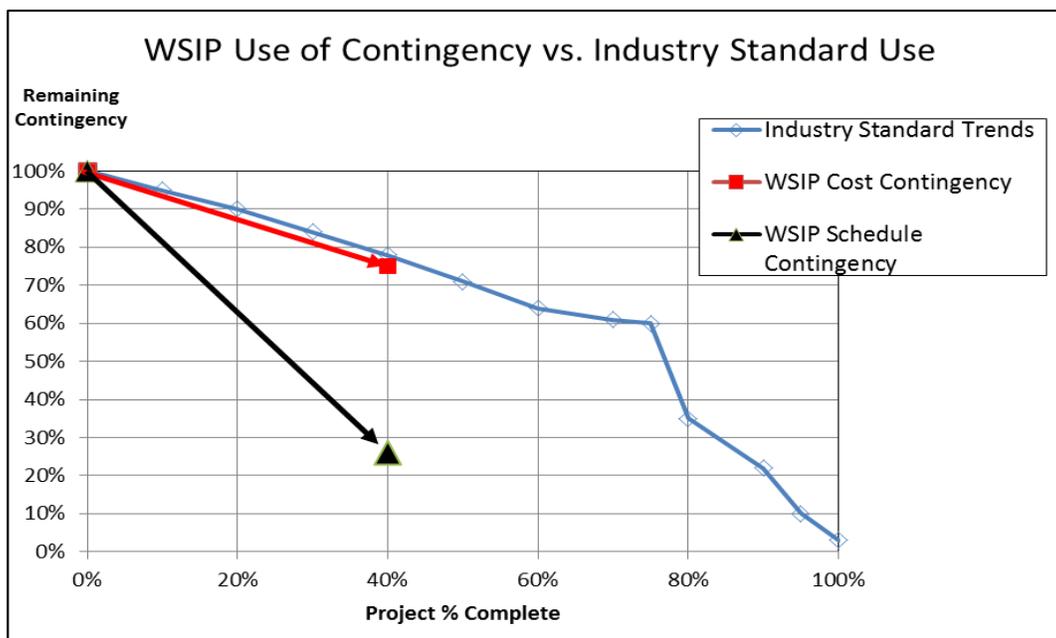


Figure 1
Standard Industry Rate of Contingency Consumption⁶
(WSIP Values Based on Approved & Pending Change Orders)

A similar diagram could be constructed for the combination of Approved, Pending and Potential Change Orders.

The IRP report also states that

“While it can be argued that including potential change orders and trends⁷ may result in an overly conservative assessment of cost performance, the IRP feels that they should continue to be tracked as is done as early indicators of potential overruns. In addition, there should be a clear and consistent policy as to what assessment should be used as an indicator of problem performance.”

⁶ Source: William Ibbs and Walter Allen, “Quantitative Impacts of Project Change.” Construction Industry Institute Research Summary RS 43-2, University of Texas, May 1995.

⁷ It appears that trends are not included in the \$66.2 million value.

The IRP report does not provide guidance on what a clear and consistent policy would be in this case. It would be helpful if the panel offered such.

Regarding schedule performance, the IRP report correctly notes,

“The schedule contingency approach discussed above is only being used to provide early warning ... the program summary schedule contingency does not relate directly to the individual project schedule performance because individual project schedules are not additive and overlap on another ... Program level schedule changes are more accurately tracked [when] analyzed together ... The Contract Summary reporting should be revised to more accurately reflect the impact to overall program critical path schedule.”

This statement is correct. However the report does not provide guidance on how such reporting should be revised. If all eighty-one WSIP projects are linked into an integrated program schedule, one possible method for reporting such would be to track and report the total float⁸ remaining for 1) the entire Program schedule and 2) the last project in the Program. A hypothetical example sometimes used in industry is shown in Figure 2.

⁸ Total Float is the amount of time a schedule activity can be delayed without delaying the overall project completion.

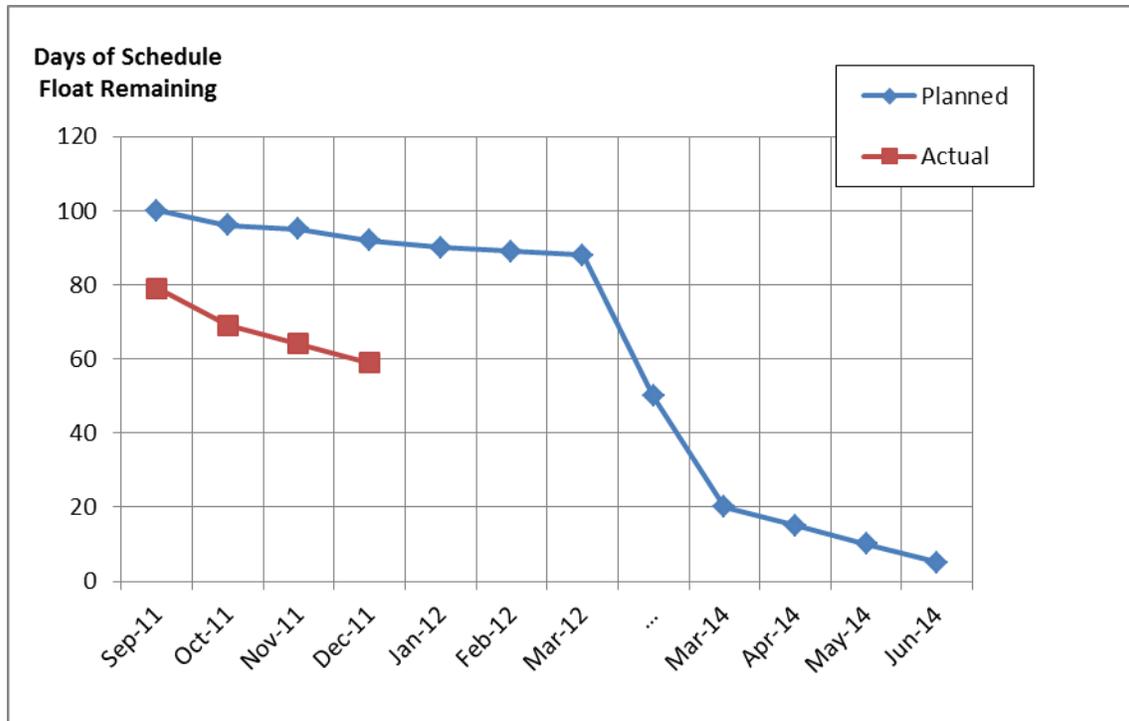


Figure 2

Sample Illustration of Program/Project Schedule Performance

Use of cost and schedule contingencies should be reviewed jointly because there is a connection between the two; e.g. schedule delays on a project might be ameliorated in the future by spending more of its cost contingency.

CM Question #2: What are the major reasons for changes? *Differing site conditions appear to be the major reason for change orders.*

The IRP report states "...change orders often do not fit into one category [for example, differing site conditions, owner requests] ... Additional peer or independent design reviews during the design phase, as well as constructability reviews by construction professionals, could reduce future expenditures for these types of change orders."

Additional design and constructability reviews might indeed reduce both change order cost expenditures and time extensions.

A senior WSIP manager did acknowledge during the onsite interviews that the change order categorization may not be consistently applied and some mischaracterization may be taking place. It is important to have clear and complementary definitions so that the true source of change can be identified and steps taken to manage and lessen it on this Program and future programs.

RBOC may wish to commission a study that reviews WSIP changes and change definitions, and how consistently those definitions are being used. If they are not being applied clearly and consistently, an improved set of definitions and processes should be implemented that provide clear and distinguishable categories of change. Such a study of change orders and their characterization could be valuable and informative to any changes SFPUC might make to its design and constructability review processes.

CM Question #3: Are COs being managed effectively and efficiently, and in compliance with authorizing legislation? *Yes.*

The IRP report states that “The program has established excellent procedures for change management that meet or exceed the guidelines established by the Construction Management Association of America.” The IRP report also indicates that contractors are concerned about how long it takes to process change requests and that large backlogs exist. It notes that follow-up internal audits have been performed to ensure compliance with procedures, but the report does not indicate if the IRP reviewed those audits.

This is one example where the IRP judges a process to be excellent but then cites examples where the use of that process may be troubled.⁹

If the IRP has not studied the actual application and use of various management processes sufficiently to render an opinion, a follow-up study should be considered by RBOC.

CM Question #6: How do project change order percentages compare to industry norms? *The overall project change order percentages appear to be within industry norms.*

The IRP report states that “The overall project change order percentages appear to be within industry norms.” The basis for this conclusion is in part one cited reference that indicates 5% is considered moderate for large projects.¹⁰ The panel also cites another study that reports on types and sizes of projects.¹¹ That study, for example, reports change order rates of 0.9% for water storage projects, 3.6% for pipelines and 20.9% for water treatment facilities.

The IRP report compares those numbers to the WSIP status; see Table 1.

	Cost-based Change Order %	Schedule-based Change Order %
Approved & Pending COs	2.6%	4.5%
Approved, Pending & Potential	3.8%	6.3%

Table 1
WSIP CO Rate as of 44% Construction Complete

⁹ Other examples include CM question #2, CM #3, CM #9, CM #13, RM #1 and RM #10. For example, RM #10 (IRP Report, page 24) states “[The] Risk management is [being handled] very effectively” but in the same paragraph IRP writes “How risk is included in schedule forecasting is not clear.”

¹⁰ Hatem and Corkum, “Megaprojects – Challenges and Recommended Practices.”

¹¹ CDM, “Multi-Agency CIP Benchmarking Program, Phase 4 Final Report.”

One problem with this analysis is that the IRP is comparing WSIP at 44% complete to other projects that are finished; i.e. at 100%.

To correctly assert that WSIP's experience is within industry norms, the IRP should either convert the referenced numbers into a 44% complete condition or develop an estimate of WSIP's change order rates when WSIP will be 100% complete.

The numbers cited here from this report by the IRP appear to be for cost change only. The IRP has not justified their use as a reference for evaluating schedule change.

CM Question #9: Evaluate the project change order management process based on the Construction Industry Institute's Change Management Process. *The change order management process meets or exceeds the Construction Industry Institute's (CII's) process.*

I agree that the WSIP change management process generally meets the CII standard. I do have concerns about the application of WSIP's change management process, as exemplified by the experiences of Sunol Valley Water Treatment Plant (large number of owner-requested and design error changes) and the Bay Division Pipeline – East Bay project (large backlog of unprocessed change order requests and turnover of field contract administrators).

This is another application area that the RBOC may wish to investigate further.

CM Question #10: What do contractors have to say about the change management process (timeliness, reasonableness, reconciliation and getting paid)? *The three contractors interviewed appeared somewhat frustrated by the handling of change orders, which is not unusual for construction projects.*

According to the IRP report "There appears to be a feeling that the owner's staff on site may not have the authority to negotiate change orders or did not want to take responsibility to do so. It was also expressed that it is not always clear who had the authority to make a final settlement."

The contractors who made these statements are large contractors that have significant experience with public works construction and with the SFPUC. I was present during those interviews and my interpretation of the contractor statements was that their WSIP experience lagged that of their other public works experience, so the IRP's statement that "[this] is not unusual for construction projects" is slightly off target in my opinion.

In response to this question the IRP also reviewed the Document Turn-Around Report and found that Applications for Payment are being made in roughly 20 days. (It appears from my reading of the IRP report that the IRP is referring here to the standard contractor monthly pay application.) That is a good record.

This is another application area that the RBOC may wish to investigate further.

CM Question #13: Are lessons learned from change orders being applied to future projects? *Yes.*

I agree with the IRP report statements that 1) the staff conducts a lessons learned debriefing, 2) they are verbally presented and discussed and 3) the SFPUC has issued a directive. The IRP report does not indicate though if these lessons are in fact being applied on projects. ***This is another application area that the RBOC may wish to investigate further.***

3.2 Risk Management

RM Question #1: Have actual risks incurred to date been previously identified in the Risk Management Plan and were the impacts accurately forecast? *Yes.*

The IRP's report cites one anecdote in responding to this question, namely the New Irvington Tunnel reclassification. It is not clear from the report if this conclusion is based on a wider set of information. Moreover, based on the problems at Bay Division Pipeline – East Bay previously cited, there is reason to believe that one key risk not included in the WSIP risk register is "Failure to follow project management procedures."

This is another application area that the RBOC may wish to investigate further.

RM Question #2: What are the capabilities for analyzing and forecasting risk and have they been tested and proven effective? *The risk assessment process appears to be very effective in identifying risks.*

See comments to RM Question #1 above.

RM Question #3: How efficiently are risks being mitigated and progress tracked? *It appears that risks have been identified and efficiently mitigated.*

See comments to RM Question #1 above.

RM Question #4: How does the Risk Management program compare with other utilities of similar size and complexity? *Based upon the experience of the CM IRP members this appears to be one of the most sophisticated management procedures being used.*

In my experience this risk management program is typical for other projects of this size and complexity.

RM Question #5: Is the Risk Management program being effectively used by the entire project team?

Yes.

I agree with this finding and conclusion. Plus, contractors are invited and tend to participate in the initial risk workshops but then their attendance tends to wane, understandably, as the project progresses.

RM Question #10: How effectively is the SFPUC mitigating and predicting risk in order to control costs and complete projects in a timely manner? *Very effectively.*

This conclusion seems to be at odds with its later statement that “How risk is included in schedule forecasting is not as clear.”

This is another application area that the RBOC may wish to investigate further.

3.3 Project Cost, Schedule and Contingencies

PCSC Question #1: Have there been major increases in cost and schedule and, if so, what are the reasons? There have been major cost increases and schedule extensions for some of the projects reviewed primarily from change orders.

The IRP report states that the cost performance on completed construction projects has “been excellent” because completed projects have averaged 4% over bid amount and 12% less than the SFPUC’s original budget. (The result of a favorable bidding climate.) Schedule performance has been problematic, however, with 53% of the completed Regional projects exceeding their planned completion dates.

The IRP also states that “the current forecast of costs for changes orders, trends and risks is \$142 million. Therefore it appears that the projects currently under construction will be completed within the approved budget amounts.”

This last statement would presuppose that the \$142 million forecast is accurate, but there is no evidence to suggest that the IRP has verified this. ***I recommend that the IRP either verify this forecast is accurate or that RBOC commission a follow-up study to evaluate this cost forecast and the schedule forecast.***

PCSC Question #2: How is cost and schedule performance being tracked and is the reporting timely and forward looking? *Cost and schedule are being tracked very well and the reporting is timely and forward looking.*

The IRP states that including the WSIP's Late Planned Progress curve into the standard S-curve provides management an effective one-page summary of the project's cost and schedule performance; see Figure 2 of the IRP report. Unfortunately that S-curve representation is so detailed that it is difficult to read.

An alternative representation that RBOC may wish to ask SFPUC to provide is a diagram that combines a project's Cost Performance Index, CPI with its Schedule Performance Index, SPI. CPI measures planned cost to-date divided by actual cost to-date, so a number above 1.0 is favorable. Similarly, SPI measures planned vs. actual schedule to-date. This is a standard Earned Value reporting mechanism.¹²

An example is shown in Figure 4 below. As shown in this chart, the CPI and SPI values are tracked over time, and are trending from on budget and on time (1, 1) to over budget and behind schedule (0.94, 0.73). Values in the upper right-hand quadrant would have favorable cost and favorable schedule performance. Values in the lower right-hand quadrant would have favorable cost and unfavorable schedule performance, etc.

¹² US Dept. of Energy, Earned Value Management System (EVMS) Guidelines. DOE G 413.3-10.

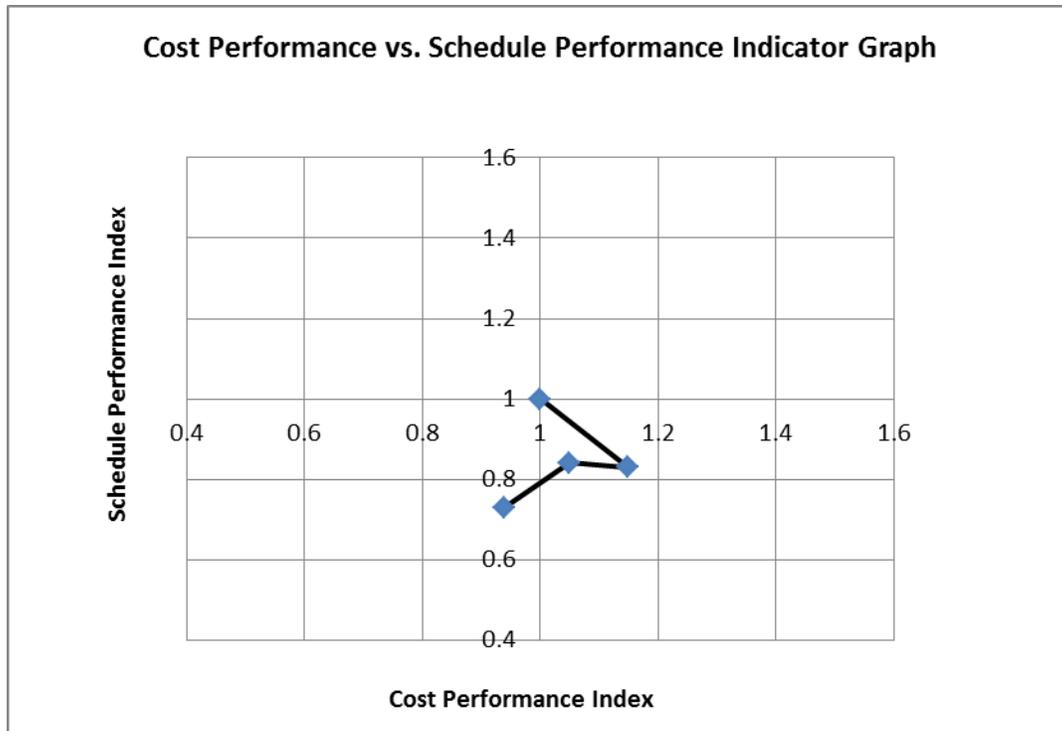


Figure 4
Illustrative CPI vs. SPI Graph

PCSC Question #4: What is the basis of the projected costs and schedules at completion and are they realistic? *In general, there appears to be a sound basis for realistic cost and schedule projections.*

The IRP report's answer to this question is focused on the first part of the question: "What is the basis..." It does not offer an opinion of whether the cost and schedule projections are realistic. Because the RBOC is obliged to ensure that revenue bond funds are being spent prudently, the RBOC needs to know if the current budget is sufficient. It cannot answer that question without knowing the cost- and schedule-to-complete. **If the IRP is not able to answer the second part of this question, the RBOC may wish to conduct a follow-up study investigating the realism of the cost and schedule projections.**

PCSC Question #6: Are sufficient contingencies being carried to cover increases in cost and schedule, and are the contingencies consistent with industry practice? *Yes.*

WSIP management is currently requesting that it be allowed to “bank” any difference between a contractor’s bid amount and the SFPUC engineer’s estimate, and add that to a Program-wide contingency reserve. That is not an unusual practice but RBOC should recognize that reserving such bid savings would increase WSIP’s contingency, not so much because of superior WSIP management performance but because of a fortuitous bidding climate. That may then make it harder for RBOC to gain a true evaluation of WSIP’s management performance in the future.

PCSC Question #7: How do the project soft costs compare with other similar programs? *As a percentage of construction cost, the soft costs appear to be at the high end of the range for other similar programs.*

The IRP computes WSIP’s construction-phase soft costs to be 17.3%. IRP compares this to five other projects, which have soft costs ranging between 10.8% and 20.8% of construction cost value. IRP then states:

“The WSIP is at the higher end of the industry range as would be expected for a complex program of 81 publicly-funded regional projects being constructed over a period of greater than ten years. Such large multi-project programs have management requirements over and above stand-alone projects.”

This last statement is not necessarily accurate. When reviewing soft costs it is important to remember that a ‘program’ is a collection of many projects. Aggregating projects into a program allows project owners to gain the advantages afforded by economies of scale, meaning that the soft costs ratio is generally lower for a program than for an individual project. A citation in the IRP report documents that larger projects and programs tend to benefit from economies of scale.¹³ Therefore the soft costs should generally be lower for programs than for stand-alone projects.

¹³ Economies of scale are shown to exist for both project soft costs and change order rates in the CDM “Multi-Agency CIP Benchmarking Program” report cited earlier.

This same citation is for projects which are predominantly treatment plant-oriented, which tend to have higher soft cost ratios, whereas the remaining WSIP projects are a mix of plant, pipeline, reservoir, etc. projects.

This 17.3% rate is higher than the soft costs reported by other comparable public works agencies; see Table 2.

	Alameda County Water District	East Bay Municipal Utility District	San Diego County Water Authority	US Army Corps of Engineers	Average
Program/Construction Management	16.9%	13.4%	11.0%	10 to 16%	12.8% to 14.3%

Table 2
Soft Cost Ratios for Various Agencies¹⁴

A second study of 51 large programs found that soft costs for both the design and construction phases of those projects was 18.9%. That is roughly comparable to WSIP's soft cost ratio of 17.3% which is just for the construction phase. See Table 3.

¹⁴ Professor William Ibbs April 6, 2005 report to SF PUC.

	Project Management for Design & Construction	Construction Administration & Construction Management	Insurance	All Other Soft Costs	Total including <u>Project Management for Design Phase</u>
Average	8.8%	6.3%	1.6%	2.2%	18.9%

Table 3
Soft Cost Ratios for Design and Construction of 51 Rail Projects^{15,16}
(Including BART & SFO International Airport)

For these reasons, WSIP's soft costs appear to be higher than comparable agencies and programs, and quite possibly outside the range that IRP references. **The RBOC may wish to conduct additional studies to better understand this issue.**

3.4 IRP Report Recommendations

The IRP presented four short-term and four long-term recommendations, as listed below. In general I agree with all these recommendations, especially:

Short term Recommendation #1: Perform an audit of the latest Earned-Value Analysis or, alternatively, perform a Cost- and Schedule-to-Complete Analysis, in order to check the forecast of overall WSIP cost and schedule performance.

Short term Recommendation #2: Revise the current Contract Summary reporting to better reflect the actual program schedule change management process being used and establish a policy for what change

¹⁵ AECOM et al, "Estimating Soft Costs for Major Public Transportation Fixed Guideway Projects," Transit Cooperative Research Program Report #138, 2010.

¹⁶ Admittedly, rail projects are not identical to water system projects but they are not entirely dissimilar either. For example, they are both civil engineering-oriented, technically-complex and publicly-managed. The point is that no two construction projects or programs are identical but certain parallels can be credibly drawn.

orders and trends are to be considered for identifying program performance problems for both cost and schedule.

Long Term Recommendation #1: Consider other delivery approaches such as design/build, CM at risk and CM/GC for future projects.

Long term Recommendation #2: Contract for Constructability Reviews to be provided by construction contractors, on a consulting or fee-for-service basis, for projects prior to the completion of design, with particular attention paid to geotechnical issues.

Long term Recommendation #3: Apply procedures and lessons learned to future programs such as the SSIP.

I believe that the IRP should have offered an opinion about WSIP's cost-to-complete and schedule-to-complete, and could have even if it was with reservations. The basis for this opinion is founded in several questions that were clearly assigned to the IRP:

- Change Management Question #1: Are COs in excess of the cost and schedule contingencies provided?
- Change Management Question #6: How do project change order percentages compare to industry norms?
- Risk Management Question #2: What are the capabilities for analyzing and forecasting risk and have they been tested and proven effective?
- Risk Management Question #10: How effectively is the SFPUC mitigating and predicting risk in order to control costs and complete projects in a timely manner?
- PCSC #2: How is cost and schedule performance being tracked and is the reporting timely and forward looking?

- PCSC #4: What is the basis of the projected costs and schedules at completion and are they realistic?
- PCSC #6: Are sufficient contingencies being carried to cover increases in cost and schedule, and are the contingencies consistent with industry practice?

In addition, every Independent Panel Review on which this writer has served was asked to review the anticipated condition of the project or program when the project or program is completed. (See writer's biography in Appendix D.) Other review panels have similar "cost-to-complete and schedule-to-complete" obligations.¹⁷

4. SUMMARY & RECOMMENDED FUTURE DIRECTIONS

4.1 Findings

The Water System Improvement Program is one of the most complex and important construction programs that the San Francisco Public Utilities Commission has ever undertaken. By some measures the WSIP is just now entering its peak phase, and that will continue for the next year. It appears to have used a disproportionately large amount of its schedule contingency.

Many of the management systems developed and incorporated into the WSIP appear to meet standard industry practice. The IRP report does cite numerous instances where those systems have not been properly applied and used. For example, problems were noted with the change management process at Bay Division Pipeline – East Bay. It is important that the actual utilization these management systems and compliance with their intended purpose continue to be improved as the SFPUC continues constructing the WSIP. Such improvement will also be important as SFPUC undertakes other large programs in the future, such as the SSIP.

4.2 Recommended Future Work

The WSIP is just now starting its peak phase in terms of WSIP Management staff size. It will peak in terms of monthly expenditures about one year from now.

¹⁷ See for example, "California High-Speed Peer Review Group Report," November 10 2011.

Given this critical juncture the RBOC may wish to commission further study to assess:

1. The actual use and compliance of the WSIP's project management processes.
 - a. There are at least seven instances in the IRP report that suggest further study of the application of a project management business process need to be pursued further: CM question #2, CM #3, CM #9, CM #13, RM #1 and RM #10.
2. WSIP's anticipated final cost and schedule performance.
 - a. The IRP report does not provide cost- and time-to-complete estimates. My understanding is that RBOC has an obligation to ensure that the WSIP bonds (and funds) are being expended in accordance their intended purpose. Since the IRP report does not provide all the information RBOC needs to make that determination, I believe that RBOC should commission a follow up study to gather that information. This should include not only remaining construction work but also post-construction activities (testing, startup, commissioning) phases that are included in WSIP's budget.

Moreover, RBOC may wish that any follow-up study examine the entire WSIP, not just the construction management phase. Such a follow-up study that examines WSIP's progress over all project phases – planning; design; bid and award; construction; and post-construction. Such would provide RBOC insight into whether lessons learned about the entire program are being transferred to and implemented by other SFPUC capital projects and programs.

Appendix E is a response to SFPUC's comments on my November 28, 2011 draft report.

APPENDIX A – QUESTIONS FOR THE INDEPENDENT REVIEW PANEL

A. Change Management

Project changes over the course of construction are one of the most significant factors in cost and schedule growth. It is essential to limit changes to those that are essential and to have a formal and controlled change order process to manage them, including trend analysis. In order to review this matter for the WSIP the following questions will be addressed:

1. Are the change orders in excess of the cost and schedule contingencies provided?
2. Among projects with significant change orders, what have been the major reasons for the changes (differing site conditions, owner-requested, contractor-requested, design changes, design errors, etc.)?
3. Are change orders being managed effectively and efficiently including documentation and causes, and are they in compliance with the authorizing legislation?
4. How are trends identified and cost and schedule estimates assigned to them?
5. Is there an understanding of the difference between risks, trends and change orders (potential, pending and approved)?
6. How do the project change order percentages (cost and schedule) compare to industry norms?
7. Is there any indication that the favorable bidding climate is constraining profit margins and resulting in greater use of change orders?
8. Is the SFPUC paying to avoid claims or, conversely, is the resolution of change orders being delayed to avoid impacts on the project, and, if so, how pervasive is it?
9. Evaluate the project change order management process based on the Construction Industry Institute's Change Management Process.
10. What do contactors have to say about the change management process (timeliness, reasonableness, reconciliation and getting paid)?
11. To what extent are there unresolved change orders (e.g. unilateral, force account and denied) that could have cost, schedule and legal implications at a later date and are they being satisfactory accounted for?
12. Is there some consistency in the management of change orders on a project-by-project basis, or are the results significantly varied among projects?
13. Are lessons learned from change orders being applied to future projects?

B. Risk Management

Risk management is essential to successful execution of the construction. This review will focus on the risk management process including construction interface management, public safety, and cost and schedule performance. Parsons concluded in 2007 that there was a significant risk that the WSIP could exceed \$4.6B and that the SFPUC should consider conducting more detailed risk analyses on the most critical projects. Since then, the SFPUC has strengthened this aspect of the WSIP Program. The following questions will address these issues:

1. Have actual risks incurred to date been previously identified in the Risk Management Plan and were the impacts accurately forecast?
2. What are the capabilities for analyzing and forecasting risk and have they been tested and proven effective?
3. How efficiently are risks being mitigated and progress tracked?
4. How does the Risk Management program compare with other utilities of similar size and complexity?
5. Is the Risk Management program being effectively used by the entire project team?
6. Is there a sufficient construction interface management plan in place to ensure that all 81 projects will fit together?
7. How are the risks associated with system shutdowns being addressed?
8. Have the risks to the public during construction been adequately addressed and mitigated?
9. Has the risk of an earthquake during construction been addressed with mitigation?
10. How effectively is the SFPUC mitigating and predicting risk in order to control costs and complete projects in a timely manner?
11. Is the SFPUC effectively including the contractors in risk discussions and analysis?
12. Is there some consistency in the identification, tracking and mitigation of risks on a project-by-project basis, or does the approach and level of efforts vary among projects?

C. Project Cost, Schedule and Contingencies

Cost growth and schedule delays are always a concern over the course of construction including increases in the soft costs associated with agency and consultant program and project management costs including construction management, engineering support during construction and environmental monitoring and mitigation. The following questions are directed at these issues:

1. Have there been major increases in cost and schedule and, if so, what are the reasons?
2. How is cost and schedule performance being tracked and is the reporting timely and forward looking?
3. Is there a mitigation process in place to address cost and schedule growth, and, if so, what is it and how effective is it?
4. What is the basis of the projected costs and schedules at completion and are they realistic?
5. What is the basis of establishing contingencies and how are they being managed at a project and program level?
6. Are sufficient contingencies being carried to cover increases in cost and schedule, and are the contingencies consistent with industry practice?
7. How do the project soft costs compare with other similar programs?
8. Are the soft costs, specifically program or project management consultant help, contributing to the ability to maintain more control over the program, thereby assuring timely program completion that might not otherwise happen?

APPENDIX B – SCHEDULE OF ACTIVITIES DURING OCTOBER 2ND REVIEW WEEK

Sunday, October 2	Working Dinner with IRP.
Monday morning, October 3	Meet with Program Advisor (Jess Yoder, Parsons Program Advisor; Julie Labonte, Program Director; John Kinneen, Program Construction Manager; Emad Mansour, CM Operations Manager
Monday afternoon, October 4	Site visit to Bay Division Pipeline 5 – East Bay project, and discussions with Project Team.
Tuesday afternoon, October 5	Review of project documents at Market Street conference room; Meet Program Contracts Manager (Doug Stovall), Program CMIS Manager (Gustavo Soto-Rosa), Program Risk Manager (Susan Hou), Program Safety Manager (Todd Bjornsen).
Wednesday morning, October 5	SVWTP Expansion and Treated Water Reservoir Site Visit.
Wednesday afternoon, October 6	New Irvington Tunnel Site Visit.
Thursday afternoon, October 6	Crystal Springs/San Andreas Transmission Upgrade Site Visit; and working dinner.
Friday morning, October 7	Review Team Working Session, Debrief SFPUC Management on Findings & Recommendations.
Friday afternoon, October 7	Review Team Working Session – Summarize Findings and Recommendations. Wrap up.

Table B - 1

Schedule of Review Activities during Week of October 2, 2011

APPENDIX C – VARIOUS SOURCE DOCUMENTS FOR SOFT COST ANALYSIS

	Alameda County Water District	East Bay Municipal Utility District	Los Angeles County Sanitation District	San Diego County Water Authority	US Army Corps of Engineers
Planning	Included in Design	Not Available	0.6%	1.2%	Included in Design
Environmental	Included in Design	Included in Design	N/A	Included in Design or Planning	Included in Design
Design Costs	10.3%	14.3%	7.3%	12.6%	14 to 19%
Construction Management & Support & Closeout	16.9%	13.4%	3.5%	11.0%	10 to 16%
Total	27.2%	27.7%	11.3%	24.8%	24 to 35%

Table C-1

Soft Cost Ratios for Various Agencies¹⁸

	Project Management for Design & Construction	Construction Administration & Construction Management	Insurance	All Other Soft Costs	Total
Average	8.8%	6.3%	1.6%	2.2%	18.9%

Table C-2

Soft Cost Ratios for Design and Construction of 51 Rail Projects¹⁹

(Including BART & SFO International Airport)

¹⁸ Professor William Ibbs April 6, 2005 report to SF PUC. The LA County Sanitation District rates were excluded from the analysis in the body of this report because they were so substantially different than the other agency rates.

¹⁹ AECOM et al, "Estimating Soft Costs for Major Public Transportation Fixed Guideway Projects," Transit Cooperative Research Program Report #138, 2010.

Appendix D

Biographical Statement of William Ibbs

William Ibbs is professor of construction management in the civil engineering department at UC Berkeley. In that capacity he teaches cost estimating, scheduling and project controls at both the graduate and undergraduate level. Professor Ibbs leads a research program at Berkeley studying large design-construction project management. In that capacity he has conducted numerous research studies for the Construction Industry Institute, the leading research organization for this industry. CII is supported by large owners (US Army Corps of Engineers, Exxon, General Electric, TVA) and contractors (Bechtel, CH2M-Hill, Parsons).

Professor Ibbs is the author of more than 180 scholarly publications, magazine articles, training manuals and books, and has been a leader in professional organizations such as the American Society of Civil Engineers, the Beavers, and the Project Management Institute.

Dr. Ibbs has also provided construction-related consulting services to owners, designers and contractors around the world for the past thirty years. At last count he has been involved in more than \$42 billion worth of capital programs. Most relevant to this report, Professor Ibbs has participated in numerous large project reviews, including:

- ◆ Metroselskabet Metro System, Phase 2. Copenhagen (Denmark) Metropolitan Transit Authority.
- ◆ Waste Treatment Plant, Hanford WA. Bechtel and US Dept. of Energy.
- ◆ San Francisco-Oakland Bay Bridge. California Joint Legislative Committee.
- ◆ Hetch Hetchy Water System Improvement Program. BAWSCA.
- ◆ Bulk Vitrification System, Richland WA. CH2M-Hill.
- ◆ Panama Canal retrofit. Government of Panama.
- ◆ Boston Central Artery/Tunnel Project. Massachusetts Highway Department.
- ◆ Pasadena Gold Line. City of Los Angeles Metropolitan Transit Authority.

APPENDIX E
RESPONSE TO SFPUC'S DECEMBER 19, 2012 COMMENTS ON

IBBS'S NOVEMBER 28, 2011 WSIP/IRP REPORT

Professor William Ibbs

Prepared for the
San Francisco Public Utilities
Revenue Bond Oversight Committee

January 19, 2012

1. EXECUTIVE SUMMARY

The San Francisco Public Utility Commission (SFPUC) is currently constructing the large and complex Water System Improvement Program (WSIP). The Revenue Bond Oversight Committee (RBOC) of SFPUC commissioned an Independent Review Panel (IRP) to review and report on the WSIP. It also commissioned this writer to review and report on the workings of the IRP.

Accordingly, I prepared and submitted a draft report dated November 28, 2011 summarizing my analysis of the IRP report. The SFPUC responded to my report with comments in a report dated December 19, 2011. This report is a response to SFPUC's comments.

In some cases the SFPUC's responses and new information lead me to change my prior draft opinions. Specifically:

- Given such updated information, WSIP use of cost contingency appears to be in line with other large project/program experiences.

In other cases I retain my original opinion. Specifically

- WSIP's project schedule has used a disproportionate amount of its planned schedule contingency and likely overrun. I recommend a more detailed review.
- WSIP's soft costs are higher than what I would expect for a comparable program.

Also, SFPUC asserts only approved and pending change orders should be used to assess the Program's status. I disagree and recommend using approved, pending and some portion of potential change orders and some portion of trends. These portions can be estimated using risk analysis techniques.

I am open to reviewing additional information as SFPUC or RBOC wishes.

2. INTRODUCTION

The San Francisco Public Utility Commission (SFPUC) is currently constructing the large and complex Water System Improvement Program (WSIP). The Revenue Bond Oversight Committee (RBOC) of SFPUC commissioned an Independent Review Panel (IRP) to review the WSIP and commissioned this writer to review the workings and report of the WRP. The IRP prepared such a report, dated October 28, 2011.

I prepared and submitted a draft report dated November 28, 2011. That report was a review of the IRP October 28, 2011 report.

The SFPUC responded with comments dated December 19, 2011. Some SFPUC responses utilize information that was submitted to the IRP and me after the IRP October 28th report. Because my November 28th draft report was focused on that IRP October 28th report, SFPUC's subsequent information was not included in my draft report. This report is a response to key SFPUC's comments. That newly-provided information is considered in the following sections.

3. RESPONSES TO SFPUC COMMENTS

The SFPUC commented on nine references. My response to those references is presented below, sometimes in multiple subsections.

2. Ibbs Report Reference²⁰: Findings (page 6) makes numerical assessments of cost and schedule contingency usage at Program 41% Completion based on data from appended Table 1, and uses these assessments to conclude that the programs health needs attention because of the perceived percent of use of contingencies exceeding Standard Industry practice.

SFPUC Comment: Referenced Table 1 information does not appear to be clearly understood by the writer; the schedule contingencies usage assessments are misinterpreted; and the conclusions and findings are not representative of the actual state of the construction program. The schedule contingency data shown in Table 1 is an early warning parameter for internal use (not an actual contingency added to our project schedules) and the representation of "schedule contingency" is just one limited and simplified measure of schedule status for local and ongoing projects."

²⁰ SFPUC's #1 actually encompasses points 2 and 8, so I start my numbering with "2" here.

My response:

1. *I agree that schedule contingency is just one measure of schedule performance, and said as much in my original report: "Schedule risk is a complicated and analysis of the interconnection between the critical paths of all projects. So tabulating and tracking the remaining days of float is an incomplete way of measuring schedule risk..."*
2. *The SFPUC itself reports this metric its quarterly reports, which suggests that it believes this metric has some reporting value.*
3. *The fact remains that Figures 1a and 1b in my report contrast a large database of industry projects against the WSIP and that contrast is troubling for WSIP. I would welcome the chance to review any other information that SFPUC can present comparing WSIP to other industry projects, especially if that information has been published in a peer-reviewed outlet.*

SFPUC comment: Table 1 does not include the \$145 million of Program Reserves which have been removed from the so-named project cost contingencies, but is still part of the program cost contingency.

My response: I agree this \$145 million of Program Reserves gives the Program added cost contingency.

SFPUC Comment: The use of both potential change orders and trend numbers in the assessment means that the percentages of contingencies as used in the Report reflect the future (projected) state of the program at completion and not at the 41% complete ... In our opinion, the actual use of contingency as of September 25, 2011 at 41% complete would be more realistically represented by a calculation based on only approved and pending change orders, which address modifications (increased cost and time impacts) at the data date.

My response: I agree that trends and their impacts may or may not occur. However, SFPUC defines them "as potential risks that SFPUC believes may eventually occur and evolve into change orders." Thus some portion of them may occur and should be monitored. Moreover, I do not agree with the SFPUC's position that all potential change orders should be excluded. Such a position presumes contractors are not entitled to any portion of the change order requests they have filed. WSIP's true position is somewhere approved + pending change orders and approved COs + pending COs + potential COs + trends.

SFPUC comment: Table 1 reflects both ongoing and completed projects, but does not include projects not yet started, so Table 1 does not include the total program cost and schedule contingencies available. The calculated percent use of contingency as of September 25, 2011 at 41% complete should reflect the total program contingency, including projects not started, rather than only some of it.

My response: If SFPUC provides this information, I will recalculate the values and contrast such with the industry study that I cited.

3. Ibbs Report Reference: The statement under item 2 of the Report's key observations on page 1 states, "Definitions of those categories are ambiguous and the PUC acknowledged that there may be inconsistency in their use."

SFPUC Comment: The categories used for WSIP change orders are clear and consistent with industry practice as recognized in the IRP Report...The significance or usefulness of this observation is not clear.

My response: In my report I was citing an opinion by a senior WSIP manager who was interviewed during the week of October 2nd and said that there was probably ambiguity and mis-categorization of some of the change orders. The importance is that lessons can be learned and processes improved with such information. For example, if there are an inordinate number of "design error and omission" changes, design processes can be changed and improved using that information.

4. Ibbs Report Reference: The statement under Item 3 of the Report's key observations on page 2 states, "...Further time extensions will increase the risk that a major earthquake will occur and disrupt water supply before WSIP is completed".

SFPUC Comment: The probability of a major earthquake will increase as time elapses. However, the impact will tend to decrease as more WSIP projects are completed and new redundant and upgraded assets come online. The assertion that the risk will increase seems unsubstantiated.

My response: I agree with the SFPUC point that the 1) probability of an earthquake increases as time elapses and 2) consequences of immediate damages to the water system itself resulting from will tend to decrease as new, hardened assets come on line.

5. Ibbs Report Reference: The statement under Item 4 of the Report's key observations on page 2 states, "WSIP soft costs are higher than comparable projects, 20.7% vs. 12.8% to 14.3%."

SFPUC Comment: The IRP Report estimates WSIP soft costs for the construction program are less. The 20.7% includes other project pre-construction phase and program management costs. Table 2 "WSIP's reported soft cost" on page 13 of the Report incorrectly indicates that the 20.7% is the total Soft Costs for the Construction Phase. The Total Soft Costs for the Construction Phase is in fact 10.8%.

My response: My calculations were based on the October 28th IRP report. The IRP's final report, dated December 28, 2011, notes that WSIP's CM soft costs are 17.3%, not SFPUC's reported 10.8%. As the IRP report says, "The WSIP is at the higher end of the industry range..."

SFPUC comment: The IRP concluded that there were good reasons for the WSIP CM costs being somewhat high and they are reasonable for a program of its complexity and magnitude and the value gained.

My response: The benchmarking report cited by IRP indicates that large programs generally benefit from economies of scale, so large programs tend to have lower soft cost ratios than smaller projects. Also, the soft cost ratio is a function of both a numerator and a denominator. The CM costs (numerator) may be higher because of "California conditions" but the construction value (denominator) will probably be higher too.

SFPUC comment: One needs to understand the definition of various soft costs that apply to a program with the magnitude and complexity of the WSIP. Comparison to other programs may not be appropriate unless one can confirm that the categorization and tracking of cost expenditures of these agencies are similar to that of the WSIP. The author should confirm that these referenced figures are representative

of a multi-billion dollar program with over 80 projects and comparable location (California Bay Area), level of regulatory requirements, shutdown complexity, and associated risks.

My response: I agree that any soft cost study needs to have a clear definition of soft cost. One complication is trying to focus on the soft cost ratio of a particular phase (such as just construction) rather than the entire project. Not all the projects cited are multi-billion projects but many are quite large. Moreover, the benchmarking report cited by IRP indicates that large programs generally benefit from economies of scale, so large programs should have a lower soft cost ratio than smaller projects.²¹ A more detailed study may be warranted.

6. Ibbs Report Reference: The statements under Item 5 of the Report's key observations on page 2 address the transfer of WSIP business practices to other programs.

SFPUC Comment: While an excellent and valid observation, the transfer of WSIP lessons to other programs is not a WSIP CM responsibility. The WSIP CM Program has specific procedures for the internal use of lessons learned during WSIP implementation and documentation of lessons learned for future programs.

My response: The SFPUC and I agree that this is my original comment re: transferring WSIP business practices is a valid point. There may be some instances though where current WSIP CM operations and personnel should be utilized for such transfers; i.e. SFPUC should not shut the door entirely on this possibility.

7. Ibbs Report Reference: The statements under Item 6 of the Report's key observation on page 2 address the use of construction contract delivery methods other than design-bid-build.

SFPUC Comment: While an excellent and valid observation, the use of other contract delivery methods is a pre-construction/planning responsibility and not a WSIP CM responsibility. This may be of interest

²¹ CDM, "Multi-Agency CIP Benchmarking Program, Phase 4 Final Report."

for future programs but with only a few WSIP projects still remaining in pre-construction, this assessment would be of no value to the WSIP.

My response: The SFPUC and I agree that this is my original comment re: consideration of other delivery methods is a valid point. Even though there are few WSIP projects still in pre-construction, it would still be prudent to consider alternative delivery methods for those projects. There also be instances where current WSIP CM operations and personnel can be utilized to help future SFPUC projects and programs. For example, current CM personnel could better determine if certain types of WSIP projects been more susceptible to change and the reasons for those changes than personnel retrospectively reviewing WSIP projects in the distant future.

8. Ibbs Report Reference: The discussion of findings under Section 4.1.1 in pages 5 through 10 address WSIP status and overall cost and schedule performance using change order cost and schedule and cost and schedule contingency information as of 9/27/2011 (actually 9/25/2011). Comparisons are made to industry standard trends from a paper coauthored by Dr. Ibbs and dated May 1995.

SFPUC Comment: The assumptions and assessment of use and current state of cost and schedule contingencies are erroneous and they and the presentation therein misrepresent the actual current situation for cost and schedule contingency. Table 1 and the Figure 1a and 1b curves are not using representative cost and schedule information at 41% complete (44% calculated for Regional Projects). They include data that reflects the biased influence of many local completed projects, potential change and trend information that reflects future costs and schedule impacts beyond 41% (44% calculated for Regional Projects) complete point in time, disregards the program cost reserve contingency (\$145 Million), disregards the concurrency of various construction contracts, distribution of float, inter-project relationships, which projects are critical to program completion, and other factors required to reach any accurate and balanced conclusion concerning schedule contingency usage.

My response: I addressed this point earlier in this report.

SPPUC comment: Assessing schedule performance based solely on a percentage of the arithmetic summation of construction contract durations is not an accurate indicator.

My response: I addressed this point earlier in this report.

SFPUC comment: The representative current status of use of construction cost and schedule contingency for the 22 current projects (i.e., the remaining construction work in the WSIP Regional Construction Program for ongoing projects) is 14% cost contingency used and 48% schedule performance indicator used at 44% of work complete.

My response: Figures 1a and 1b in my November 28th report were prepared using IRP October 28th report data. WSIP's use of 14% cost contingency would put it slightly ahead of the other projects reported in Figures 1a and 1b. WSIP's use of 48% of the schedule contingency amount still is unfavorable compared to the other projects reported in Figures 1a and 1b.

SFPUC comment: It is also believed that the drawdown curve of Industry Standard Trends used in the Report is not a representative "apples-to-apples" comparison for the following reasons: 1) The comparison curve is believed to be derived from data from multiple single projects. It may not be appropriate to compare a Program Curve with what is essentially an "averaged" single project curve; 2) The comparison curve includes both design and construction whereas the WSIP curves are for construction only; 3) Many projects and programs do not use all contingency and would not approach 0% remaining contingency at 100% completion; 4) The comparison curve is believed to reflect costs and was not derived to reflect schedule aspects of a project or program; and 5) Competitive environment at the present time may not be comparable to 1995 when the referenced report was prepared.

My response:

- 1. As I say in my November 28th report, "The point is that no two construction projects or programs are identical comparisons but certain parallels can be credibly drawn." In other words, benchmark comparisons still have some validity. Can SFPUC present a comparison of WSIP to some other published study? Or be interested in conducting a more direct study?*
- 2. 104 of the projects were collected in the 1994-95 time period; another 50 of the projects comprising these figures were collected in the past ten years. All data were for the construction phase of a project, whether the project was Design-Build or Design-Bid-Build.*

9. Ibbs Report Reference: Item 6 of Key Observations, Page 3, “WSIP’s management has not responded in writing to the CM Panel’s January 2011 Phase 1 report and recommendations, although WSIP management assured the CM Panel that those recommendations were carefully and fully considered.”

SFPUC Comment: As stated, WSIP Management indeed carefully and fully considered the CM Panel’s previous comments and recommendations and has demonstrably implemented all of those recommendations during the past year with the exception of the following items....

My response: My finding and recommendation did not address whether SFPUC has implemented the CM Panel’s Phase 1 recommendations. My original finding and recommendation pertained to the documentation of such. A documented response is better because it will more likely be a record that survives to the future.

4. SUMMARY

Experienced professionals can look at the same information and legitimately come to different conclusions. That appears to be the case in several instances here.

WSIP is a difficult project in many regards – technically, financially, from a public spotlight perspective, etc. SFPUC is working hard to manage this challenging project. In accordance with my contractual obligation to RBOC, all my findings and recommendations have been presented in the spirit of helping RBOC and SFPUC improve its management of WSIP.

I would welcome the opportunity to discuss these and other issues further as SFPUC or RBOC wishes.