RW Block Consulting, Inc.

San Francisco Public Utilities Commission
Revenue Bond Oversight Committee

EVALUATION OF THE
WATER SYSTEM IMPROVEMENT PROGRAM (WSIP)

PROJECT CS-254

FINAL REPORT

May 9, 2013

RW Block Consulting, Inc.

Contents

Executive Summary

R.W. Block Consulting, Inc. (RWBC) was engaged by the Revenue Bond Oversight Committee (RBOC) to perform the following two tasks:

TASK A – Analyze the estimate at completion (EAC) and schedule at completion (SAC) for five projects in the Water System Improvement Program (WSIP). The primary objective of this task is to evaluate whether the current methodology used by the WSIP team provides realistic and reliable projections. The outcome of TASK A is our determination of the likelihood that each of the five projects analyzed will be completed within projected EAC and SAC parameters. RWBC was provided with four scenarios to use in analyzing each project, as follows:

1. Highly Likely – The consultant believes that there is a 90% or greater likelihood that the projects/program will be completed on time and within budget.
2. Very Likely – Same as above, except with an on-time and on-budget likelihood of 80%-90%.
3. Somewhat Likely – Same as above, except with an on-time and on-budget likelihood of 70%-80%.
4. Unlikely – Same as above, except with on-time and on-budget likelihood below 70%.

TASK B – Evaluate WSIP delivery costs, defined as soft-costs or non-construction costs, including project and program management, planning, engineering, environmental review and permitting, and construction management costs. The outcome of TASK B is our observations and recommendations associated with projected soft costs to complete the WSIP.

TASK A RESULTS

Figure 1 below provides the results of our WSIP project evaluation. The subsequent sections of this report expand on the methodology and approach used to evaluate each project.

FIGURE 1 - WSIP PROJECTS EVALUATED CONFIDENCE LEVEL CONCLUSIONS

WSIP Project Ref.	Project Name	Confidence Level
CUW37401	Calaveras Dam Replacement (CDR)	Unlikely (below 70%)
CUW35901	New Irvington Tunnel (NIT)	Very Likely (80%-90%)
CUW36801	Bay Division Pipeline (BDPL) Reliability Upgrade Tunnel	Highly Likely (90% or higher)

WSIP Project Ref.	Project Name	Confidence Level
CUW36701	Harry Tracy Water Treatment Plant (HTWTP) Long Term Improvements	Somewhat Likely (70%-80%)
CUW37101	Crystal Springs/San Andreas (CSSA) Transmission System Upgrade	Unlikely (below 70%)

Although our recommendations may not reflect that all projects will be completed on-time and within budget with a 90% or higher confidence level, we found that the WSIP management team has overcome difficult challenges on all five of the projects analyzed and that the program and project staff have worked diligently to ensure positive outcomes for the WSIP. Steps taken to mitigate cost creep included the use of formalized processes and procedures to review and proactively evaluate additional cost and time requests and the use of trends to project future cost/time required. As indicated in subsequent sections of this report, we found all WSIP project/program teams to be technically competent and to have a full understanding of the project requirements and activities needed to complete the work.

Based on the results for the five projects, but primarily driven by the encountered condition on the Calaveras Dam Replacement project (CUW37401), we conclude that the WSIP will not be finished on time and within budget as of the September 30, 2012 data date and corresponding approved budget at the time ($4,585.6M with an end date of July 26, 2016). This conclusion is also supported by the most current forecast to completion generated by the WSIP management team included in the March 22, 2013 Notice of Posting for Consideration of Revisions to the San Francisco Public Utilities Commission WSIP ($4,630.5M with a projected end date of April 11, 2019).

We also compared the value of our independent estimate for costs at completion for the five projects evaluated and found them to be within 3% of the latest estimates prepared by the WSIP management team (Notice of Public Hearing, March 22, 2013 Notice of Posting for Consideration of Revisions to the San Francisco Public Utilities Commission WSIP) as shown in Figure 42. Based on the principle of independent cost estimate reconciliation used by the Department of Transportation as well as other federal agencies, RWBC used a +/- 10% variance as the threshold to establish reasonability of presented forecast data prepared by the WSIP management team for the five projects evaluated. Based on the results that reflect a 3% variance between RWBC's forecast and WSIP management's forecast, we conclude that the existing methods used by the WSIP management team to forecast cost and schedule to completion are both reliable and realistic.

TASK B RESULTS

We found that the forecast soft costs to complete the WSIP ($909M) have exceeded the current budget totaling $864M. We also found that the ratio of soft costs to construction spend is forecast to increase above historical levels (Figure 45).

The task of ramping down a program the size and complexity of the WSIP can be daunting, as multiple competing interests must be dealt with simultaneously, such as: completing complex projects on which material unforeseen conditions were encountered, managing contractor performance, while also gathering and reporting project, regional, and program-wide information, and all while ensuring that budgetary parameters are maintained.

We recommend that the following actions be considered:

1. Evaluate the possibility of reducing soft costs by eliminating the regional program management structure.
2. Re-evaluate CDR and HTWTP projected staffing levels for opportunities to reduce costs through the use of San Francisco Public Utilities Commission (SFPUC) staff and by reducing overall staff.
3. Evaluate the monthly program management efforts to reconcile all project expenditures using a Construction Management Information System (CMIS) versus a less frequent reconciliation that would be offset by a reduction in program management staff needed to perform this function monthly.
4. Reconciliation of forecast soft costs to complete the WSIP compared to historical performance as well as reconciliation of WSIP's bottom up analysis to their top down staffing model using average annual staffing costs.

The sections that follow expand on these recommendations and provide supporting data used to develop the conclusions reached.

We would like to acknowledge the WSIP program and project management teams, which were, at all times, professional and courteous, and provided expedited replies to all of our requests for information. RWBC was also given full access to their CMIS and all data contained therein.

We appreciate the opportunity to prepare this report as the final deliverable under procurement CS-254, RBOC Evaluation of the Water System Improvement Program.

Respectfully submitted,

R. W. Block Consulting, Inc.

Report Organization

Although the material evaluated and the analyses performed were very technical in nature, R.W. Block Consulting, Inc. (RWBC) prepared this report using language that is straight-forward so that readers with no specific technical background would be able to understand the general concepts presented. This approach has some limitations, given that discussion of certain topics must incorporate technical information. In such cases, we attempted to balance the need for technical specificity with the need to reach the widest audience.

The **BACKGROUND** section of this report provides information summarizing the overall state of the WSIP, the manner under which the scope of engagement was developed, and a general overview of RWBC's tasks.

Following the **BACKGROUND** section is a narrative outlining RWBC's **APPROACH AND WORK PLAN** to perform the work that resulted in our evaluation of estimate at completion (EAC) and schedule at completion (SAC) for the five projects assigned for evaluation, as well as Water System Improvement Program (WSIP) soft costs. This section aims to expand on the **BACKGROUND** section and to provide a general understanding of the concepts discussed for readers not familiar with the WSIP.

Several sections pertain to the **METHODOLOGIES** used to evaluate various aspects of each project's performance. The purpose of these sections is to provide a general background on each methodology and parameter evaluated.

The technical analysis and observations on EAC/SAC are segregated for each project evaluated. The sections containing the project evaluation provide a general overview of the project and RWBC's assessment of the unique features of each project, as well as detailed calculations on throughput, project criticality, the cost realization rate (CRR) and time realization rate (TRR), and our independent estimate of budget (EAC) and time exposure (SAC) supporting our conclusions and observations. Each project evaluation is included under **TASK A: EXAMINE THE PROCESS FOR PROJECTING COST ESTIMATE AT COMPLETION AND SCHEDULE AT COMPLETION.**

Discussion of our evaluation of WSIP soft costs is provided in the section titled **TASK B: WATER SYSTEM IMPROVEMENT PROGRAM DELIVERY COSTS (SOFT COSTS)**. This section provides background information on the activities performed to evaluate WSIP delivery costs, as well as the analyses and calculations that support our observations and recommendations. Additional exhibits provided at the end

of the report provide detailed data calculations and analyses; a listing of documents reviewed and related data is also provided.

Background

The City's Revenue Bond Oversight Committee (RBOC) is charged with confirming that proceeds from revenue bonds issued to support the San Francisco Public Utility Commission's (SFPUC) Water, Power, and Wastewater Enterprise infrastructure improvements are being used in a professional and cost effective manner. Currently, the RBOC is focused on reviewing the SFPUC's delivery of the $4.6 billion Water System Improvement Program. As of September 29, 2012, the approved WSIP budget totaled $4.6 billion, of which $2.4 billion had been expended (52.9%).[1] Of this total currently approved WSIP budget, $2.2 billion was budgeted for construction, of which $1.3 billion had been expended (59.2%) as of September 29, 2012.[2]

As a result of recommendations made to the RBOC by Dr. William Ibbs (Ibbs Consulting) and an SFPUC Independent Review Panel, RBOC engaged RWBC to perform two tasks. The first task is to analyze EAC and SAC for five large water infrastructure projects, as shown in Table 1 below. The EAC and SAC analysis is discussed in the section titled "**TASK A: EXAMINE THE PROCESS FOR FORECASTING COST ESTIMATE AT COMPLETION AND SCHEDULE AT COMPLETION**" to coincide with the scope of work included in the procurement materials that resulted in this evaluation.[3]

TABLE 1 - PROJECTS INCLUDED IN EAC/SAC ANALYSIS

WSIP Project Ref.	Project Name	Budget[4] ($)
CUW37401	Calaveras Dam Replacement	415,638,000
CUW35901	New Irvington Tunnel	319,925,000
CUW36801	Bay Division Pipeline Reliability Upgrade Tunnel	307,081,000
CUW36701	Harry Tracy Water Treatment Plant Long Term Improvements	276,896,000
CUW37101	Crystal Springs/San Andreas Transmission System Upgrade	164,722,000

[1] WSIP *Regional Projects Quarterly Cost Report*, *1st Quarter/Fiscal Year 2012-2013* (Table 3.1, "Program Cost Summary").
[2] WSIP *Regional Projects Quarterly Cost Report, 1st Quarter/Fiscal year 2012-2013* (Table 3.1, "Program Cost Summary").
[3] RWBC's project scope is included in the Request for Proposal (RFP) CS-254: *RBOC Evaluation of the Water System Improvement Program (WSIP).*
[4] WSIP *Regional Projects Quarterly Cost Report,* Section 5, "Project Performance Summary."

The EAC/SAC analysis for these five projects entailed reviewing existing work conditions, performing project site visits, interviewing project and program management staff, and reviewing applicable EAC/SAC project data, as further detailed in subsequent sections of this report. The ultimate objective of TASK A was to answer the following fundamental questions:

1. Does the current EAC/SAC methodology provide realistic, sound, and reliable forecasts?
2. What is the confidence level that the five projects evaluated will be completed within the currently approved program cost and schedule?
3. Does the EAC/SAC analysis suggest that the overall WSIP program is on schedule/budget?

In addressing the above questions, RWBC determined the likelihood that the five selected projects would be completed as projected by the SFPUC's program management/project management/construction management teams. A four scenario rating scale was used by RWBC in evaluating each project based on the information reviewed and analyses performed:

1. Highly Likely – The consultant believes that there is a 90% or greater likelihood that the projects/program will be completed on time and within budget.
2. Very Likely – Same as above, except with an on-time and on-budget likelihood of 80%-90%.
3. Somewhat Likely – Same as above, except with an on-time and on-budget likelihood of 70%-80%.
4. Unlikely – Same as above, except with an on-time and on-budget likelihood below 70%.

The second task performed under this engagement was an evaluation of WSIP delivery costs, defined as soft costs or non-construction-related costs, including project and program management, planning, engineering, environmental review and permitting, and construction management. Given the stage of the WSIP, RWBC focused this evaluation on program, project, and construction management costs, as they account for the material portion of soft costs. The evaluation of WSIP soft costs is referenced in this report as TASK B, to coincide with the scope of work contained in the procurement materials that resulted in this evaluation.[5]

[5] RWBC's project scope is included in Request for Proposal (RFP) CS-254: *RBOC Evaluation of the Water System Improvement Program (WSIP).*

Approach and Work Plan to Accomplish TASK A and TASK B

RWBC's overall approach to accomplishing TASK A and TASK B entailed a process of discovery, data gathering, and data analysis for each of the five projects. The discovery phase commenced with preparation of a detailed work plan, which was presented to the WSIP management team and RBOC members at a kickoff meeting on October 30, 2012. Outcomes of the kickoff meeting included an initial detailed document request to gather background information on cost, schedule, and applicable contractual information for the five projects to be analyzed under TASK A and for the soft costs to be evaluated under TASK B. Additionally, the kickoff meeting served as the medium through which we scheduled site visits and project management interviews. Subsequent to the kick-off meeting and prior to conducting site visits, RWBC was provided with a wide range of documents for review including construction contracts, drawings, specifications, cost reports, schedules and related data. Site visits for all five projects evaluated were conducted between December 3, 2012, and December 14, 2012. Another key parameter that was agreed upon by all engagement stakeholders was to use September 30, 2012, as the project data date from which data for EAC/SAC would be evaluated. It was critical to have an agreed-upon data date for the analyses, as a moving data date would have created severe complications in attempting to evaluate the projections. Where possible and to a limited degree, RWBC used information later than the data date to make the analysis as current as possible. The data gathering phase of our work entailed the extraction of data from the WSIP Construction Management Information System (CMIS), the web-based project management system housing project information. The data gathering phase also entailed a review of project documentation provided, including applications for payments, change orders, trends, risks, and contracts. Interactions occurred between the WSIP program management team and RWBC, during which additional data or clarifications were requested. The final phase of our work entailed analysis of the data to fulfill RWBC's mission for TASK A and TASK B. A key aspect of the data analysis phase was development of a methodology that would provide data to independently determine the likelihood that the five projects analyzed would be completed as projected in terms of cost and schedule. Of importance to RWBC was development of a quantitative approach to evaluating EAC and SAC using project data. Detailed explanations of our Cost Realization Rate (CRR) and Time Realization Rate (TRR), throughput, and other methodologies are provided in subsequent sections of this report.

Our specific approach to evaluating EAC/SAC for each of the five projects consisted of the following activities:

1. Review applications for payment to determine how the work was being financially administered, review project cost information for major activities, and review billings on approved change orders.
2. Conduct a site visit to validate that, in general, major elements of the work have progressed in a manner consistent with that shown in the applications for payment and as reported by the WSIP team. Note that the purpose of the site visit was not to perform a detailed site inspection or an independent measurement of quantities, which were not included in this engagement.
3. Interview project management and construction management staff to understand project specific dynamics, features, or other data that provide context on financial values reported. At each project site, we also interviewed staff responsible for preparing and updating trends in the CMIS to evaluate standardization of trend input and use.
4. Review a sample set of construction change orders for general contract compliance to validate that required financial information exists in support of approved costs and adherence to program procedures. As proposed, RWBC reviewed a random sample consisting of 50% of the value of approved change orders for each project.
5. Perform a detailed evaluation of trends included in project cost reports and within the CMIS. RWBC extracted the entire population of trend information for each project contained in the CMIS.
6. Apply various methodologies, including CRR/TRR, throughput, and criticality, to evaluate budget and time performance and forecast to completion.
7. Apply additional project information providing context for CRR/TRR.
8. Develop recommendations based on RWBC's evaluation of whether or not each project would be completed on time and within budget.

To analyze WSIP soft costs, we gathered a wide range of information, including staffing plans (historical and planned), project expenditure information, and detailed project level staffing plans. We also evaluated the program management structure (project, regional, program wide) to identify potential areas of soft cost reduction, as well as the SFPUC's available resources to perform program management functions. After we reviewed this information, we evaluated the projects remaining to be completed to ascertain the complexity of work as well as the nature of the project teaming relations, recognizing that strained relations typically require additional project oversight and management to resolve issues and

ensure efficient completion of the work. Finally, we have provided recommendations for potential actions to reduce soft costs**.**

Cost Realization Rate and Time Realization Rate Methodologies for Analyzing Future Performance

The WSIP program management team uses standardized methodology to forecast cost and time at completion. The general formula for calculating final cost at completion (FAC) is shown below. FAC is the equivalent of EAC. The formula term was kept as FAC to match the terminology used by the program management team.

EQUATION 1:

$$FAC = \ Original\ Contract\ Value + Approved\ and\ Pending\ Change\ Orders + Potential\ Change\ Orders + Trends$$

From a cost definition perspective, each of the elements (starting with Original Contract Value and moving right to Trends) represents a decreasing level of cost definition. Note that other potential costs are not included in the forecast such as risks. Risks are not used by the WSIP management team to forecast costs but rather as management tool to evaluate and test project and/or program contingency and not as a cost or schedule to completion forecasting tool. Trends, as used by the WSIP management team, are the least defined work element used to forecast costs. Starting in 2010 the WSIP management team has moved to using risks and associated Monte Carlo Simulation to support contingency levels of projects.

The Original Contract Value is a contractually defined term that incorporates both time and cost performance parameters and is a well-defined cost element of a project. Similarly, Approved Change Orders are contractually binding work elements that modify the terms and conditions of the base contract and may reflect any modification to scope and/or contract terms and conditions.[6] Potential change orders are changes identified in a change order request or potential change order but whose negotiations are not completed. A Pending Change Order represents a defined and accepted cost not yet certified by the City Controller. The final element of EQUATION 1 is Trends. Trends represent potential cost impacts

[6] Changes order may increase or decrease the contract time and/or cost, or modify contract terms and conditions.

that have varying degrees of definition, but are generally not fully defined. The cost/time definition of Trends may be in the form of a rough-order-magnitude (ROM) estimate, management's arbitrary estimate of what the potential cost may be, or preliminary pricing provided by the general contractor. In the WSIP policies and procedures,[7] Trends are defined as:

> ...any expected deviation from approved schedule or contract amount, which is not yet a potential change… Trends may result from the following: issues that are identified and tracked in CMIS; analysis of the rate of expenditure of unit price items or allowance items versus progress; quality issues. In short anything that is occurring that is not yet a potential change that the project CM [Construction Manager] believes has a high probability of becoming a change to the contract amount or schedule. "

In EQUATION 1, Trends is the least defined cost category and the category with the highest variability. The FAC value is compared with approved budgets and contingencies to test whether or not sufficient funds are available to pay all forecast costs.

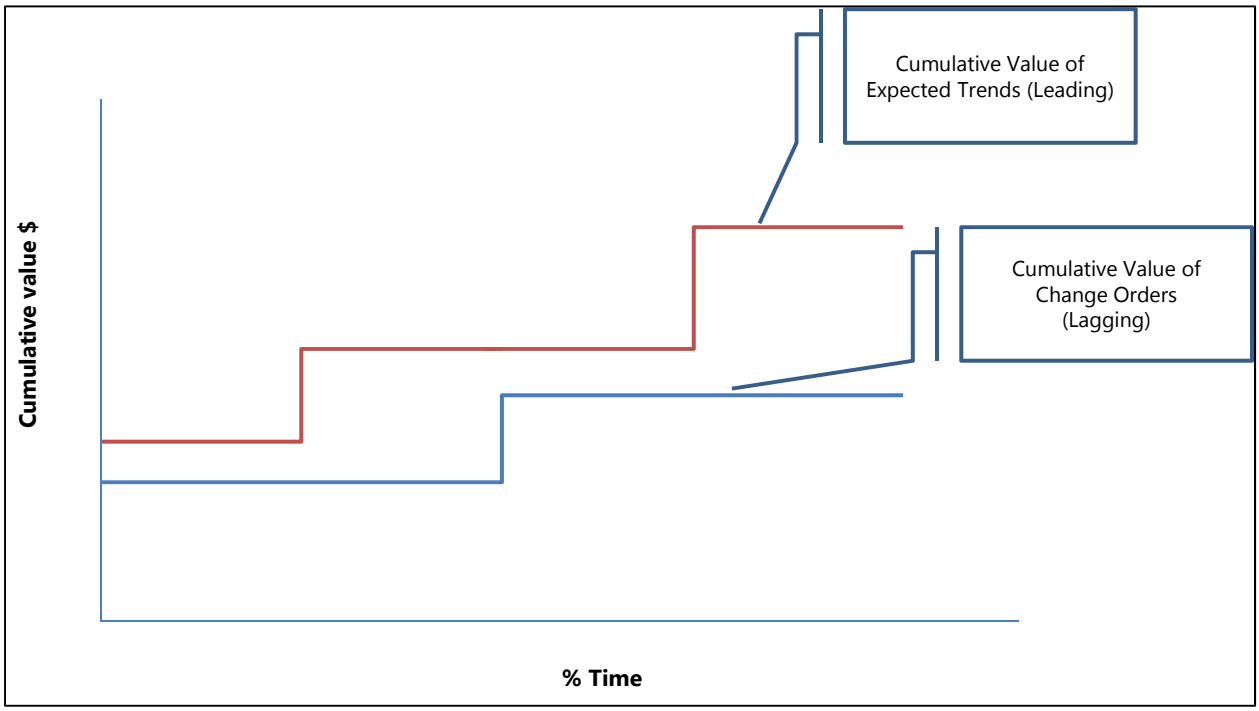
The evaluation of Trends and EAC then becomes a marginal analysis of those elements that have the highest variability given that all remaining elements have been approved or are pending approval and are well defined. Given this feature, RWBC developed a quantitative approach to test the accuracy of Trends in forecasting future costs. This approach is used to compare the cumulative expected value of Trends compared with the cumulative value of Approved Change Orders over time.

Given that Trends are leading indicators of potential costs, it would follow that, theoretically, the cumulative value of expected Trends over time, when shown graphically, would be a step function leading to realized costs (change orders),[8] as shown in Figure 2 below.

[7] WSIP Procedure #20, *Monthly Project Construction Progress Reports*.

[8] Exceptions may occur when credits are forecast or time deductions which would modify the step function. The general rule highlighted is that trends are leading indicators and change orders lagging indicators. Other exceptions can be introduced when a change is realized without a trend. If such conditions exist on the WSIP such would need to be addressed to ensure the accuracy of EAC/FAC (otherwise there may be a temporary understatement in EAC.

FIGURE 2 - THEORETICAL PLOT OF CUMULATIVE TRENDS VERSUS CUMULATIVE



Using this approach, we extracted change order data (date, amount) and trend data (trend value, probability of occurrence, date) for each of the five projects evaluated. We converted these values to cumulative values under a normalized project time scale (conversion of time expended to 100% basis). A metric, termed the Cost Realization Rate (CRR), was then developed to evaluate costs (similar analysis was conducted for time). CRR reflects the ratio of the Cumulative Value of Approved Change Orders divided by the Cumulative Value of Expected Trends, as shown in EQUATION 2 below:

EQUATION 2:

$$CRR = (Cumulative\ Value\ of\ Approved\ Change\ Orders)/(Cumulative\ Value\ of\ Expected\ Trends)$$

A CRR ratio of 1.0 is considered to be the uniform condition wherein forecast costs and realized costs are the same. A CRR ratio less than 1.0 is considered to be a conservative condition, as realized costs (Approved Change Orders) are lower than forecast costs (Trends). A CRR greater than 1.0 means that realized costs are higher than forecast costs (non-conservative condition). It should be noted that the key

element in determining CRR (and TRR) is the creation of a common time scale to enable both data points to be plotted concurrently. RWBC created a common percent-based timescale on which both Trends and Approved Change Orders can be plotted. It should also be noted that, in preparing CRR and TRR, project-specific conditions must be understood to provide context to the data, including variability in how trends are viewed by each project team, how the data are reflected in CMIS, and the project team's method for reporting cost (and time) forecasts. Several adjustments or notes are provided with each project evaluation where extenuating circumstances may warrant an adjustment to the CRR (or TRR). If structured properly, CRR and TRR could be used on other programs to evaluate the book-ends of cost forecasting performance. CRR and TRR were devised for the sole purpose of developing a metric to independently forecast costs and time to completion and not to replace existing practices used by the WSIP management team to forecast cost and time to completion.

Using this approach a wide range of analyses can be performed, including creation of a weighted CRR portfolio value based on construction value; test of CRR trends (is CRR remaining flat or moving in a certain direction over time?), or evaluation of CRR swings to understand the effects of events at the project level (lag in change order processing or realization of a change order given identification of a material unforeseen condition, for example).

The CRR can be applied to FAC to test, based on the specific project team's experience, whether or not a premium or credit should be expected based on the CRR value through the date analyzed. The CRR reflects the specific attributes of each project team (e.g. how it captures information, the management experience applied in assigning probability to an event occurring); in short, CRR is a metric that provides insights into the specific behaviors of the project management team in forecasting costs.
Using a similar approach, we calculated the Time Realization Rate, as shown in EQUATION 2A:

EQUATION 2A:

$$TRR = (Cumulative\ Value\ of\ Approved\ Time\ Extensions) \\ /(Cumulative\ Value\ of\ Time\ Identified\ In\ Trends)$$

A TRR ratio of 1.0 is considered to be the uniform condition where forecast time and realized time are the same. A TRR ratio less than 1.0 is considered to be a conservative condition, as realized time extensions

are lower than forecast time impacts (Trends). A TRR greater than 1.0 means that realized time is higher than forecast time (non-conservative condition).

Throughput Methodology for Evaluating Work-in-Place Performance

As used in this report, throughput measures the rate at which work is put in place compared to the rate at which the performance period is expended. Throughput analysis is another mechanism used to determine if work is being performed at rates adequate to achieve completion within the performance period. For this report, we have defined Throughput as set forth in EQUATION 3**:**

EQUATION 3: $$Throughput = \frac{Percent\ Work\ In\ Place}{Percent\ Time\ Expended}$$

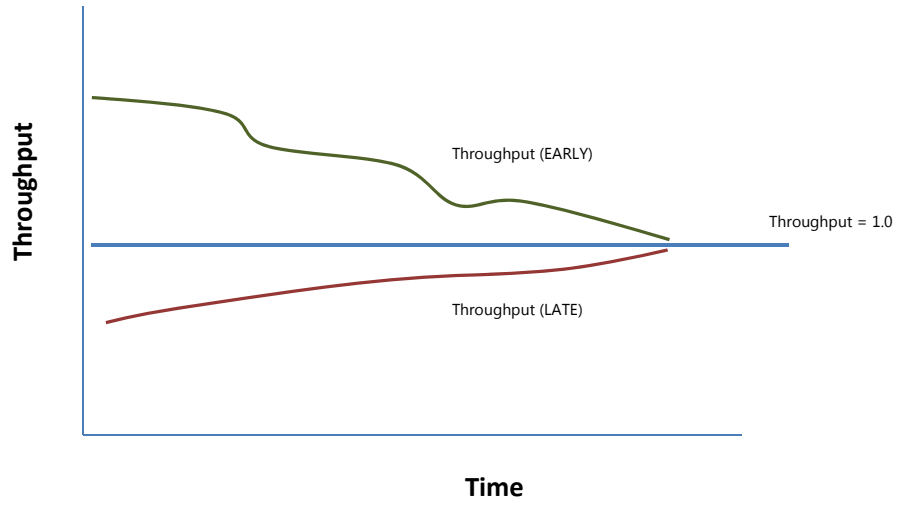
EQUATION 3 is further expanded as follows:

EQUATION 3A: $$Throughput = \left[\frac{Construction\ Expended}{Current\ Construction\ Contract\ Value}\right] / \left[\frac{Data\ Date - Notice\ to\ Proceeed\ Date}{Final\ Completion\ Date - Notice - to - Proceed\ Date}\right]$$

A throughput value of 1.0 means that work is being accomplished at the same rate that the performance period is being expended in a uniform condition. A throughput value less than 1.0 means that time is being expended faster than the work is being accomplished. A throughput value greater than 1.0 means that work is being accomplished faster than the rate at which the performance period is being expended**.** It is recognized that project Throughput performance is typically represented by an S-curve with a higher value of Throughput toward the end of the project. To incorporate this feature in our analysis, we evaluated Throughput performance for a defined time period using CMIS (schedule) generated S-curves for planned (late and early) conditions and compared these performance bookends to actual performance through the data date (or beyond if possible). Ultimately, when all work is completed, work in place and time expended will both be 100% resulting in a Throughput value of 1.0[9], the terminal condition. Figure 3, below, highlights how early and late throughput curves behave over time.

[9] Extenuating circumstances may occur wherein projects that are late in completion and for which time has not been approved may have an end result in which throughput is not 1.0. However, such cases would yield results that would fall outside the defined bookends and explanations would be provided for such results.

FIGURE 3 - THEORETICAL THROUGHPUT CURVES (EARLY, LATE, AND NORMALIZED)



Methodology for Evaluating Project Criticality and Schedule

For each project within the WSIP, the general contractor is contractually required to prepare a project schedule using the critical path method (CPM). The CPM is a scheduling technique developed in the 1950s by Morgan R. Walker of DuPont and James E. Kelley, Jr. of Remington Rand. The key feature of a CPM schedule is identification of the project's critical path, which is defined as the longest path of planned activities covering the project's performance period within which a delay in any activity will result in a day-for-day delay to the end date of the entire project. The criticality of a project is defined as the number of activities on the critical path compared to the total value of activities in the project schedule. This measure is important because the higher the number of activities on the critical path, the higher the probability that an activity may be affected and cause a delay to the project, or the less flexibility the project implementation team would have in re-sequencing activities to maintain the overall project end date. RWBC measured the criticality of a project using the following formula:

EQUATION 4:

$$Project\ Criticality = (Number\ of\ Critical\ Path\ Activities)/(Total\ Open\ Activities)$$

Task A: Examine the Process for Preparing EAC and SAC

This section provides a project-by-project analysis of the five projects evaluated, overall observations, and conclusions associated with each project. At the end of this section, we have compiled all project EAC/SAC analyses into top level observations that are reflected in the Executive Summary.

The project-by-project analysis consists of a background section describing the project scope, any unique characteristics of each project, and project status as of the data date. The analyses discussed include throughput analysis, project criticality analysis, CRR, and TRR. Based on these analyses, we provide our observations and recommendation on the likelihood that a project may finish as forecast by the WSIP program team.

PROJECT ANALYSIS: Calaveras Dam Replacement (CUW37401)

SCOPE

The Calaveras Dam Replacement (CDR) project consists of replacement of the original dam, which is seismically unsafe, with a new 210-foot-high earth and rock fill dam designed to accommodate a maximum credible earthquake on the Calaveras Fault. The new dam is to be constructed immediately downstream of the existing dam and have a crest length of 1,210 feet, a base thickness of 1,180 feet, and a crest thickness of 80 feet. The total volume of the dam will be approximately 2.8 million cubic yards. A new spillway, stilling basin, and intake tower/shaft are also part of this project. The drain line and three adits from the existing facility will be connected to the new shaft. The existing dam will largely remain in place, but will be modified to accommodate construction and operation of the replacement dam. The replacement dam will restore the original reservoir capacity, and it will be designed so that it can be raised to accommodate potential reservoir expansion in the future. Additionally, the Alameda Creek Diversion Dam (ACDD), which diverts water from Alameda Creek to the Calaveras Reservoir, will be modified with a new flow bypass tunnel and valve to allow for downstream flows below the ACDD. The bypass flows at ACDD, together with flow releases from new low-flow capacity valves installed at the base of the replacement Calaveras Dam, will provide water downstream of these facilities to support native aquatic resources and the future population of steelhead trout that are being restored to the Alameda Creek Watershed.

CHARACTERISTICS

The CDR project is technically very difficult. For example, a few of the challenges the project team has had to overcome when performing the work include movement of 2.8 million cubic yards in constrained site conditions, fill material that contains naturally occurring asbestos (NOA), and coordination of work with multiple environmental regulating agencies, each with significant influence in its ability to affect work activities. Over 1 million cubic yards of excavated soil and rock materials will have to be double handled; schedule delays required the project team to work with regulatory agencies to amend existing permits to accommodate for changes, and delays associated with protected species found on site and maintenance of environmental fencing, present but a few of the challenges the project team has to overcome when performing the work.

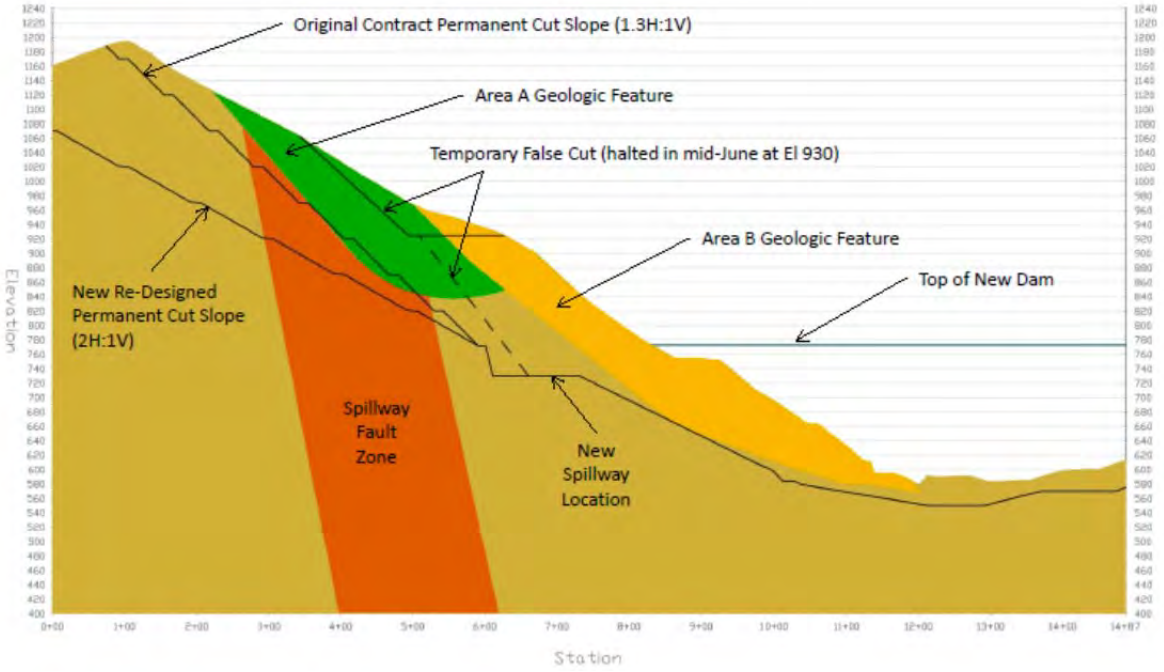
PROJECT STATUS AS OF THE DATA DATE (SEPTEMBER 30, 2012)

The original base bid for construction, totaling $259,571,850, was awarded to the Dragados USA, Inc./Flat Iron/Sukut Construction, Inc., Joint Venture. As of the data date, 23 change orders had been approved with a total value of $19,022,881.86 and additional time totaling 69 days, extending the construction completion date from August 13, 2015, to October 21, 2015. As of September 30, 2012, the project was 26.19% complete ($72,974,499 earned against a contract value totaling $278,594,731). In June 2012, a significant unforeseen project site condition was encountered pertaining to geological conditions on the left side of the valley (looking downstream from the existing dam). This condition is located at a critical point in the construction of the new dam. Previous geotechnical investigations performed during the planning and design phases did not fully reveal conditions which were encountered. Between June and September 2012, several previously unknown geologic features were found within the cut slope excavation of the 700-ft high slope known as Observation Hill on the left side of the valley above the future dam and spillway. These are shown as "Geologic Features A and B" in Figure 4. "Geologic Feature A" is now considered to be an ancient landslide, whereas the specific origin of "Geologic Feature B" is less definitive. In addition, a fault zone previously known to exist was found to occur approximately 200 feet further west than previously known, placing it within a critical location within the designed excavation cut slope shown in Figure 4. The approved budget as of the September 30, 2012 data date is $415.638M and an approved completion date of July 26, 2016.[10]

[10] WSIP Quarterly Report, Project Performance Summary, September 29, 2012

Figure 4 below shows the location of the encountered condition[11] while Figure 5 is a project field photo showing the general location of the encountered geologic condition.

FIGURE 4 - SCHEMATIC CROSS-SECTION OF OBSERVATION HILL[12]



[11] November 7, 2012 SFPUC Memorandum. Area "A" shaded in green area "B" shaded in dark yellow represent the encountered condition.
[12] November 7, 2012, SFPUC Memorandum (graphic)

FIGURE 5 - FIELD PHOTOGRAPH OF ENCOUNTERED CONDITION

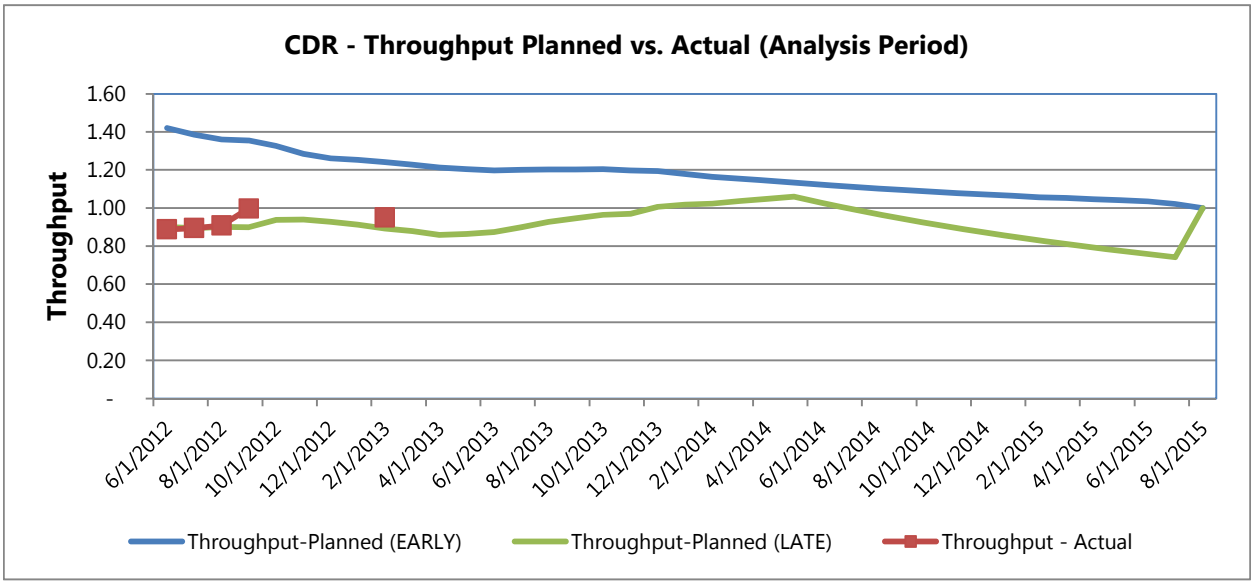
The general contractor's initial estimated cost to address this unforeseen condition totals $133 million and a 25-month extension to the project schedule. The estimated amount consists of current unit prices, new unit prices, acceleration, and general conditions costs. Additional soft costs are expected and a re-baseline of project contingency will be needed, given that this project is only 26.91 complete and ample opportunities exist to encounter additional costs. As of February 2013, the project team and the general contractor continued to negotiate elements of this change including the appropriate value of general conditions, lump sum work, or work to be performed under current unit prices and new unit prices.

THROUGHPUT ANALYSIS

As described earlier in this report, RWBC evaluated the actual throughput achieved through the data date of September 30, 2012, and compared this throughput value with the planned throughput under early and late start dates. The early and late throughput curves provide bookends against which actual performance can be measured. It is important to note that a throughput curve based on early dates would be based on the assumption that work in place is achieved using the early dates identified for the related project activities, while the inverse assumption related to a throughput curve based on late

dates[13]. As shown on Figure 6,[14] actual performance to date for the CDR project trends to the late throughput condition. Factors attributing to work not being performed at rates required to achieve contract performance throughput at this time are primarily driven by the encountered geological feature that slowed work activities significantly in June through November 2012. As of the end of February 2013, throughput for the project was 1.02[15] which shows that productivity is improving. It is important to note, however, that the throughput as of February 2013 does not reflect the impact of the encountered geologic impact on either early and late curves or actual throughput that will essentially reset all throughput curves given the materiality of the impact. Any delay to negotiations or proceeding with the work associated pertaining to the encountered geological condition without an agreement may significantly reduce productivity and create conditions where claims or disputes may be submitted by the general contractor.

FIGURE 6 - CDR PLANNED VS. ACTUAL THROUGHPUT



[13] Note that this statement pertains to throughput curves not cashflow curves generated from a cost-loaded CPM schedule for early and late dates.

[14] Early and late date data were extracted from the WSIP Report, *Planned vs. Actual Progress Performance, CUW37401: Calaveras Dam Replacement,* September 25, 2012.

[15] In calculating throughput, the $133 million/761 day impact was not included given the variability of pricing at the end of negotiations and the fact that early and late cost curves incorporating this impact are not yet developed as this change is not yet final.

CRITICALITY ANALYSIS

As indicated in the throughput analysis described above, as of the data date of September 30, 2012, work on the CDR project is progressing against late start rates. RWBC's analysis of the CDR project schedule is also consistent with this trend, as activities on the critical path materially increased from 25% in June 2012 to 35% in September 2012. The more activities on the critical path, the higher the probability for an impact to an activity that will affect the end date of the project. Contributing factors to this increase in schedule criticality are driven by the resolution of excavation/fill activities to mitigate NOA in soil being handled on the project site, encountered geological conditions, and environmental mitigation activities. Table 2, below, contains a summary of the results associated with our project schedule review.

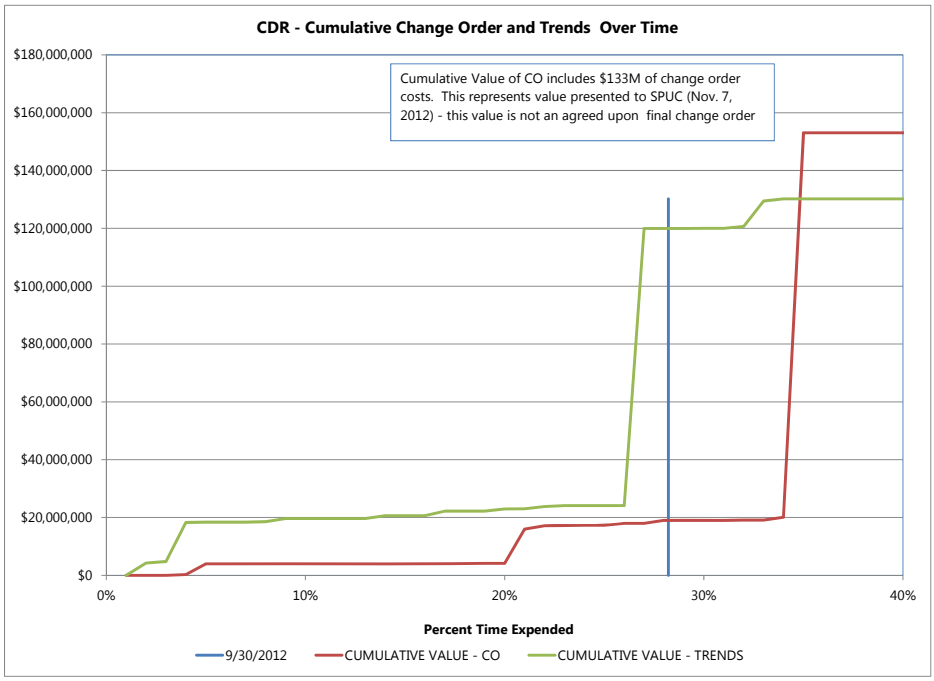
TABLE 2 - CDR PROJECT CRITICALITY ANALYSIS

Data Date	Total Activities	Open Activities	Critical Activities	% Critical	Period Change % Critical
	(A)	(B)	(C)	(D)=(C)/(B)	(E)
July 2012	3221	2338	583	25%	n/a
August 2012	3693	2747	736	27%	7%
September 2012	3652	2576	900	35%	30%

COST REALIZATION RATE ANALYSIS

The underlying data used to calculate CRR values are provided in EXHIBIT 1 and EXHBIT 2. The current CRR for the CDR project is 1.18, meaning that the actual costs realized on this project exceed projected trends. RWBC decided to include Trend 00044 (the unexpected geological condition) as an approved change with a value of $133 million and a time extension of 25 months (761 days). We fully recognize that this trend has not formally been approved as a change order; however, it is a trend that is currently being negotiated with the contractor and initial work authorizations for portions of the work have been authorized under change orders #17, #25, and #27, and presented to oversight committees as a forthcoming change. It is our opinion that including this information as a change order more accurately reflects actual project conditions. As shown on Figure 7, the cumulative value of trends is acting as the leading indicator while approved changes are the lagging indicator. The vertical line is the data date line inserted for reference.

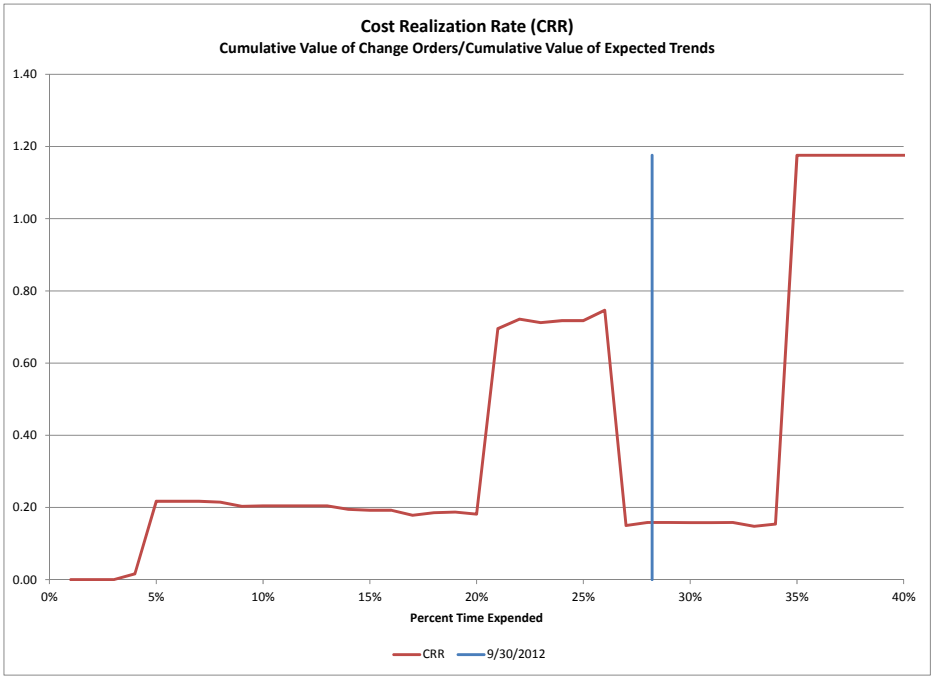
FIGURE 7 – CDR CUMULATIVE TRENDS VS. CUMULATIVE CHANGE ORDERS



Another feature to be noted is the time-lag in converting trends to change orders.[16] One of the features shown on Figure 7 is the material period of time in converting trends to change orders. Contributing factors include the complex nature of the work and the size of the proposed changes (e.g., Trend 00044-encountered geological condition). Using EQUATION 2, RWBC calculated the resulting CRR data for the CDR project, as shown on Figure 8. The step functions prior to the introduction of costs associated with the unforeseen geological condition reflect a conservative cost forecasting methodology given that the CRR for this project was less than 1.0.

[16] A trend may not necessarily result in a change order. Conversely, a change order may not have an associated trend. However, if trends are to be used as the leading indicators of cost, we would expect that a material volume of change orders would have a trend.

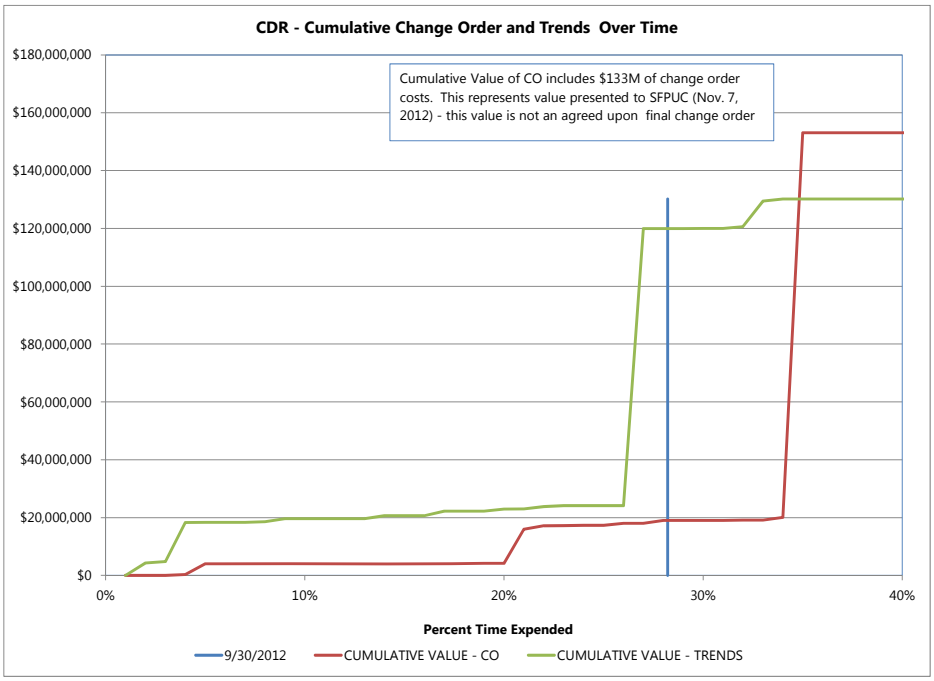
FIGURE 8 - CDR COST REALIZATION RATE



TIME REALIZATION RATE ANALYSIS

As shown in EXHIBITS 1 and 2, time is also associated with trends and approved change orders. Through Change Order #29, 69 days were added to the base contract schedule. To ensure that the most current project performance is reflected consistent with CRR calculations, RWBC included the proposed 25-month extension in the approved change order time approval. Similar to the data used in calculating the CRR, we believe that including this information more accurately reflects project conditions, yet we fully recognize that this extension is not yet an approved change. In calculating the TRR for the CDR project, RWBC first plotted the approved time extensions identified under trends and through approved change orders, as shown in FIGURE Figure 9 below.

FIGURE 9 – CDR CUMULATIVE TIME ANALYSIS (TRENDS VS. CHANGE ORDERS)



The TRR for the CDR project is 0.93, as other trends, aside from the trend pertaining to the encountered geological feature, included additional time for which a change order has not been approved.

OVERALL OBSERVATIONS

Our overall observations, provided below, are based on our review of the CDR project, as well as the basis for EAC and SAC analyses.

1. We found that the CDR project team is technically competent and has a thorough understanding of the project's technical and construction requirements. The joint venture general contractor appears to be working cooperatively with the project team. It should be noted that this is the first time the joint venture team has worked together.
2. The encountered geological condition represents a $133 million issue that includes a wide range of pricing components, most notably: the use of current unit prices, introduction of new unit prices, lump sum costs, and general conditions costs. The 25-month time extension consists of two components: (1) the additional time needed to address the encountered condition and (2) the additional time needed to address other current and not-yet-encountered conditions. It should be noted that, even if a change order were executed and agreed to by all parties,

additional costs may be incurred under the following conditions: (a) overruns in unit quantities[17], (b) availability of assumed borrow material as planned and at the required quality, and/or (c) environmental mitigation requirements. It should also be noted that the $133 million budget does not include soft costs or costs to mitigate or remediate environmental impacts, which are material values that will need to be added to the total costs.

3. The unforeseen geological condition was encountered early in the CDR project (less than 30% complete). Given that the CDR project is technically difficult with a constrained site (access, environmental, NOA, etc.), it would be imprudent to assume that no other changes will arise aside from those already experienced or projected. Even with a competent project team actively identifying and managing trends, it is reasonable to expect that additional changed conditions will be encountered. Given this expectation, we projected budgetary performance using a 10% contingency based on forecast construction costs, as shown in Figure 10. The 10% contingency was calculated using the overall percentage of work methodology set forth in the Construction Cost Engineering Handbook (Patrascu) and adjusted for technical complexity of work, general contractor/owner relations, site characteristics of work, opportunity for realization of unforeseen costs not currently forecast, and size of the project.[18]
4. Using CRR and our contingency forecast, we project that the overall remaining budgetary requirement is $67.9 million above current budget approvals of $532.6 million. This projected value applies the project team's forecast for all project elements with the addition of CRR performance and, in this case, our estimate of what a reasonable construction contingency would be given the project requirements and stage of the work (35% complete as of February 2013). This value was used as a data point to determine our conclusion on the likelihood that the CDR

[17] Very difficult to ascertain actual quantities at this time.

[18] As described in the Construction Cost Engineering Handbook (Anghel Patrascu): "Four common methods for estimating contingency are (1) overall percentage; (2) detailed percentage; (3) detailed percentage considering the probability of occurrence; and (4) risk analysis. The **overall percentage** method was selected by RWBC to estimate contingency requirements as it is readily calculated, incorporates our own experience, and can easily be understood. **Detailed percentage** method applies a different percentage of contingency to components of the estimate rather than an overall amount on the whole estimate. **Detailed percentage considering the probability of occurrence** is similar to detailed percentage methodology but adds the probability of occurrence to each contingency item. **Risk analysis** is a method of contingency calculation that uses Monte Carlo simulation. The probability of underrun/overrun is evaluated using probability distributions. All methods described have advantages and disadvantages. For example the overall percentage is the simplest to use and easiest to understand yet the one with the least level of detail in how contingency value was calculated (percent applied to a base cost). Meanwhile use of risk analysis incorporate a wide range of scenarios based on probabilities yet its basic weakness of this approach is the difficulty, if not impossibility, of making each component input totally independent and limited by the quality of inputs and associated probabilities.

project will finish on time and within budget. FIGURE Figure 10, below, provides a summary of the calculations used to determine the overall projected budget.

FIGURE 10 - CDR PROJECTED BUDGET

Element	Amount	Reference/Comments
Current Construction Contract value	$ 280,707,564	(Feb. 23, 2013 Contract Summary)
Potential changes	$ 112,331,216	
Trends	26,017,074	Potential CO's included in CRR given there are material differences between owner and contractor pricing. (Feb. 23, 2013 Contract Summary)
CRR @1.18 (applied to Trends)	4,683,073	
Subtotal Construction:	423,738,927	
Contingency:	42,373,893	Recommended project contingency (10%)
Total Construction	**$ 466,112,820**	

Project Budget:		
Project Management	$ 13,878,000	(January 1, 2013 - Quarterly Report)
Planning	6,035,000	(January 1, 2013 - Quarterly Report)
Environmental	16,039,000	(January 1, 2013 - Quarterly Report)
Design	22,469,000	(January 1, 2013 - Quarterly Report)
Bid & Award	705,000	(January 1, 2013 - Quarterly Report)
Construction Management	74,080,000	(January 1, 2013 - Quarterly Report)
Construction	466,112,820	From above
Closeout	1,242,000	(January 1, 2013 - Quarterly Report)
TOTAL Forecast	**$ 600,560,820**	

Current Approved Budget:	**532,638,000**	(January 1, 2013 - Quarterly Report)

Variance Forecast vs. Current Approved Budget:	**(67,922,820)**	Forecast requirement

CONCLUSION

Based on our review of the CDR project, as discussed above, we believe that it is **Unlikely** that this project will be completed within the current budget and time. It should be noted that this conclusion is primarily driven by a significant unforeseen condition, expected additional changes given that the project is only 35% complete (as of February 2013), the potential for additional costs in performing the changes resulting from Trend 00044, as described in the preceding sections. Even with a 25-month time extension, significant opportunities exist for time overruns, including potential impacts associated with actual conditions found when addressing the encountered geological condition, inability to access borrow sites as planned, and other associated impacts. We also believe that the impacts, regardless of severity, would be significantly worse had the project team not worked to mitigate issues and identify workarounds for these technically challenging issues.

PROJECT ANALYSIS: Crystal Springs/San Andreas Transmission System (CUW37101)

SCOPE

The Crystal Springs/San Andreas (CSSA) Transmission System is a series of inlet and outlet structures, pipelines, and pumping facilities that move water from the Crystal Springs Reservoirs north to San Andreas Lake and the Harry Tracy Water Treatment Plant, and then into the water distribution pipelines. This transmission system ensures that the San Francisco Peninsula's emergency and supplemental water supply can be quickly moved into the water pipes leading to residential taps. The construction contract for the CSSA Transmission System upgrade was awarded to Kiewit Infrastructure West, Inc. with a Notice to Proceed (NTP) date of December 1, 2010. The project area (including all construction, staging, and access areas) encompasses approximately 135 acres and consists of seven distinct project components running approximately 7.6 miles across the Peninsula Watershed. The project includes upgrades to the water transmission pipeline adjacent to Sawyer Camp Trail, the outlet structures at Crystal Springs and San Andreas reservoirs, and the Upper Crystal Springs Dam culverts and construction of a new Crystal Springs Pump Station. The project consists of improvements to facilities necessary to transport water from the Upper Crystal Springs Reservoir, through the Lower Crystal Springs Reservoir, to the San Andreas Reservoir and, ultimately to the HTWTP. Specifically, improvements will be made to the Upper Crystal Springs Dam discharge culverts, the Lower Crystal Springs outlet structures, the Crystal Springs Pump Station, the Crystal Springs/San Andreas Pipeline, and the San Andreas outlet structures.[19] The approved budget for CSSA as of the September 30, 2012 data date was $164.722M with a corresponding approved completion date of April 23, 2014.[20]

CHARACTERISTICS

Unique features of this project include underwater construction at Lower Crystal Springs Reservoir and San Andreas Reservoir, where multiple site conditions have been found that differ from expected conditions. Work at these underwater locations requires divers to work at depths of 110 feet. This project is also located in an environmentally sensitive area (protection of wildlife and water quality during construction). The project site is large and disparate, with seven distinct locations encompassing 135 acres over 7.6 miles across the Peninsula Watershed. Another project-related feature is that the general contractor staff is estimated to outnumber project management/construction management staff by a ratio

[19] WSIP Quarterly Report, June 2012 and site visit on December 6, 2012.
[20] WSIP Quarterly Report, Project Performance Summary, September 29, 2012

of 2:1 based on interviews during our site visit. Issues have been found related to the underwater structures and differing site conditions. Given the disparate nature of the work, this project can be thought of as seven disparate projects that have to be managed as a whole. In addition, this project requires multiple phased shutdowns, which have interdependencies with other projects in the WSIP.

Project records show a large volume of correspondence pertaining to progress on the project, requests for recovery schedules, and a very high number (1,085) of Requests for Information (RFIs). The number of RFIs on this project is the highest of the five projects reviewed. In and of itself, RFI volume may be indicative of poor design (hence, a high number of questions), a general contractor attempting to structure a position on the project, and/or other condition. Regardless of the merit of an RFI, each RFI has to be reviewed and responded to, which consumes construction management project staff time. We found that the contractor team and construction/project management team were working in a somewhat strained relationship.

PROJECT STATUS AS OF THE DATA DATE (SEPTEMBER 30, 2012)

The construction contract for this project was executed with Kiewit Infrastructure West, Inc., on September 7, 2010, for a value of $99,763,000. An NTP was awarded on December 1, 2010, with a 920-day

FIGURE 11 - CSSA PROJECT SITE

construction period, ending on August 6, 2013. To date, a total of 90 change orders have been approved with an aggregate value of $4,067,499.39 (EXHIBIT 3) but no additional time has been added to the project. This project is under construction and was 59% complete as of the September 30, 2012, data date. Construction was in progress at both Lower Crystal Springs Reservoir and San Andreas Reservoir. Barges, cranes, and other equipment were visible at the project site, with divers still working on the outlet structures, tunnels, and pipes that move water from the reservoirs to the HTWTP. Work was also observed on the new Crystal Springs Pump Station and on seismic improvements to the water pipeline that runs adjacent to Sawyer Camp Trail. Short periods of trail closure are necessary to complete the work. Given the environmental sensitivity of the Peninsula Watershed, the project team is carefully focused on protecting species and water quality. The Crystal Springs Reservoir System serves as the emergency water supply for over one million people in San Mateo and San Francisco Counties. Based on our site visit on

FIGURE 12 - CSSA PROJECT SITE - MARINE CONSTRUCTION

December 6, 2012, we concur with the project progress reported to date.[21] As of December 31, 2012, the project was 66% complete. Figures 11 and 12 contain project site photos.

[21] The site visit did not entail a detailed inspection of field-installed quantities, but was intended to gather a sense of whether or not reported progress to date reflected actual project conditions.

THROUGHPUT ANALYSIS

RWBC evaluated and compared the actual throughput achieved on the CSSA project through the data date of September 30, 2012, with the planned throughput under early and late start dates. We also added a data point of December 31, 2012. Figure 13 below shows that actual performance to date follows the late date throughput condition, but within acceptable levels. It should be noted, however, that actual throughput performance has not improved, and remained steady at about 0.80. Factors contributing to work not being performed at improving throughput rates include delays to the outfall structures given unforeseen conditions encountered and resolution of unforeseen conditions in a marine environment, general contractor generation of a high number of RFIs (1,085 as of December 31, 2012 – the highest number of all five projects evaluated; see Figure 14 below), requirements to re-sequence the work and issue recovery schedules,.

FIGURE 13 - CSSA THROUGHPUT ANALYSIS

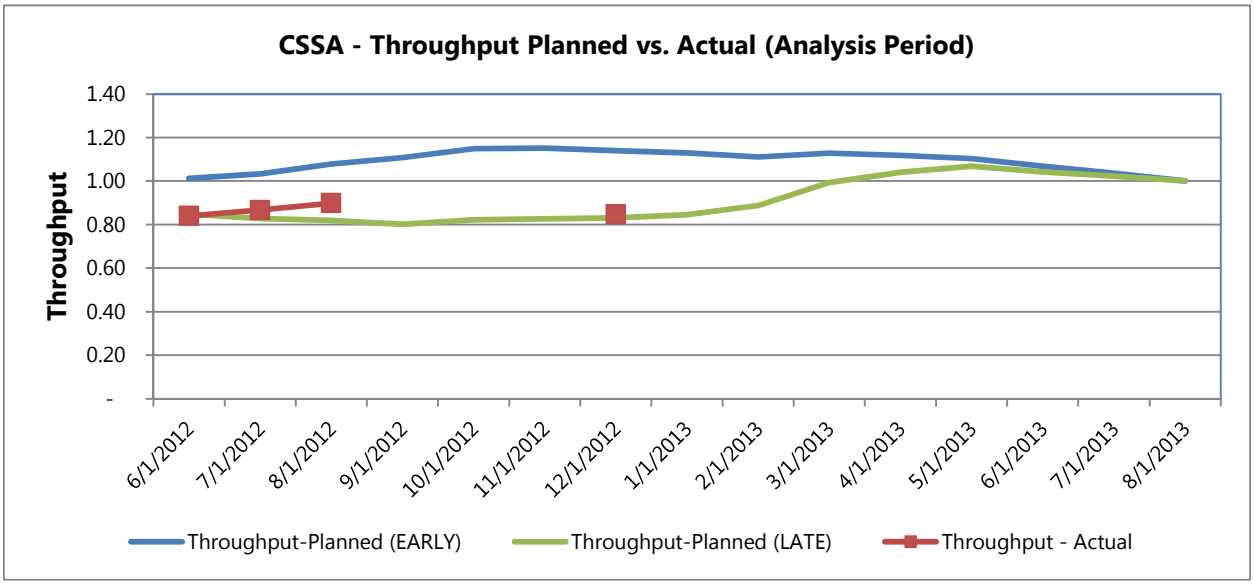


FIGURE 14 - CSSA REQUESTS FOR INFORMATION

Period	RFI (EA)
June 2012	785
September 2012	180
December 2012	120
Total through 12/31/12	1,085

CRITICALITY ANALYSIS

As shown in Figure 15FIGURE , the throughput performance on the CSSA project is within the acceptable early and late boundaries, but the project performance remains flat, still trending on the late start throughput boundary. This trend highlights that maintaining project performance completion dates will require a material increase in productivity at a project site that is not conducive to high production work (multiple constrained locations in a geographically disparate area, for example). The criticality of the project also reflects this trend, as nearly half (45%) of the open activities on the CSSA project are on the critical path, as shown on Figure below. Please note that the rate at which the criticality increased: 28% between July and August 2012 and 13% between August and September 2012.

FIGURE 15 – CSSA CRITICALITY ANALYSIS

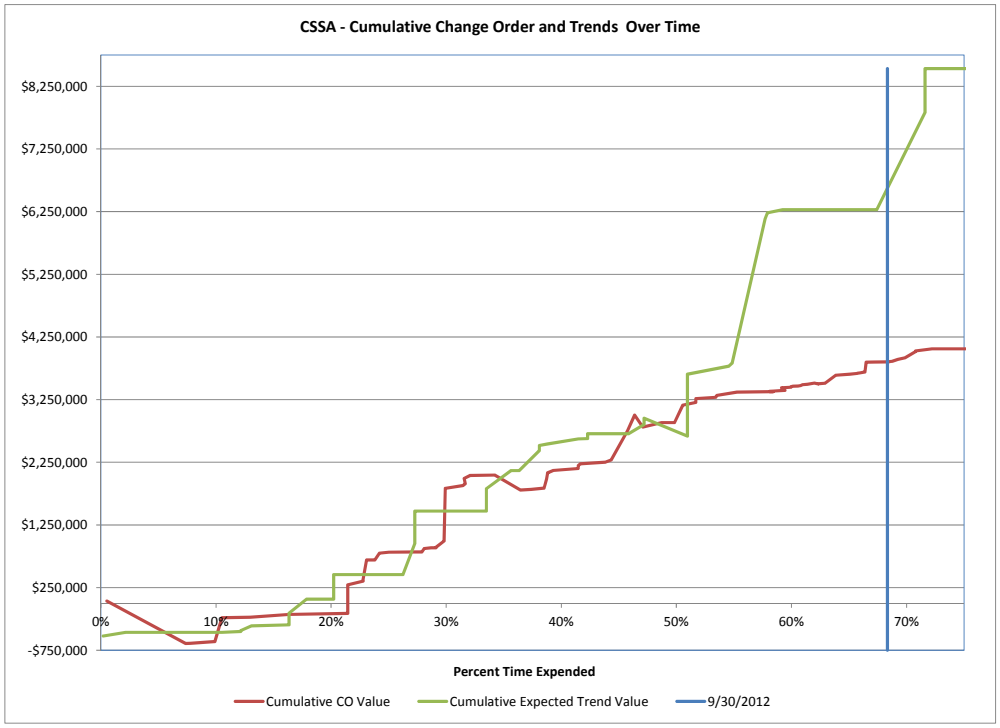
Data Date	Total Activities	Open Activities	Critical Activities	% Critical	Period Change % Critical
	(A)	(B)	(C)	(D)=(C)/(B)	(E)
July 2012	2734	969	302	31%	n/a
August 2012	2762	829	331	40%	28%
September 2012	2788	796	360	45%	13%

COST REALIZATION RATE ANALYSIS

Similar to the CDR project, the underlying data used to generate the CRR for the CSSA project are contained in EXHIBITS 3 (change orders) and 4 (trends). As shown below on Figure 16, through April/May 2012 (roughly 50% of time expended), the cumulative value of trends closely followed the cumulative value of change orders. From April/May 2012 through the project data date (September 30, 2012) and through the last trend captured (December 13, 2012), the cumulative value of trends increased at a much faster rate than the change orders being approved. Based on the trend information reviewed, the bifurcation starting at 50% of time expended was driven by trends associated with culvert stabilization, phasing adjustments, re-sequencing of work, and potential acceleration of the work. We believe that a driving reason for the bifurcation is that the project team and the contractor could not readily agree on certain project elements. This observation is based on interviews conducted at the project site, the number of RFIs and nature of RFIs, and the fact that, for 50% of the project performance period, the rate

at which trends were realized into change orders almost reflected the theoretical case shown on Figure 16.

FIGURE 16 – CSSA CUMULATIVE CHANGE ORDER AND TRENDS OVER TIME[22]

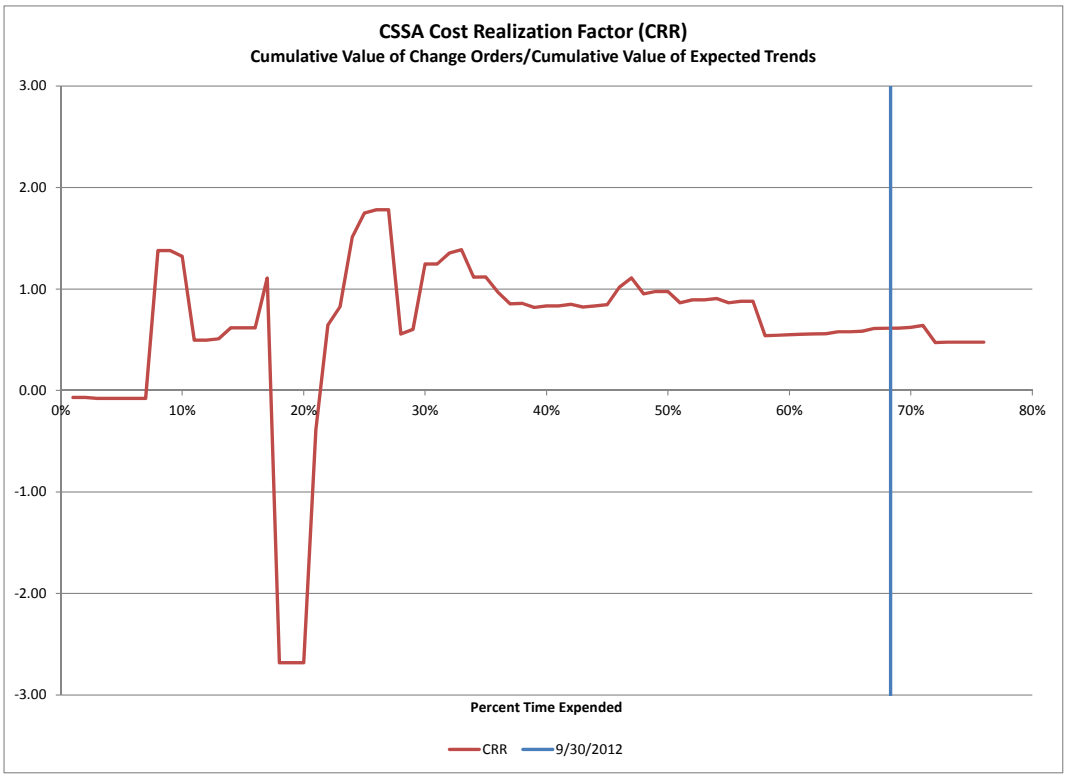


The CRR for the CSSA project, through December 13, 2012, was 0.48 compared with the 0.56 CRR as of the data date (September 30, 2012). As shown in Figure 17 and explained in the preceding section, the decreasing CRR was driven by what appears to be unresolved change order pricing. It should be noted that this project has 90 approved change orders, the highest number of changes to date on any of the five projects, as well as 1,085 RFIs, also the highest number of requests for information submitted by the general contractor of the five projects evaluated. Given the materiality of the bifurcation, we used performance through 50% of the project, which we believe reflects future budgetary performance once the backlog of potential changes is cleared (CRR = 0.98).

It should also be noted that, as of February 26, 2013, the total aggregate value of trends reflected on the WSIP CSSA project summary report was increased to $16,279,451.

[22] Graphs were generated using MS Excel. At 50% time expended there is an unusual shape to the Cumulative Expected Trend Value (green) line. This is the result of multiple data entries on the date which are graphically depicted as shown. There is no data error or data manipulation associated with the shape of this line.

FIGURE 17 – CSSA COST REALIZATION RATE



TIME REALIZATION RATE ANALYSIS

The TRR for the CSSA project is 0, as no time extensions have been approved through construction change orders. Conversely, a total of 180 days is shown through trends. While conducting our site visit on December 6, 2012, we discussed that multiple recovery schedules had been submitted or were under review. The underlying issue discussed was a difference of opinion on the entitlement for time between the contractor and the construction management team. We expect that, although no trends show additional time, that time will most likely be added to the project. Factors underlying this conclusion include project criticality, the high value of time forecast under trends, and the bifurcation in forecast impacts versus actual time approvals. We also note there have been four recovery schedules already submitted on this project (submitted in October 2011, March 2012, April 2012, June 2012 and most current in January 2013). Correlating this trend is that there are also $14.4 million of disputed/unresolved cost elements (13 items) of which $6.8 million pertain to schedule related issues (acceleration, compression, recovery).

OVERALL OBSERVATIONS

Our overall observations, provided below, are based on our review of the CSSA project, as well as the bases for the EAC and SAC analyses.

1. We found that the project team is technically competent and has an accurate understanding of the project technical and construction requirements. The general contractor and construction management team appear to have a strained relationship. Symptoms include the very high level and tone of project correspondence, the high number of RFIs, and our field observations of project team meetings and interviews with project and contractor staff.
2. Of the open activities on the project, 45% are on the critical path, which provides ample opportunity for the contractor to impact the critical path on a wide range of activities. Coupled with a throughput of 0.80 (at the edge of late throughput performance) and a project site/type of work that do not lead to high levels of acceleration (without significant cost), many activities and production rates have to be executed exactly right for the project to be completed on time and on budget.
3. The bifurcation between trends and realized changes is a material change to project performance. For the first 50% of the project time (Figure 16), the project team realized an exemplary rate of conversion between forecast trends and approved change orders (CRR = 0.98). This performance decreased to a CRR of 0.56. We believe that important challenges are preventing resolution of these trends (which may include recovery schedules or accelerations, working multiple sites at once). Additional reasons why trends are not being converted into approved change orders include: (a) disagreement on entitlement and cost of work markups; (b) general contractor reserving its rights and not signing change orders; (c) submitted disputed costs which are as of yet unsupported (yet captured as trends using conservative cost to completion forecasting methods).
4. Using the CRR, we project an overall budget shortfall of $18.1 million above the currently approved budget of $164.7 million. This projected amount incorporates the project team's forecast for all project elements with the application of CRR performance to the current value of trends, plus our recommended value of contingency based on project performance to date (66% complete yet 45% of open activities on the critical path and a sharp increase in the value of trends).

5. Given the criticality of the CSSA project, it is not surprising there have been four recovery schedules and approximately $6.8 million of disputed costs associated with time (acceleration, recovery, and compression). As of February 26, 2013, the total forecast time exposure increased from 180 to 434 days (52 days for potential change orders and the remainder, totaling 382 days, in trends).

FIGURE 18 – CSSA BUDGET FORECAST

Element	Amount	Reference/Comments
Current Construction Contract value	$ 103,580,514	(Feb. 26, 2013 Contract Summary)
Pending and Potential changes	6,870,934	(Feb. 26, 2013 Contract Summary)
Trends	16,279,451	(Feb. 26, 2013 Contract Summary)
CRR @ 0.98 (applied to Trends)	(325,589)	
Subtotal Construction:	126,405,310	
Contingency:	6,320,266	Recommended project contingency (5%)
Total Construction	**$ 132,725,576**	

Project Budget:		
Project Management	$ 5,709,000	(January 1, 2013 - Quarterly Report)
Planning	3,985,000	(January 1, 2013 - Quarterly Report)
Environmental	3,945,000	(January 1, 2013 - Quarterly Report)
ROW	56,000	(January 1, 2013 - Quarterly Report)
Design	11,380,000	(January 1, 2013 - Quarterly Report)
Bid & Award	942,000	(January 1, 2013 - Quarterly Report)
Construction Management	23,669,000	(January 1, 2013 - Quarterly Report)
Construction	132,725,576	(January 1, 2013 - Quarterly Report)
Closeout	456,000	(January 1, 2013 - Quarterly Report)
TOTAL Forecast	**$ 182,867,576**	

Current Approved Budget:	**164,722,000**	(January 1, 2013 - Quarterly Report)

Variance Forecast vs. Current Approved Budget:	**(18,145,576)**	Forecast requirement based on CRR/Trends/Soft Costs

CONCLUSION

Based on our review of the CSSA project, as discussed above, we conclude that this project is **Unlikely** to finish on time and within budget. Reasons underlying this conclusion include the high level of project criticality, existence of multiple recovery schedules and large value of disputed costs, a projected budget overrun of $18.1 million (see Figure 18 above) and a work site and nature of work that are not conducive to a high degree of project acceleration or productivity increases.

PROJECT ANALYSIS: Harry Tracy Water Treatment Plant (WD2596)

SCOPE

The Harry Tracy Water Treatment Plant, in conjunction with the Crystal Springs Reservoir System (Upper and Lower Crystal Springs Reservoirs) and San Andreas Reservoir, serves as the emergency backup and supplementary water supply system for the entire San Francisco Peninsula and City of San Francisco. The purpose of this project is to improve delivery reliability and provide seismic upgrades at this regional water treatment plant to achieve a sustained capacity of 140 million gallons per day (mgd) for at least 60 days, and to provide 140 mgd within 24 hours following a seismic event on the San Andreas Fault. The sustainable capacity would be provided through the addition of filters, upgrades to various systems, and seismic retrofits of critical process units. The project consists of seismic and hydraulic improvements to various treatment units and includes expansion of the filtration process capacity by adding five new filters. In addition, a new 11 million gallon treated water reservoir will be built to replace the two existing treated water reservoirs. The HTWTP project also includes improvements to the sludge handling and wash-water systems and provides a new additional wash-water tank to enhance the plant's performance, and improvements to key valves and pipelines conveying the raw water supply to the plant and treated water to the distribution system.[23] Additional improvements are also planned for the electrical system, including a new substation, switchgear, and motor control center. The approved budget for this project as of the September 30, 2012 data date was $276.896M with an approved completion date of December 1, 2015.[24]

[23] SFPUC Project Description, Quarterly Report 2012, June 2012.
[24] WSIP Quarterly Report, Project Performance Summary, September 29, 2012

PROJECT STATUS AS OF THE DATA DATE (SEPTEMBER 30, 2012)

Construction of the HTWTP project was awarded to Kiewit Infrastructure West, Co. in the amount of $174,197,000 and with a construction period of 1,445 days (starting on March 16, 2011, and ending on February 27, 2015). Through December 18, 2012, 59 change orders had been approved in an aggregate amount of $1,896,511.48. As of February 26, 2013, this project was shown as 34% complete. Major activities under construction included work on the 11-million-gallon treated water reservoir, preparation for the planned plant shutdown, power installation, support of excavation from the East Chemical Storage Area and new high rate clarifiers, operations building renovations, underground foundations and electrical

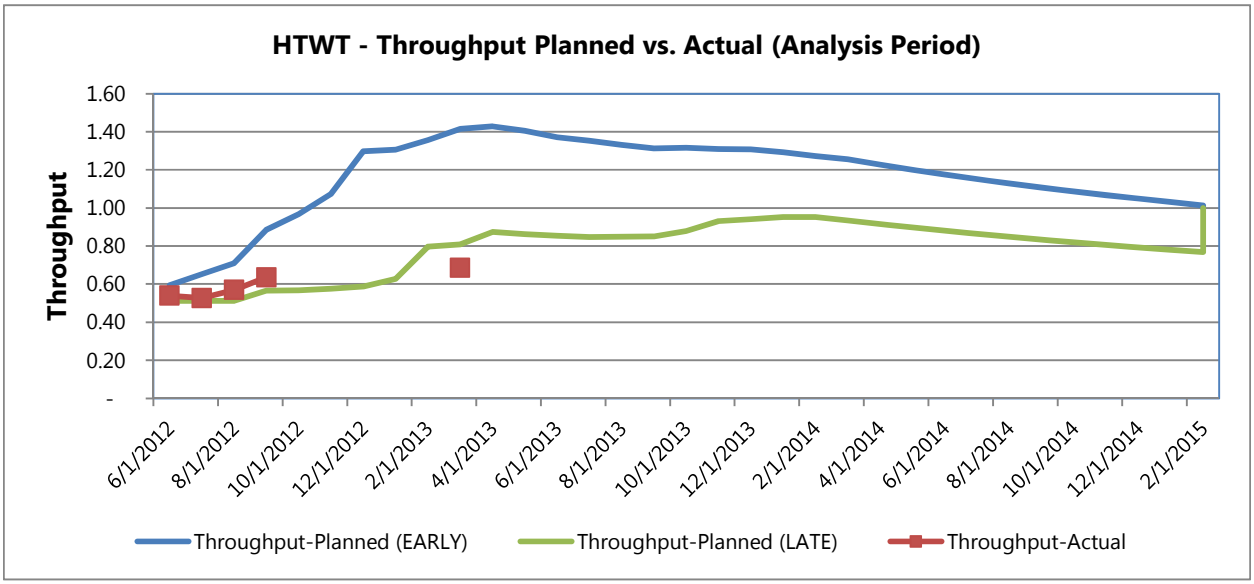
FIGURE 19 - HTWTP PROJECT SITE

work, along with geotechnical investigation and foundation design for the wash-water tanks, and tunnel for an 84-inch pipeline. The project worksite is unique in that it is a physically constrained site. The construction management team best described the conditions at the work site as "performing very complex surgery on a patient that is awake."

THROUGHPUT ANALYSIS

RWBC evaluated and compared the actual throughput achieved on the HTWTP project through the data date of September 30, 2012, with the planned throughput under early and late start dates. An additional data point of February 26, 2013, was also provided. Figure 20, below, provides the results of our throughput analysis, which shows that actual performance to date followed the late date throughput condition; however, as of February 26, 2013, throughput performance had fallen below planned levels (Planned [EARLY] = 1.41, Planned [LATE] = 0.81, Actual = 0.69). Viewed from a different perspective, as of February 2013, 50% of the project time remained, but 66% of the work had yet to be completed. The accompanying project criticality analysis is consistent with lower-than-planned throughput performance to date.

FIGURE 20 – HTWTP THROUGHPUT ANALYSIS



CRITICALITY ANALYSIS

As shown in Figure 20 the throughput performance on the HTWTP project was within the late throughput boundary through the September 30, 2012, data date, but has subsequently fallen materially below this threshold. This trend highlights the fact that, to maintain existing project performance completion dates, a significant increase in productivity (throughput) will be required on a very constrained site and for which a significant shutdown must be adequately managed. However, the project analysis shows that only 9%

of the non-completed activities are on the critical path. As shown on Figure 21 below, 64% of the total HTWTP project activities are either in progress or not complete, which follows the low percent of work in place accomplished to date.

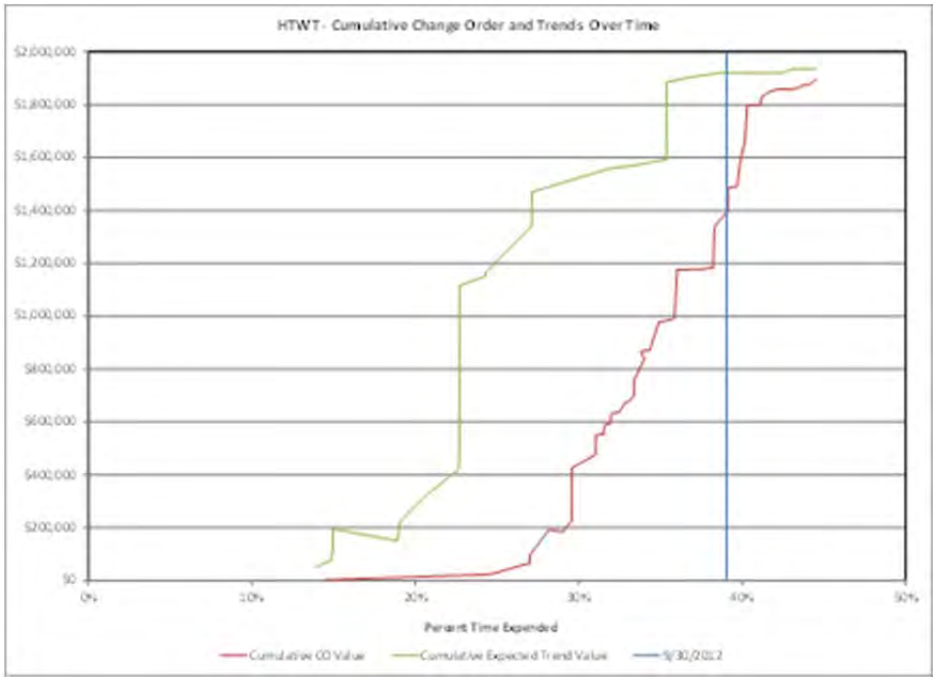
FIGURE 21 – HTWTP PROJECT CRITICALITY ANALYSIS

Data Date	Total Activities	Open Activities	Critical Activities	% Critical	Period Change % Critical
	(A)	(B)	(C)	(D)=(C)/(B)	(E)
July 2012	4884	3373	310	9%	n/a
August 2012	4916	3256	369	11%	23%
September 2012	4922	3162	282	9%	-21%

COST REALIZATION RATE ANALYSIS

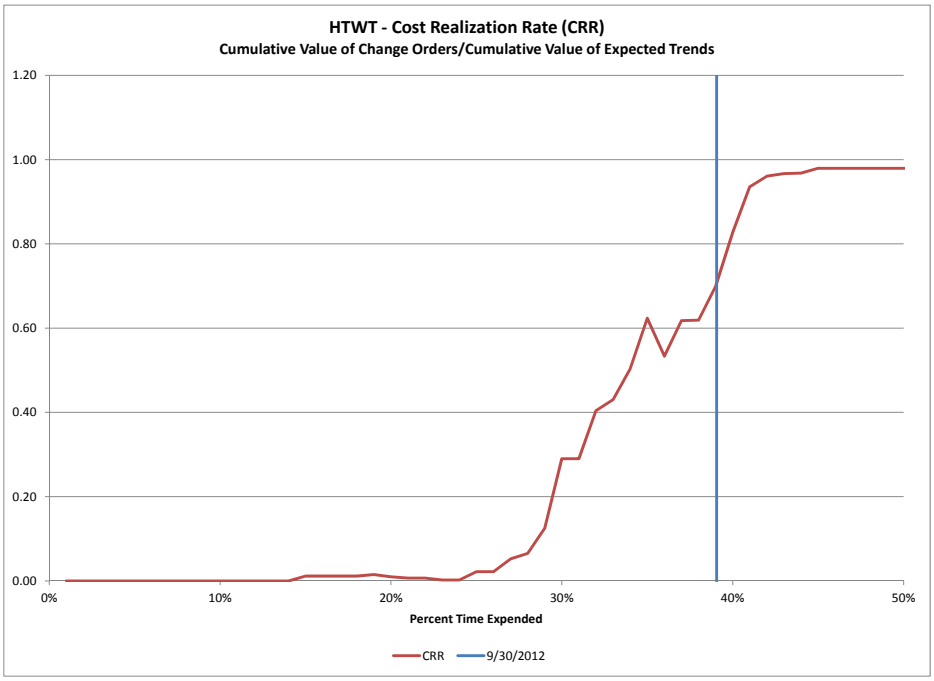
EXHIBITS 5 and 6 provide detailed listings of all approved change orders and trends, respectively, through December 18 and 17, 2012. As shown on Figure 22 below, trend and change order realization converges just past the data date of September 30, 2012.[27] The CRR for the HTWTP project is 0.62 through the data date and 0.98 through December 18, 2012. It should be noted that the cumulative amount extracted from the CMIS through December 2012 totals $1.9 million while that reported in February 2013 totaled $9.4 million. Figures 22 and 23, below, provides the CRR results for HTWTP.

FIGURE 22 – HTWTP CHANGE ORDERS AND TRENDS OVER TIME



[27] SFPUC Project Description, *Quarterly Report 2012,* June 2012.

FIGURE 23 – HTWTP COST REALIZATION RATE



TIME REALIZATION RATE ANALYSIS

The TRR for the HTWTP project is 0, as 20 days trended (Trend #16, 40 days x 50% probability), yet no additional time has been approved on this project through change orders. Even through the February 26, 2013, Project Summary report, no additional time was being forecast on the project. Other factors, such as a potential dispute over existing productivity rates and the reasons therefore should be considered, as only 34% of the project is complete yet 50% of the time has been expended. We also note that a recovery schedule was submitted in May 2012 and a second recovery schedule is being developed by the general contractor (as of March 15, 2013).

OVERALL OBSERVATIONS

Our overall observations, provided below, are based on our review of the HTWTP project, as well as the bases for the EAC and SAC analyses.

1. We found that the project team is technically competent and has an accurate understanding of the project's technical and construction requirements. The general contractor and construction management team appear to have a somewhat strained relationship. On this project, we noted

the second highest number of RFIs of all five projects evaluated, as shown on Figure 24 (highest number [1,085] of RFIs were on the CSSA project).

FIGURE 24 - HTWTP REQUESTS FOR INFORMATION

Period	RFI (EA)
June 2012	556
September 2012	121
December 2012	79
Total through 12/31/12	756

2. Only 9% of open activities are on the critical path, yet it is of concern that 70% of total project activities are still open.
3. A TRR of 0 coupled with throughput achieved to date that is below the late completion curves creates a potential scenario wherein the need for the schedule to be extended becomes increasingly important to the contractor, as throughput rates to complete the work will have to be materially higher than the rates achieved thus far on the project.[28] We note that as of March 15, 2013, the general contractor was working on a second recovery schedule for the project.
4. Using the CRR, we project that the overall remaining budget requirement for this project is $0.12 million above the current budget approval of $276.9 million. This projected amount was determined by applying the project team's forecast for all project elements with the CRR performance to the current value of trends, plus our recommended contingency amount based on project performance to date. Reference Figure 25 for details.

[28] Throughput required would be 1.32 (66% to complete/50% remaining time) vs. the highest throughput achieved to date of 0.69 (a 93% increase in required throughput).

FIGURE 25 – HTWTP PROJECT BUDGET

Element	Amount	Reference/Comments
Current Construction Contract value	$ 175,293,309	(Feb. 26, 2013 Contract Summary)
Pending and Potential changes	717,872	(Feb. 26, 2013 Contract Summary)
Trends	9,444,435	(Feb. 26, 2013 Contract Summary)
CRR @ 0.98 (applied to Trends)	(188,889)	
Subtotal Construction:	185,266,727	
Contingency:	13,895,005	Recommended project contingency (7.5%)
Total Construction	**$ 199,161,732**	

Project Budget:		
Project Management	$ 11,028,000	(January 1, 2013 - Quarterly Report)
Planning	4,816,000	(January 1, 2013 - Quarterly Report)
Environmental	1,862,000	(January 1, 2013 - Quarterly Report)
Design	19,533,000	(January 1, 2013 - Quarterly Report)
Bid & Award	1,041,000	(January 1, 2013 - Quarterly Report)
Construction Management	38,728,000	(January 1, 2013 - Quarterly Report)
Construction	199,161,732	From above
Closeout	855,000	(January 1, 2013 - Quarterly Report)
TOTAL Forecast	**$ 277,024,732**	

Current Approved Budget:	**276,896,000**	(January 1, 2013 - Quarterly Report)

Variance Forecast vs. Current Approved Budget:	**(128,732)**	Forecast requirement based on CRR/Trends/Soft Costs

CONCLUSION

Based on our review of the HTWTP project, as discussed above, we believe that it is **Somewhat Likely** that this project will finish on time and within budget. If throughput performance to date had been higher (0.8-1.0), we would have treated the slight projected budget overrun as acceptable ($0.12 million projected overrun). However, the 0.69 actual throughput achieved to date is materially lower than the early and late thresholds of planned throughput, which ranged between 1.41 and 0.81. Further, it should be noted that the project site is very restricted, and it would be very expensive for a general contractor to significantly increase productivity without incurring significant costs. This characteristic coupled with the current effort underway by the general contractor to submit a recovery schedule is a leading indicator that work is not progressing as required to complete the work within existing performance periods.

PROJECT ANALYSIS: New Irvington Tunnel (CUW35901)

SCOPE

The New Irvington Tunnel (NIT) project consists of a new tunnel being constructed adjacent to the existing tunnel between the Sunol Valley south of Interstate Highway 680 (I-680) and Fremont, California. The NIT will provide a seismically designed connection between water supplies from the Sierra Nevada Mountains and the Alameda Watershed to Bay Area water distribution systems. Not only will it provide a seismically sound alternative to the existing tunnel, the NIT will allow the SFPUC to take the existing tunnel out of service for much-needed maintenance and repair. The NIT will consist of an 18,300-foot-long tunnel in a horseshoe shape with excavated dimensions of approximately 12 feet by 14 feet. The NIT alignment runs parallel and just south of the existing tunnel. The final NIT lining will be slip-formed concrete, resulting in a finished diameter of about 9 feet. Steel liner segments will be used at low-cover areas near the portals and beneath I-680, and where the NIT intersects inactive fault zones or in locations with poor ground conditions. Additional security-related site improvements will be made at the existing Alameda West Portal and Irvington Portal.[29] The approved project budget as of the September 30, 2012 data date was $319.928M with an approved completion date of January 21, 2016.[30]

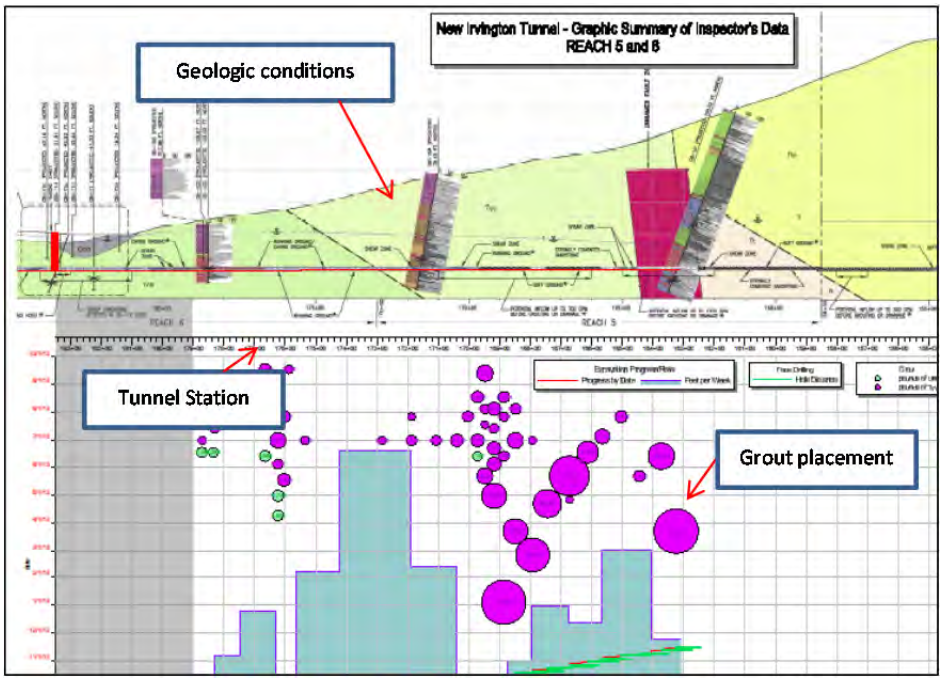
PROJECT STATUS AS OF THE DATA DATE (SEPTEMBER 30, 2012)[31]

On July 1, 2010, the construction contract was executed with Southland/Tutor Perini Joint Venture for a base amount of $226,657,700. The construction period began on August 26, 2010, and had an original contract duration of 1,390 days, resulting in a planned end date of June 15, 2014. Through the data date, approved change orders totaled $12,405,390.25, which also included 257 day added to the project schedule. The project was 65% complete as of the data date. Through December 3, 2012, a total of 72 change orders had been approved, in an aggregate total of $18,119,356. As of February 2013 the project was 77% complete.

From November 5, 2012, through January 11, 2013, NIT crews worked 7 days a week, 24 hours a day at the Irvington Portal to complete the last of the planned connections between the NIT and the Bay Division Pipe Lines (BDPL). The much-longer 14,400-foot Alameda West-Vargas tunnel segment is being excavated and is expected to hole through in July 2013. After that, 102-inch-diameter steel pipe will be installed and welded together inside the tunnel. A total of 18,660 feet of welded steel pipe will also be installed in the

[29] 01 WSIP JUN12 Regional Qtrly Rpt 4 Web data date 6/30/2012.
[30] WSIP Quarter Report, Project Performance Summary, September 29, 2012.
[31] Where applicable, information subsequent to the agreed-upon data date of September 30, 2012, is provided.

FIGURE 26 - NEW IRVINGTON TUNNEL GRAPHICAL DATA ANALYSIS



NIT. The pipes will be the final liner of the New Irvington Tunnel, through which the pristine drinking water from the Hetch Hetchy Reservoir will flow to the San Francisco Bay Area. As of December 2012, excavation activities are progressing well at the two headings between the Vargas Shaft and the Alameda West Portal despite continued challenging ground conditions. As of December 25, 2012, the length of excavated tunnel totaled 13,905 feet, which represents 74% of the NIT's total length. A significant reduction in groundwater in the probe holes at both headings required less-extensive drilling and grouting to reduce the groundwater inflows. Based on the current production rates, the second and final segment of the NIT is expected to hole through by mid-2013. A unique characteristic of the NIT project is that it is one of the few projects in the United States to be mined using traditional mining methods (drill-blast vs. tunnel boring machine), which presented several challenges, including identification and training of qualified labor. The project was also reclassified from a non-gassy to a gassy tunnel, which resulted in a material change. Other challenges encountered during the project have included higher than anticipated dewatering requirements and differing rock conditions. The project team used sophisticated data analysis to evaluate actual conditions encountered on the project.[32] Figure 6 highlights the type of information and data analysis used by the project team to track performance and to identify potential impacts in execution of the work. Figure 27 provides a picture of the work site.

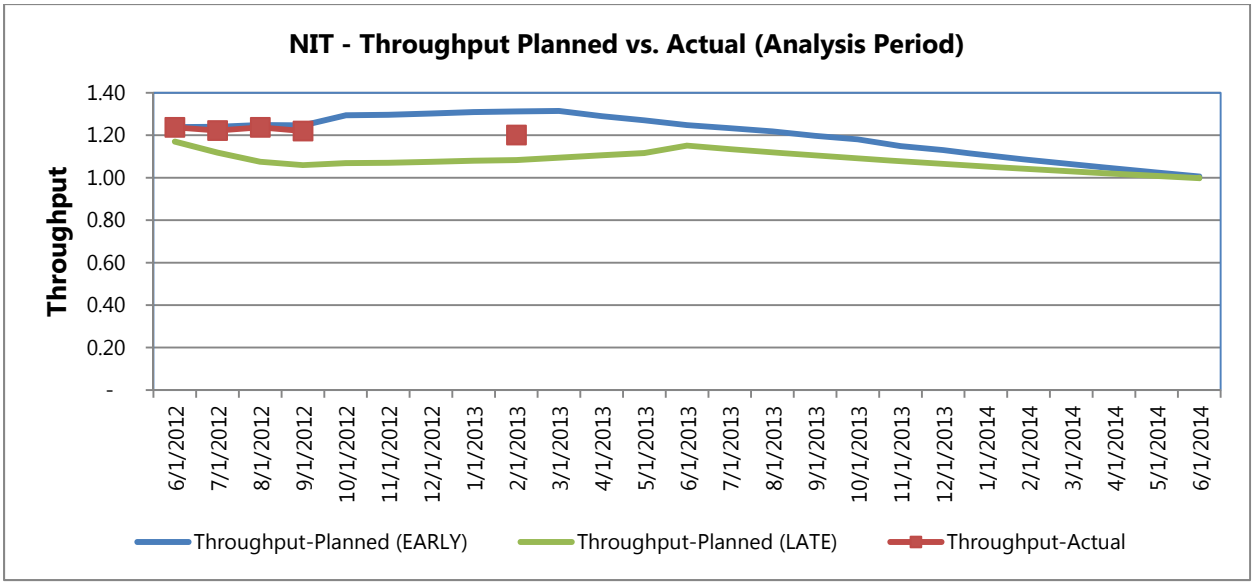
[32] In fairness to the other projects evaluated, tunnel projects lend themselves to linear data analysis given the linear nature of the work.

FIGURE 27 NEW IRVINGTON TUNNEL PROJECT SITE

THROUGHPUT ANALYSIS

RWBC evaluated the actual throughput achieved on the NIT project through the data date of September 30, 2012, and compared this value to the planned throughput under early and late start dates. An additional data point of February 25, 2013, was provided. Figure 28, below, presents the results of our throughput analysis, which show that actual performance to date is well within the required rates to meet overall project schedule requirements. As of September 30, 2012, throughput for the NIT project was 1.22 (compared with early and late throughput rates [boundary conditions] of 1.25 and 1.06, respectively).

FIGURE 28 - NIT THROUGHPUT ANALYSIS



PROJECT CRITICALITY ANALYSIS

The project criticality analysis indicates that only 12.3% of the non-completed NIT project activities are on the critical path. As shown on Figure 29 below, 72% of the total activities have been completed, which is consistent with the reported project progress.

FIGURE 29 – NIT PROJECT CRITICALITY ANALYSIS

Data Date	Total Activities	Open Activities	Critical Activities	% Critical	Period Change % Critical
	(A)	(B)	(C)	(D)=(C)/(B)	(E)
July 2012	1921	589	73	12.4%	n/a
August 2012	1922	584	73	12.5%	1%
September 2012	1867	521	64	12.3%	-2%

COST REALIZATION RATE ANALYSIS

EXHIBITS 7 and 8 provide detailed listings of all approved change orders and trends, respectively, through December 3 and 4, 2012. As shown on Figure 230 below, the trend and change order realization rates diverge just past the data date of September 30, 2012. The CRR for the NIT project is 1.66; however, the

NIT project contains certain cost features associated with allowances where change orders were approved without identification of a trend. As such, we used the CRR of 1.12, effective as of the data date of September 30, 2012, and recommend that, if trends are to be used as a forecasting tool, they should reflect forecast changes prior to a change order being identified. Figures 30 and 31 contain the CRR for NIT.

FIGURE 30– NIT CHANGE ORDERS AND TRENDS OVER TIME

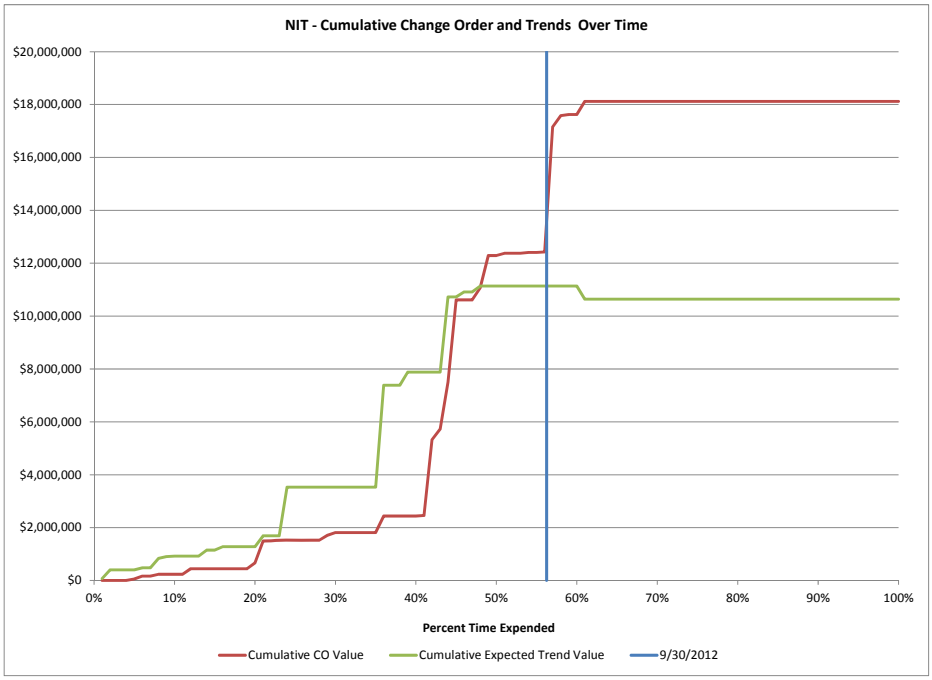
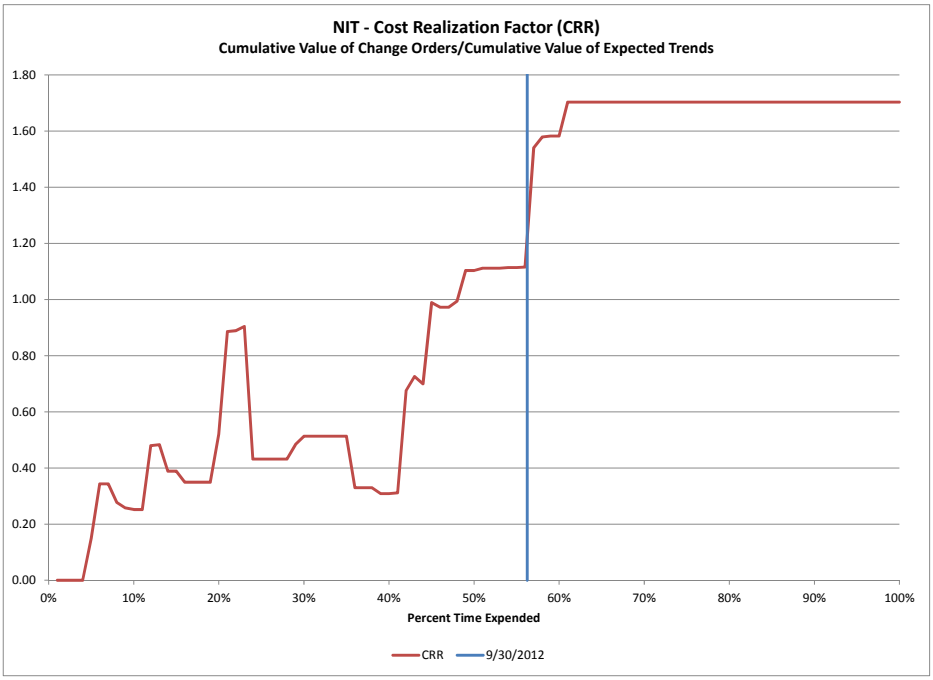


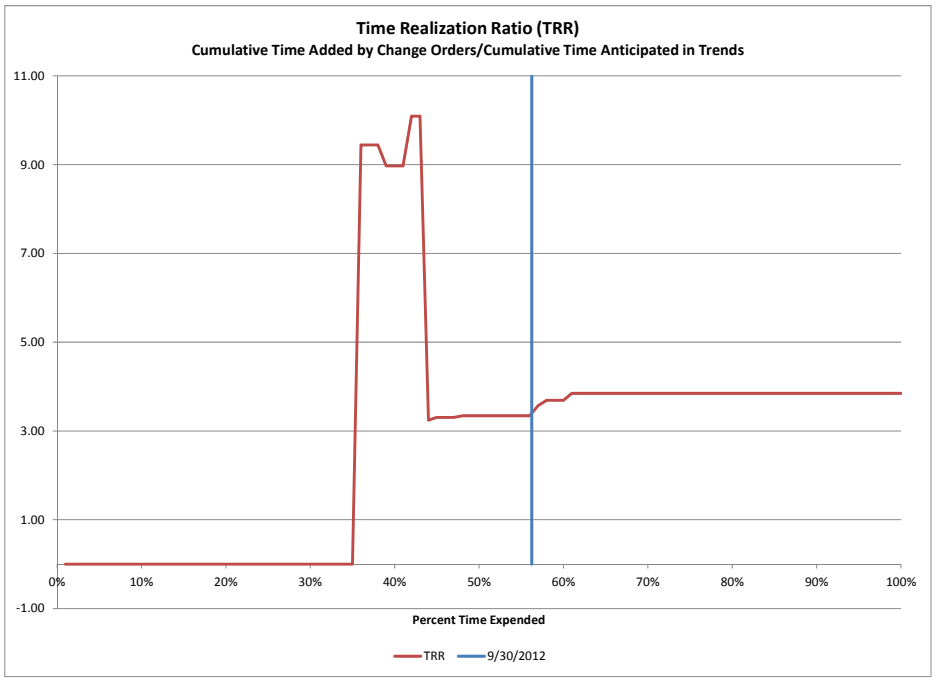
FIGURE 31 – NIT COST REALIZATION RATE



TIME REALIZATION RATE ANALYSIS

The TRR for the NIT project is 3.85; however, this value is skewed by 400 days approved under Change Order #1 as a result of a contract allowance (the owner is contractually required to provide yet for which the time is must be added to the performance period). Given this feature time is added as needed without use of trends. Therefore the TRR adjusted for Change Order #1 is 1.75 as shown on Figure 32.

FIGURE 32 – NIT COST REALIZATION RATE



OVERALL OBSERVATIONS

Our overall observations, provided below, are based on our review of the NIT project, as well as the bases for the EAC and SAC analyses.

1. We found that the project team is technically competent and has a detailed understanding of the project technical and construction requirements. The general contractor and construction management team appear to have a strong teaming relationship and appear to be working together to achieve project objectives.
2. Only 12% of open activities are on the critical path and the percent complete and balance to finish periods are supported by throughput rates within acceptable limits.
3. Application of a TRR of 1.75 would yield a total required performance period of 1,903 days, which is 113 days longer than the current allowable 1,790 day performance period. It should be noted, however, that throughput performance to date has been very favorable and performance to date is within acceptable productivity ranges.
4. Another contributing factor to the likely successful completion of this project is that, historically, the project team has added project time and cost for contractually delineated elements without a

trend (e.g., grouting/dewatering), which resulted in an inflated TRR. Figure 33 contains the forecast completion requirements based on TRR.

FIGURE 33 - TIME FORECAST REQUIREMENTS USING THE TIME REALIZATION RATE

Element	Days
Current Project Performance Time (including change orders)	1,390
Approved Change Orders	359
Potential Change Orders	12
Trends	81
TRR@1.75	61
TOTAL Expected Time	**1,903**
Revised contract time:	1,790
Expected additional time requirement based on TRR	**(113)**

5. We recommend that the project team review its practices regarding the treatment of trends on work elements that may be contractually bound, but which are only reflected as a change order with no trends, to ensure that the final cost at completion is properly stated. If a change order is shown for a condition without a trend, the project estimate could be understated (although it would be a temporary understatement). We believe this is a project-specific issue given the unique contract language that approved time for Change Order #1, for example, but as a matter of course recommend the WSIP team revisit its treatment of such unique conditions that impact how time is forecast.
6. Using the CRR, it appears that the overall projected budget is $1.0 million lower than currently approved. This amount was determined by applying the project team's forecast for all project elements and the adjusted CRR performance to the current value of trends, plus our recommended contingency amount based on project performance to date. Figure 34 contains the budget analysis for NIT.

FIGURE 34 – NIT BUDGET ANALYSIS

Element	Amount	Reference/Comments
Current Construction Contract value	$ 244,777,056	(Feb. 26, 2013 Contract Summary)
Pending and Potential changes	3,754,409	(Feb. 26, 2013 Contract Summary)
Trends	5,297,500	(Feb. 26, 2013 Contract Summary)
CRR @ 1.12	635,700	
Subtotal Construction:	254,464,665	
Contingency:	2,544,647	Estimated required contingency (for analysis purposes) (1%)
Total Construction	**$ 257,009,312**	

Project Budget:		
Project Management	$ 6,632,000	(January 1, 2013 - Quarterly Report)
Planning	3,908,000	(January 1, 2013 - Quarterly Report)
Environmental	4,273,000	(January 1, 2013 - Quarterly Report)
Right of Way	2,416,000	(January 1, 2013 - Quarterly Report)
Design	16,085,000	(January 1, 2013 - Quarterly Report)
Bid & Award	725,000	(January 1, 2013 - Quarterly Report)
Construction Management	27,649,000	(January 1, 2013 - Quarterly Report)
Construction	257,009,312	From above
Closeout	206,000	(January 1, 2013 - Quarterly Report)
TOTAL Forecast	**$ 318,903,312**	

Current Approved Budget:	**319,925,000**	(January 1, 2013 - Quarterly Report)

Variance Forecast vs. Current Approved Budget:	**1,021,688**	Forecast requirement based on CRR/Trends/Soft Costs

CONCLUSION

Based on our review of the NIT project, as discussed above, we believe that it is **Very Likely** that this project will finish within budget and on time. Although the CRR and TRR are greater than 1.0, throughput performance has been well within acceptable rates. Although the overall schedule is projected to extend beyond current contract performance periods, mitigating contractual circumstances may improve final project performance as time extensions associated with Change Order #1 are already approved in the contract for example.

PROJECT ANALYSIS: Bay Division Pipe Line Reliability Upgrade – Tunnel (CUW36801)

SCOPE

The BDPL is a tunnel project that will extend 5 miles under San Francisco Bay, adjacent to the marshlands between the vicinity of the Ravenswood Valve Lot and the Newark Valve Lot. The Bay Division tunnel is being constructed using a tunnel boring machine (TBM) (instead of the traditional mining methods used to excavate the NIT). The final tunnel lining will consist of a 9-foot-diameter welded steel pipeline. The tunnel will terminate at each end with vertical shafts and a connection to the BDPL Nos. 1, 2, and 5 piping manifolds. The two new piping manifolds are being provided under the BDPL Reliability Upgrade project. The excavated tunnel materials are anticipated to be used as part of the conversion of adjacent salt ponds to marshland. The portion of the existing BDPL Nos. 1 and 2 that are to be replaced by the new Bay Division tunnel will be capped on each end and will be abandoned in place. The new tunnel will link the existing segments of BDPL Nos. 1 and 2 and the future BDPL No. 5 in the East Bay with those on the Peninsula. The existing portions of BDPL Nos. 1 and 2, which were built in the 1920s and 1930s, lay along the bay floor and on trestles that cross over environmentally sensitive marsh land. The pipe and the trestle are in a deteriorated condition. The Bay Division Tunnel will bypass these environmentally sensitive wetlands.[33] The approved budget as of the September 30, 2012 data date for this project was $307.081M and a corresponding approved end date of November 13, 2015.

PROJECT STATUS AS OF THE DATA DATE (SEPTEMBER 30, 2012)

The base construction contract for the BDPL project, totaling $215,294,530, was executed on January 4, 2010, with the Michaels/Jay Dee/Coluccio Joint Venture. The performance period for construction is 1,857 days. As of September 30, 2012, change orders had added $3,759 to the contract with no time extension. As of the data date, the BDPL project was 65% complete and the project was 80% complete as of February 2013.

Excavation activities began in 2011 and, as of September 30, 2012, the TBM was in full production, but additional challenges remain, including: crossing three additional levees, a Cargill pump station, the Union Sanitary District's two force main sewer lines, and BDPL Nos. 1 and 2 before reaching the receiving shaft in Newark. Tunnel excavation has progressed into a zone of the San Antonio formation, where geotechnical

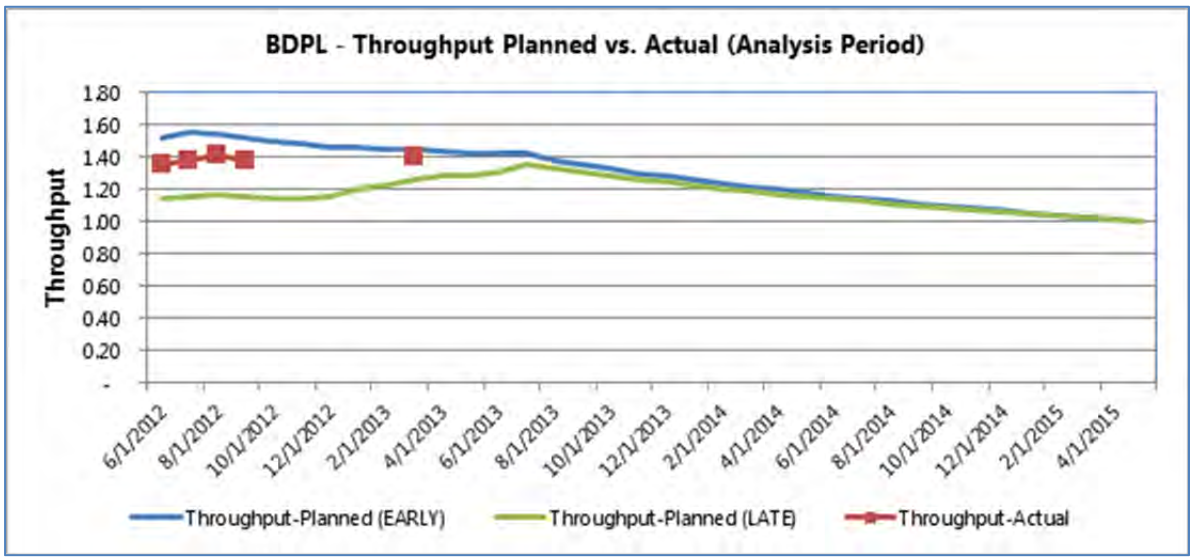
[33] WSIP JUN12 Regional Qtrly Rpt

investigation could not be performed during preconstruction. An increase in deep sand and gravel zones has been encountered and a 750-foot-long section of the Franciscan rock formation lies ahead, along with potentially less stable subsurface conditions. As of December 2012, a total of 25,735 feet of initial tunnel lining was installed (98%). The contractor successfully tunneled under the rest of the Cargill levees and the Caltrain railway, and through 750 feet of Franciscan rock. The contractor continued to advance proof grouting behind the TBM trailing system. The TBM receiving shaft at Newark is complete, with the frozen shaft seal top-hat structure filled with bentonite fluid, and ready for the TBM arrival. As of December 2012, overall construction was 77.8% complete.

THROUGHPUT ANALYSIS

RWBC evaluated and compared the actual throughput achieved on the BDPL project through the data date of September 30, 2012, with the planned throughput under early and late start dates. An additional data point of February 25, 2013, was provided. FIGURE Figure 35, below, presents the results of our throughput analysis, which shows that actual performance to date is well within the required rates to meet overall project schedule requirements. As of September 30, 2012, throughput for the BDPL project was 1.37 (compared with boundary throughput thresholds of 1.52 and 1.15 based on early and late dates). As of February 27, 2013, the actual throughput was 1.39 (compared with boundary throughput thresholds of 1.44 and 1.29 based on early and late dates) as shown on Figure 35.

FIGURE 35 – BDPL THROUGHPUT ANALYSIS



CRITICALITY ANALYSIS

As shown on Figure 36 below, as of the data date (September 30, 2012), over 50% of the open activities were on the critical path. We believe that the strong throughput performance maintained through February 2013, and barring an unforeseen event, will ensure that this project will be completed within the projected performance period. Figure 36 contains a summary of our schedule analysis for three consecutive periods.

FIGURE 36 – BDPL PROJECT CRITICALITY ANALYSIS

Data Date	Total Activities	Open Activities	Critical Activities	% Critical	Period Change % Critical
	(A)	(B)	(C)	(D)=(C)/(B)	(E)
July 2012	457	220	106	48.2%	n/a
August 2012	457	217	100	46.1%	-4%
September 2012	459	218	118	54.1%	17%

COST REALIZATION RATE ANALYSIS

EXHIBITS 9 and 10 provide detailed listings of all approved change orders and trends, respectively, through December 2012. As shown on Figure 38 below, the realization rate between trends and actual change orders is extremely low. As of the data date of September 30, 2012, the CRR for the BDPL project was 0.0027, and as of December 2012, it was 0.0021. A low CRR has been consistent throughout the project, with a peak CRR of 0.16 early in the project. Figures 37 and 38 contain the CRR for the BDPL project.

FIGURE 37 – BDPL CHANGE ORDERS VERSUS TRENDS

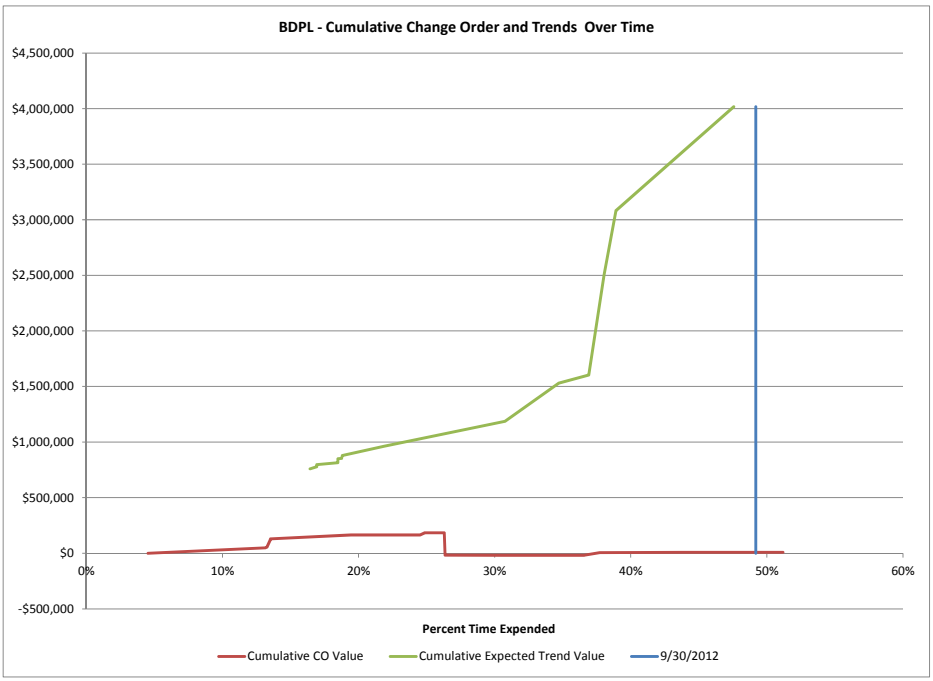
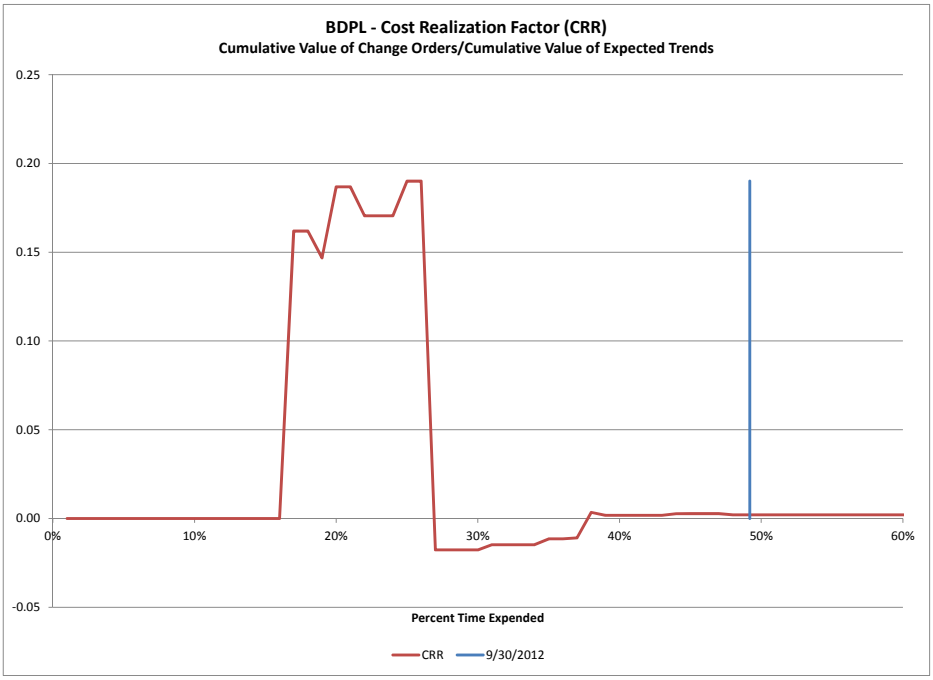


FIGURE 38 – BDPL CRR



TIME REALIZATION RATE ANALYSIS

The TRR for the BDPL project is zero as no time has been included in trends and no time extensions on the BDPL project have been approved.

OVERALL OBSERVATIONS

Our overall observations, provided below, are based on our review of the BDPL project, as well as the bases for the EAC and SAC analyses.

1. We found that the project team is technically competent and has a detailed understanding of the BDPL project technical and construction requirements. The general contractor and construction management team appear to have a performing team structure and appear to work together toward achieving project objectives.
2. We found that 54% of open activities are on the critical path. A contributing factor to the high number of critical path activities is the general contractor's decision to develop a schedule with relatively few activities. This trend of criticality is offset by strong throughput performance achieved through February 2013, well within the early and late throughput boundaries.
3. The project team appears to be too conservative in forecasting potential costs, as the CRR has not exceeded 0.16. The project team may seek to evaluate whether the amounts trended will actually be required as presented.
4. Using the CRR, it appears that the overall projected budget is $47 million lower than currently approved. This projected amount was determined by applying the project team's forecast for all work elements and the adjusted CRR performance to the current value of trends, plus our recommended contingency amount based on project performance to date.

FIGURE 39 – BDPL BUDGET FORECAST

Element	Amount	Reference/Comments
Current Construction Contract value	$ 215,298,290	(Feb. 26, 2013 Contract Summary)
Pending and Potential changes	12,000	(Feb. 26, 2013 Contract Summary)
Trends	3,010,000	(Feb. 26, 2013 Contract Summary)
CRR @ 0.0021	(3,003,679)	
Subtotal Construction:	215,316,611	
Contingency:	1,000,000	Estimated required contingency (for analysis purposes)
Total Construction	**$ 216,316,611**	

Project Budget:		
Project Management	$ 9,938,000	(January 1, 2013 - Quarterly Report)
Planning	2,608,000	(January 1, 2013 - Quarterly Report)
Environmental	3,099,000	(January 1, 2013 - Quarterly Report)
Right of Way	1,945,000	(January 1, 2013 - Quarterly Report)
Design	13,159,000	(January 1, 2013 - Quarterly Report)
Bid & Award	315,000	(January 1, 2013 - Quarterly Report)
Construction Management	26,447,000	(January 1, 2013 - Quarterly Report)
Construction	216,316,611	From above
Closeout	513,000	(January 1, 2013 - Quarterly Report)
TOTAL Forecast	**$ 274,340,611**	

Current Approved Budget:	**307,081,000**	(January 1, 2013 - Quarterly Report)

Variance Forecast vs. Current Approved Budget:	**32,740,389**	Forecast requirement based on CRR/Trends/Soft Costs

CONCLUSION

Based on our review of the BDPL project, as discussed above, we believe that it is **Highly Likely** that this project will finish within budget and on time. This conclusion is based on throughput rates achieved to date, as well as low realization of budgeted costs. It should be noted that the application of highly conservative estimates does overstate required project costs at completion; we encourage the project team to review the current trends to ensure that they reflect the realization expected to be achieved on the BDPL project.

COMPARISON OF THE FIVE PROJECTS EVALUATED

Figure 40 below provides a side-by-side project performance comparison. Included in each project evaluation is RWBC's independent forecast of budget performance based on data reviewed and our assessment of the remaining contingencies required. The data on Figure 40 show a wide range in budgetary performance, from a projected additional $68 million requirement for the CDR project to a projected underrun of $33 million for the BDPL project, and an aggregate projected budget shortfall

totaling $52 million for the five projects combined. The WSIP project team will have to make decisions regarding its evaluation of projected program requirements, but areas we suggest be evaluated include: (1) project contingencies/underruns available on other projects; (2) reduction in soft costs; (3) de-scoping projects to remain within budget; and (4) identification of additional sources of funding to cover projected budget shortfalls. We recommend that the evaluation be inclusive of all projects so that a holistic picture can be presented to authorizing and/or oversight committees.

FIGURE 40 - PROJECT-BY-PROJECT COMPARISON - BUDGET PERFORMANCE

	CDR	CSSA	HTWT	NIT	BDPL	ALL
Element	**Amount**	**Amount**	**Amount**	**Amount**	**Amount**	**Amount**
Current Construction Contract value	$ 280,707,564	$ 103,580,514	$ 175,293,309	$ 244,777,056	$ 215,298,290	$ 1,019,656,733
Pending and Potential changes	$ 112,331,216	$ 6,870,934	$ 717,872	3,754,409	12,000	123,686,431
Trends	26,017,074	16,279,451	9,444,435	5,297,500	3,010,000	60,048,460
CRR	4,683,073	(325,589)	(188,889)	635,700	(3,003,679)	1,800,617
Subtotal Construction:	423,738,927	126,405,310	185,266,727	254,464,665	215,316,611	1,205,192,240
Contingency:	42,373,893	6,320,266	13,895,005	2,544,647	1,000,000	66,133,809
Total Construction	**$ 466,112,820**	**$ 132,725,576**	**$ 199,161,732**	**$ 257,009,312**	**$ 216,316,611**	**$ 1,271,326,050**
Project Budget:						
Project Management	$ 13,878,000	$ 5,709,000	$ 11,028,000	$ 6,632,000	$ 9,938,000	$ 47,185,000
Planning	6,035,000	3,985,000	4,816,000	3,908,000	2,608,000	21,352,000
Environmental	16,039,000	3,945,000	1,862,000	4,273,000	3,099,000	29,218,000
Right of Way	-	56,000		2,416,000	1,945,000	4,417,000
Design	22,469,000	11,380,000	19,533,000	16,085,000	13,159,000	82,626,000
Bid & Award	705,000	942,000	1,041,000	725,000	315,000	3,728,000
Construction Management	74,080,000	23,669,000	38,728,000	27,649,000	26,447,000	190,573,000
Construction	466,112,820	132,725,576	199,161,732	257,009,312	216,316,611	1,271,326,050
Closeout	1,242,000	456,000	855,000	206,000	513,000	3,272,000
TOTAL Forecast	**$ 600,560,820**	**$ 182,867,576**	**$ 277,024,732**	**$ 318,903,312**	**$ 274,340,611**	**$ 1,653,697,050**
Current Approved Budget:	**$ 532,638,000**	**$ 164,722,000**	**$ 276,896,000**	**$ 319,925,000**	**$ 307,081,000**	**$ 1,601,262,000**
Variance Forecast vs. Current Approved Budget:	**$ (67,922,820)**	**$ (18,145,576)**	**$ (128,732)**	**$ 1,021,688**	**$ 32,740,389**	**$ (52,435,050)**

Figure 41 provides a project-by-project comparison of selected performance indicators. In evaluating the project data, we found that the trend logs reflect all known conditions, yet the way trends are entered for both time and cost projections varies. Regarding cost information, a top-down approach is used to forecast trends on certain projects (e.g., CSSA, HTWTP), while a more granular approach is used on other projects (e.g., NIT). We found that project teams used different approaches to estimating the time impacts of trends. For example, the NIT project team assigned time impacts to each trend, and then used the aggregated value to forecast trend time. The assumption under this approach is that all time associated with trends is additive (no concurrency) and that all time forecast is on the critical path (hence, a day-for-day addition of time is shown on reports). In addition, a top-down approach is also used in which all trend time is captured under one catchall activity. Neither approach is incorrect; however, given the undefined nature of the data, it is not feasible to perform detailed scheduled analysis. We recommend that the WSIP management team re-evaluate current trends and probabilities assigned to their occurrence, and ensure that the data in the CMIS is consistently entered.

FIGURE 41 - PROJECT COMPARISON - PERFORMANCE INDICATORS

MEASURE	CDR	CSSA	HTWT	NIT	BDPL	Comments
Throughput						
Early	1.23	1.13	1.41	1.31	1.44	Through February 2013
Late	0.88	0.85	0.81	1.08	1.26	Through February 2013
Actual	1.02	0.84	0.69	1.2	1.39	Through February 2013
Criticality	30%	45%	9%	12.30%	54.10%	Through September 2012
CRR	1.18	0.98	0.98	1.12	0.0021	Through December 2012
TRR	0.93	0	0	1.75	0	Through December 2012
Forecast Budget Performance ($ Million)	$ (67.90)	$ (18.10)	$ (0.12)	$ 1.00	$ 32.70	Through February 2013

RWBC compared its own independent estimate of costs to completion and found that the aggregate value of forecast costs is within 3% of the same value estimated by the WSIP team. A benchmark of 10% (+/-) was used to set the expected benchmark of acceptability for estimated costs (based on Department of Transportation guidelines for establishing reasonability of costs when comparing independent estimates). The value realized is well within this threshold as shown in Figure 42.

FIGURE 42 – RWBC VS WSIP EAC PROJECTIONS

	PROJECT					
Cost at Completion	**CDR**	**CSSA**	**HTWT**	**NIT**	**BDPL**	**TOTAL**
FORECAST RWBC	$ 600,560,820	$ 182,867,576	$ 277,024,732	$ 318,903,312	$ 274,340,611	$ 1,653,697,051
FORECAST WSIP*	$ 620,813,000	$ 193,623,446	$ 283,238,337	$ 323,734,000	$ 286,372,630	$ 1,707,781,413
WSIP/RWBC:	103%	106%	102%	102%	104%	103%
* data extracted from Notice of Public Hearing (March 22, 2013) SFPUC April 23, 2013 meeting						

USE OF RISK TO FORECAST BUDGET EXPOSURE

The evaluation of risk is performed by the WSIP management team using a Monte-Carlo model to calculate the probability curves for identified risks on each WSIP project. RWBC found the application and use of risk probability to be unclear: on one hand risks are not used to forecast costs yet are used to test budget performance: contingency (which is a cost measure). Based on interviews with each project team, we found various opinions regarding their use of risk probability as a management tool. The opinions expressed ranged from risk probability being used as a management tool to different methods being used to manage projects. RWBC did not incorporate the values of risk on the risk registers within the forecast to completion as we've accounted for such using contingency for each project. However, we recommend that, moving forward, more clarity be provided by the WSIP management team on the application of risk probabilities and their use in preparing EAC/SAC forecasts or on the reasons that risk probabilities are used to test overall budget performance yet not used to forecast costs. Despite the manner in which risks are treated, RWBC concludes that existing cost and time forecasts prepared by the WSIP management team to be realistic and reliable based on the overall results of our own independent forecasts compared to the most current forecasts for cost and time as submitted by the WSIP management team on the March 22, 2013 Notice of Posting for Consideration of Revisions to the San Francisco Public Utilities Commission WSIP.

TASK B: WATER SYSTEM IMPROVEMENT PROGRAM SOFT COSTS

Our review of WSIP soft costs was divided into three components: those pertaining to the five projects analyzed under TASK A, those pertaining to Program Management, and those related to the balance of the WSIP. In evaluating soft costs, it is critically important to understand what is included within each category and it becomes more critical when trying to use general rules related to the ratio of soft costs to construction costs or the application of comparable data. For the WSIP, the following categories are included as soft costs: (a) SFPUC Labor costs, (b) Other City Department costs, and (c) WSIP Consultant costs

The totals for categories A, B and C are the primary components of soft costs. In addition, **Program Management Costs** that support the entire WSIP in an oversight function are included. RWBC developed metrics to evaluate projected staffing plans, as follows:

1. Percent of Soft Costs/Construction Costs (both for historical and forecast conditions).
2. Remaining Construction Costs (Forecast Construction Costs less expenditures to date)[34]/(Remaining Soft Costs). This ratio provides a productivity rate that can be compared across projects.
3. Remaining Construction Costs/sum of FTEs associated with remaining soft costs for the forecast period (another productivity ratio, using FTEs to measure the amount of remaining work being managed by each resource).
4. A breakdown was provided of the amount of SFPUC costs/Other City Department costs/Consultant costs for each project evaluated under TASK A, Program management costs, and costs related to the balance of the WSIP.

[34] RWBC used its prior forecasts of construction costs shown on Figure 39 to independently evaluate ratios and to maintain a consistent application of data.

EVALUATION OF SOFT COSTS FOR PROJECTS ANALYZED UNDER TASK A

The soft costs forecast for each project under TASK A were analyzed, as shown on Figure 43 below.

FIGURE 43 - SOFT COST ANALYSIS OF TASK A PROJECTS

ELEMENT	PROJECT					ALL
	CDR	CSSA	HTWT	NIT	BDPL	
Total Forecast Construction (RWBC-5 Projects)	**466,112,820**	**132,725,576**	**199,161,732**	**257,009,312**	**216,316,611**	**1,271,326,050**
Expended Construction (12/31/12)	**149,156,102**	**87,731,606**	**62,337,622**	**186,845,770**	**168,294,323**	**654,365,423**
Remaining Construction (Unexpended)	**316,956,717**	**44,993,970**	**136,824,110**	**70,163,542**	**48,022,288**	**616,960,627**
Soft Costs Expended (12/31/12)	**68,893,962**	**40,138,610**	**47,961,109**	**50,385,024**	**37,731,421**	**245,110,126**
SFPUC	16,124,970	15,556,436	18,603,435	17,384,631	10,648,369	78,317,841
Other City Departments	5,081,887	2,560,994	2,702,550	3,059,064	2,862,592	16,267,087
Consultants	47,687,105	22,021,180	26,655,125	29,941,329	24,220,460	150,525,198
Soft Costs Forecast Total	**65,480,963**	**6,934,610**	**29,101,562**	**15,680,418**	**18,303,194**	**135,500,746**
SFPUC	7,725,038	835,962	11,946,174	1,693,225	2,617,330	24,817,730
Other City Departments	5,574,706	2,649,090	2,589,568	2,098,193	2,748,296	15,659,854
Consultants	52,181,219	3,449,557	14,565,820	11,889,000	12,937,567	95,023,163
Soft Costs/Construction (Historical)	**46%**	**46%**	**77%**	**27%**	**22%**	**37%**
SFPUC	11%	18%	30%	9%	6%	12%
Other City Departments	3%	3%	4%	2%	2%	2%
Consultants	32%	25%	43%	16%	14%	23%
Soft Costs/Construction (Forecast)	**21%**	**15%**	**21%**	**22%**	**38%**	**22%**
SFPUC	2%	2%	9%	2%	5%	4%
Other City Departments	2%	6%	2%	3%	6%	3%
Consultants	16%	8%	11%	17%	27%	15%
TOTAL FTE (2013-2017)	**232**	**28**	**103**	**56**	**65**	**483**
FTE SFPUC	27	3	42	6	9	88
FTE Other City Departments	20	12	9	7	10	58
FTE Consultants	185	12	52	42	46	337
Remaining Construction/Remaining Soft Costs	**4.84**	**6.49**	**4.70**	**4.47**	**2.62**	**4.55**
Remaining Construction/FTE	**1,365,004**	**1,632,866**	**1,325,853**	**1,263,743**	**739,886**	**1,276,348**

In evaluating Figure 43, above, it is important to note the explanation of the data fields:

Full Time Equivalent (FTE): as presented in the data provided to RWBC by the WSIP management team 1 FTE = 1 staff working full time at a cost of $282,000 per year. RWBC did not modify this calculation.

Total Forecast Construction (RWBC-5 projects): cost at completion for construction costs prepared by RWBC for each of the five mega projects evaluated.

Expended Construction (12/31/12): expended construction costs through December 31, 2012.

Remaining Construction Costs: the difference between the Total Forecast Construction (RWBC-5 projects) and Expended Construction through December 31, 2012.

Soft Costs Expended (12/31/12): total soft costs expended inclusive of planning, environmental, engineering support, City departments, design, bid/award, project management, construction management, and legal costs.

Soft Costs Forecast Total: the remaining value of soft costs expected for the remainder of the applicable project. Given that these five projects are in construction, the Soft Costs Forecast Total would not include additional fees for early project work such as planning, design, or environmental in some instances.

Soft Costs/Construction (Historical): the ratio of Soft Costs Expended divided by historical construction expenditures.

Total FTE (2013-2017): staffing level data provided by the WSIP management team for each project by year aggregated into a total figure. In the data provided the WSIP management team used an average rate of $282,000/year to equal 1 full time equivalent (FTE).

EXHIBIT 11 provides detailed data of staffing levels by year for each of the five projects evaluated. This data is extracted directly from WSIP management staffing plans provided to RWBC.

The following observations and recommendations were made based on the data and ratios contained on Figure 43:

1. Approximately $616 million of construction work remains to be placed on the five projects evaluated and it is forecast that $135 million will be needed over the same period (2013-2017) to manage the work, equating to a 22% soft cost rate. The remaining construction to be performed accounts for about 49% of the work.[35]
2. We found that, over the forecast period (2013-2018), 337 (70%) of the 483 planned total FTEs aggregated over the same period, are consultants and 18% are slated to be provided through the SFPUC. The remaining 12% are slated to come from other City departments. We believe that an opportunity exists to increase the level of SFPUC staffing, as the cost-benefit analysis for using internal staffing versus external consultants should be evaluated, given the construction values under management. Two projects (i.e., CDR and HTWTP) could be candidate projects given their remaining duration and the fact that they have the highest staffing levels.
3. It should be noted that, in preparing budgets and FTE calculations, a standard $282,000 annual cost/FTE was used by the WSIP management team in the data provided to RWBC for all FTE calculations (SFPUC, Other City Departments, and Consultants). We recommend that actual costs be used for the SFPUC and Other City Departments, as internal City staff should be more cost

[35] As previously stated, RWBC included base contract, approved, pending, and potential changes, trends, and contingency amounts when forecasting construction costs, as is reflected in these amounts.

effective than consulting staff. As a point of reference, a $282,000 salary equates to an hourly cost of $135.58 ($282,000/2,080 hours per year). We also note that this data be reconciled to the WSIP's own bottom up analysis for calculating staffing levels.

4. We believe that staffing on the CDR project should be re-evaluated as, on average, the CDR management plan provided by the WSIP management team to RWBC shows that there are 45 FTEs per year over the next 5 years (see EXHIBIT 11 for additional details). It should be noted that pricing under negotiation for the unforeseen geological condition includes extensive owner monitoring of the general contractor.
5. We recommend that each project be managed as a stand-alone project without regional program management support for the following reasons: (a) all are under construction, (b) all have seasoned senior staff managing the project, (c) a web-enabled program management system is in place that can be leveraged to maximize information/data flow, and (d) cost savings could be realized by eliminating the regional oversight function through a project-centric management structure.
6. We recommend that the staffing plan for the BDPL project be reviewed, as the current forecast of soft costs represents 38% of the remaining construction costs, which is a high percentage, especially when the soft costs for the remaining projects range between 15% and 21% of remaining construction costs.
7. The resulting weighted average value of remaining construction costs to remaining soft costs is 4.55, compared with a historical value of 2.66,[36] which represents an efficiency increase of 71%. However, we believe that this value can be improved by evaluating opportunities to re-evaluate staffing levels for the CDR and HTWTP projects, and using actual costs to calculate the costs associated with FTEs (versus using a top-down forecast of soft costs/average annual FTE costs).
8. We also recommend that the WSIP management team reconcile the staffing estimates prepared using $282,000 against the bottom up analysis prepared for the program.

Additional data capturing FTE calculations for the five projects evaluated under TASK A are provided in EXHIBIT 11.

Figures 44 and 45 build on the information analyzed to provide more detail on soft costs, especially since the soft costs provided in Figure 43 were all inclusive. Figure 44, specifically, segregates soft costs into

[36] $654.0 million historical construction expenditures/$245.1 million soft costs = 2.66

three categories: total soft costs (same as the values provided in Figure 43 and all inclusive regardless of phase/activity), soft costs excluding pre-construction costs (would include project management, construction management, and other construction phase only services), soft costs for pre-construction which would include planning, design, and those soft costs associated with activities performed prior to construction. Figure 45 also contains ratios comparing historical performance of the soft cost categories described compared against using construction as the benchmark.

FIGURE 44 – BREAKOUT OF SOFT COSTS (PRE-CONSTRUCTION VS. CONSTRUCTION)

Project	All Soft Costs (WSIP Soft Cost Analysis)	Soft Costs - EXCLUDING costs for pre-construction	Soft Costs - Preconstruction	Forecast-Soft Costs (WSIP bottom up anlysis)	EAC Construction (RWBC) -within 3% of WSIP projection	Expended through 12/31/12 (Construction - WSIP Quarterly report)	Remaining Construction To be Expended
	(A)	(B)	(B1)=(A)-(B)	(C)	(D)	(E)	(F)=(D)-(E)
CDR	$ 68,893,962	$ 17,911,375	$ 50,982,587	$ 65,480,963	$ 466,112,820	$ 149,156,102	$ 316,956,717
CSSA	40,138,610	14,972,230	25,166,380	6,934,610	132,725,576	87,731,606	44,993,970
HTWTP	47,961,109	14,492,750	33,468,359	29,101,562	199,161,732	62,337,622	136,824,110
NIT	50,385,024	15,285,834	35,099,190	15,680,418	257,009,312	186,845,770	70,163,542
BTPL	37,731,421	9,965,988	27,765,433	18,303,194	216,316,611	168,294,323	48,022,288
ALL REMAINING	458,122,174	158,914,356	299,207,818	70,369,963	1,039,859,000	743,134,577	296,724,423
TOTAL	**$ 703,232,300**	**$ 231,542,533**	**$ 471,689,767**	**$ 205,870,709**	**$ 2,311,185,050**	**$ 1,397,500,000**	**$ 913,685,050**
Program Management	**$ 78,572,030**			**$ 30,624,138**	**$ 2,311,185,050**	**$ 1,397,500,000**	**$ 913,685,050**

FIGURE 45 – RATIO ANALYSIS OF SOFT COSTS COMPARED TO HISTORICAL PERFORMANCE COMPARED TO PROJECTIONS

Project	Total Soft / Expenditure Construction (Historical)	Soft Cost - Preconstruction only/Expenditure Construction (historical)	Soft Cost excluding pre-construction/Expenditure Construction (Historical)	Forecast Total Soft Costs/Remaining Construction to be Expended
	(G)=(A)/(E)	(G1)=(B1)/(E)	(H)=(B)/ (E)	(I)=(C)/(F)
CDR	46%	34%	12%	21%
CSSA	46%	29%	17%	15%
HTWTP	77%	54%	23%	21%
NIT	27%	19%	8%	22%
BTPL	22%	16%	6%	38%
ALL REMAINING	62%	40%	21%	24%
TOTAL	**50%**	**34%**	**17%**	**23%**
Program Management	**6%**			**3%**

The following observations were made based on the data contained in Figures 44 and 45:

1. The ratio of soft costs (total) compared to the value of construction, is decreasing from 50% (historical – ref column G, Figure 45) to 23% under the forecast (ref. column I, Figure 45). These

values were calculated by taking historical applicable soft cost data and divided by historical construction spend. Similarly we calculated the ratio of those soft costs forecast and divided the same by the remaining unexpended construction value based on our forecast.

2. We note that the primary activity remaining on the WSIP (with few exceptions) is construction. Recognizing that column G in Figure 45 contains a large volume of costs associated with design, planning, and other non- construction phase activities, we calculated the ratio of soft costs excluding pre-construction (column H and I, respectively in Figure 45) historically to that forecast and the results show an increase from 17% to 23%. The largest contributors include NIT and BDPL, two of the best rated projects in our Task A analysis. This result runs counterintuitive to a ramp down in construction activity, although there may be viable explanations for this trend including front loaded projects, the need to keep project and construction management staffing levels to the end of a project, or other similar reasons. Other potential contributors to this result include time extensions added at a rate greater than construction cost, which would require use of project and construction management professional for longer periods of time.
3. The internal benchmark shown in Figure 45 is the most correlated benchmark for performance evaluation. We recognize there may be different phases of work contributing to skewed values in ratio analysis, yet note that the only other project like the WSIP is the WSIP (structure, processes, teams, systems, work, interdependencies, etc.).
4. Program Management costs show a decrease from 6% historical performance against construction expenditures to 3% under the forecast.
5. As shown in Table 3, below, the ratio of program delivery (soft costs as used in this section) has remained relatively flat.

Table 3 – WSIP Program Budget Comparison (Construction & Program Delivery Costs)

Budget Category	2005	2011	Current	Forecast (Q2 FY12/13)
Construction Cost (budget), $M	$2,322.00	$2,172.30	$2,315.30	$2,302.40
Program Delivery Cost (Budget) $M	709.00	851.60	864.00	909.60
Program Delivery Cost/Construction:	**30.53%**	**39.20%**	**37.32%**	**39.51%**

Budget Category	2005	2011	Current	Forecast (Q2 FY12/13)
Update % Increase/Decrease - Ratio (Program Delivery/Construction)		8.67%	-1.89%	2.19%

EVALUATION OF SOFT COSTS FOR PROGRAM MANAGEMENT

The program management function for a program of this magnitude is especially important during program startup and high activity phases. The WSIP is more than 50% complete and the WSIP infrastructure is mature. Further, the CMIS allows project information to flow directly from the project site into the system to capture data in the most efficient manner. As shown on Figure 44, 71% of budgeted Program Management costs have been expended ($78,572,030 + $30,624,318 = $109,196,168. $78,572,030/$109,196,168 = 71%), which is not unusual given that Program Management costs are a be a leading category of expenditures on a program.

FIGURE 46 – WSIP PROGRAM MANAGEMENT

Program Management	ALL
Expended through 12/31/12	**$ 78,572,030**
SFPUC	17,012,714
Other City Departments	4,916,068
Consultants	56,643,248
Forecast remaining (2013-2016)	**$ 30,624,138**
SFPUC	13,484,338
Other City Departments	3,604,249
Consultants	13,535,551
Forecast remaining (2013-2016) FTE	**94**
SFPUC	33
Other City Departments	13
Consultants	48

Opportunities to evaluate reductions in Program management costs are as follows:

1. Evaluate the opportunity to transfer data reconciliation duties to SFPUC staff (who are qualified to perform assigned duties). We understand that reconciling data from the CMIS against the City's core financial system is not straightforward. However, the WSIP executive management staff may want to consider (if acceptable to oversight agencies) not performing monthly reconciliations (possibly performing such reconciliations quarterly), as this task appears to require a very high level of effort for program management staff. The benefit would be that data reported may be off by an amount (that should be acceptable), yet which could be reconciled less frequently. A

quarterly reconciliation would also provide for the issuance of reports potentially closer to when the costs are incurred.

2. The program management forecast shows 33 FTEs for 2013, 28 FTEs for 2014, 21 FTEs for 2015, and 11 FTEs for 2016. We recommend that the 2013 and 2014 levels be evaluated to identify 2 to 3 additional FTE reductions through transfer to SFPUC staff, modifications to reconciliation (it would be helpful to analyze the FTE effort required monthly to reconcile project expenditures against the City's financial system).

EVALUATION OF SOFT COSTS FOR THE BALANCE OF THE WATER SYSTEM IMPROVEMENT PROGRAM

For the balance of the WSIP, approximately $296 million in construction costs remain and it is forecast that $70 million in soft costs is required to administer the work as shown on Figure 47. Using a similar metric as that used for the five projects evaluated under TASK A, the ratio of construction work completed divided by soft costs was 1.66 through December 31, 2012, and is forecast to increase to 4.22 at WSIP completion. Similar to our previous evaluation of soft costs, we recommend that, instead of using a standard $282,000 annual FTE value, actual costs should be used to ensure that FTE equivalents are more accurately calculated. The FTE data contained in Figure 47 was extracted by the WSIP management teams staffing plans provide to RWBC.

FIGURE 47 - BALANCE OF WATER SYSTEM IMPROVEMENT PROGRAM SOFT COSTS

Balance of Projects (All less 5 Mega Projects)	**ALL**
Total Forecast Construction (Balance)	**1,039,859,000**
Expended Construction (12/31/12)	**743,134,577**
Remaining Construction:	**296,724,423**
Soft Costs Expended through 12/31/12	**458,122,174**
SFPUC	195,120,628
Other City Departments	63,385,648
Consultants	199,615,898
Soft Costs Forecast remaining (2013-2016)	**70,369,963**
SFPUC	28,863,987
Other City Departments	11,358,082
Consultants	30,147,893
Forecast remaining (2013-2016) FTE	**247**
SFPUC	102
Other City Departments	37
Consultants	107
Remaining Construction/Remaining Soft Costs	**4.22**
Remaining Construction/FTE	**1,202,977**

WATER SYSTEM IMPROVEMENT PROGRAM SOFT COST RECOMMENDATIONS

Based on our review of WSIP soft costs, we recommend the following:

1. Consider streamlining the Program management function by eliminating the regional level of oversight given that the WSIP is well under way and major projects are expected to be completed in the next 2 years.
2. Evaluate the level of effort required to reconcile monthly costs between the CMIS and the City's core financial system and validate whether or not it would be beneficial to perform less frequent reconciliations with the benefit of lower Program management costs and potentially the ability to issue cost reports more quickly.
3. Evaluate opportunities to add SFPUC staff on the CDR and HTWTP projects, as staffing levels appear high and a large number of consultants are used. We recommend a two-step evaluation: (a) evaluate staffing level in total and (b) identify opportunities to leverage SFPUC staff.
4. We recommend that the WSIP management team provide a reconciliation of staffing models presented that use both bottom up staffing levels and top down staffing levels using an average $282,000/year FTE costs.
5. We also recommend that the WSIP management team explore the reasons driving an increase in the rate of remaining soft costs under the current forecast when compared to the same soft costs and work delivered historically.

EXHIBIT 1 – CALAVERAS DAM REPLACEMENT APPROVED CHANGE ORDERS (THROUGH 12/11/12)

Change Order Information				
CO #	Date of Approval	Days	CO $	Cumulative CO
00001	3-Oct-11	-	$ 301,025	$ 301,025
00002	20-Oct-11	-	$ 250,000	$ 551,025
00003	19-Oct-11	-	$ 3,376,370	$ 3,927,395
00004	20-Oct-11	-	$ 65,000	$ 3,992,395
00005	4-Jan-12	-	$ 3,807	$ 3,996,202
00006	4-Jan-12	-	$ 18,796	$ 4,014,998
00007	13-Mar-12	-	$ 72,305	$ 4,087,303
00008	13-Mar-12	-	$ 169,062	$ 4,256,365
00009	15-Mar-12	-	$ (285,374)	$ 3,970,991
00010	2-May-12	-	$ 49,630	$ 4,020,621
00011	2-May-12	-	$ 104,786	$ 4,125,407
00012	7-May-12	-	$ 40,514	$ 4,165,921
00013	6-Jun-12	69.00	$ 11,782,647	$ 15,948,568
00014	8-Jun-12	-	$ 34,714	$ 15,983,282
00015	18-Jun-12	-	$ 102,356	$ 16,085,638
00016	21-Jun-12	-	$ 98,750	$ 16,184,388
00017	28-Jun-12	-	$ 1,000,000	$ 17,184,388
00018	12-Jul-12	-	$ 7,950	$ 17,192,338
00019	12-Jul-12	-	$ 1,962	$ 17,194,300
00020	30-Jul-12	-	$ -	$ 17,194,300
00021	30-Jul-12	-	$ 134,358	$ 17,328,658
00022	20-Aug-12	-	$ 320,000	$ 17,648,658
00023	20-Aug-12	-	$ 374,224	$ 18,022,882
00024	10-Sep-12	-	$ -	$ 18,022,882
00025	18-Sep-12	-	$ 1,000,000	$ 19,022,882
00026	14-Nov-12	-	$ 120,000	$ 19,142,882
00027	10-Dec-12	-	$ 500,000	$ 19,642,882
00028	10-Dec-12	-	$ 350,000	$ 19,992,882
00029	11-Dec-12	-	$ 67,000	$ 20,059,882
00030**	**TBD**	761.00	$ 133,000,000	$ 153,059,882

** Change Order not formally approved. This value is that presented to SFPUC and BASWAC on 11/7/12 ($133M and 25 month time extension)

EXHIBIT 2 – CALAVERAS DAM REPLACEMENT TRENDS (THROUGH 12/14/12)

Trend Information								
Trend #	Date	% Time	Days	Trended Days	Initial Value	Likelihood	Trend $	Cumulative
00001	8-Sep-11	2%	-	-	$ 302,200.32	100%	$ 302,200.32	$ 302,200.32
00002	13-Sep-11	2%	90.00	90.00	$ 3,500,000.00	100%	$ 3,500,000.00	$ 3,802,200.32
00003	13-Sep-11	2%	10.00	10.00	$ 475,000.00	100%	$ 475,000.00	$ 4,277,200.32
00004	23-Sep-11	3%	-	-	$ 500,000.00	100%	$ 500,000.00	$ 4,777,200.32
00005	5-Oct-11	3%	-	-	$ 13,521,816.00	100%	$ 13,521,816.00	$ 18,299,016.32
00006	17-Oct-11	4%	-	-	$ 68,000.00	100%	$ 68,000.00	$ 18,367,016.32
00007	15-Nov-11	6%	-	-	$ 3,806.88	100%	$ 3,806.88	$ 18,370,823.20
00008	1-Dec-11	7%	-	-	$ 18,796.47	100%	$ 18,796.47	$ 18,389,619.67
00009	6-Dec-11	8%	-	-	$ 72,305.00	100%	$ 72,305.00	$ 18,461,924.67
00010	6-Dec-11	8%	-	-	$ 90,000.00	100%	$ 90,000.00	$ 18,551,924.67
00011	19-Dec-11	9%	-	-	$ 180,000.00	100%	$ 180,000.00	$ 18,731,924.67
00012	19-Dec-11	9%	-	-	$ 179,378.00	100%	$ 179,378.00	$ 18,911,302.67
00013	19-Dec-11	9%	-	-	$ 35,000.00	100%	$ 35,000.00	$ 18,946,302.67
00014	19-Dec-11	9%	-	-	$ 75,000.00	100%	$ 75,000.00	$ 19,021,302.67
00015	19-Dec-11	9%	-	-	$ 29,200.00	100%	$ 29,200.00	$ 19,050,502.67
00016	19-Dec-11	9%	-	-	$ 9,600.00	100%	$ 9,600.00	$ 19,060,102.67
00017	19-Dec-11	9%	-	-	$ 22,000.00	100%	$ 22,000.00	$ 19,082,102.67
00018	19-Dec-11	9%	-	-	$ 500,000.00	100%	$ 500,000.00	$ 19,582,102.67
00019	19-Dec-11	9%	-	-	$ 35,000.00	100%	$ 35,000.00	$ 19,617,102.67
00020	21-Feb-12	13%	-	-	$ (302,097.60)	100%	$ (302,097.60)	$ 19,315,005.07
00021	21-Feb-12	13%	-	-	$ 109,333.03	100%	$ 109,333.03	$ 19,424,338.10
00022	21-Feb-12	13%	-	-	$ 150,000.00	100%	$ 150,000.00	$ 19,574,338.10
00023	21-Feb-12	13%	-	-	$ 80,000.00	100%	$ 80,000.00	$ 19,654,338.10
00024	21-Feb-12	13%	-	-	$ 64,436.80	100%	$ 64,436.80	$ 19,718,774.90
00025	21-Feb-12	13%	-	-	$ 18,740.00	100%	$ 18,740.00	$ 19,737,514.90
00026	21-Feb-12	13%	-	-	$ 25,000.00	100%	$ 25,000.00	$ 19,762,514.90
00027	2-Mar-12	14%	10.00	10.00	$ 560,000.00	100%	$ 560,000.00	$ 20,322,514.90
00028	2-Mar-12	14%	-	-	$ 60,000.00	100%	$ 60,000.00	$ 20,382,514.90
00029	2-Mar-12	14%	-	-	$ 245,000.00	100%	$ 245,000.00	$ 20,627,514.90
00030	5-Apr-12	16%	-	-	$ 350,000.00	100%	$ 350,000.00	$ 20,977,514.90
00031	5-Apr-12	16%	-	-	$ 100,000.00	100%	$ 100,000.00	$ 21,077,514.90
00032	5-Apr-12	16%	-	-	$ 100,000.00	100%	$ 100,000.00	$ 21,177,514.90
00033	5-Apr-12	16%	-	-	$ 120,000.00	100%	$ 120,000.00	$ 21,297,514.90
00034	5-Apr-12	16%	-	-	$ 380,000.00	100%	$ 380,000.00	$ 21,677,514.90
00035	5-Apr-12	16%	-	-	$ 150,000.00	100%	$ 150,000.00	$ 21,827,514.90
00036	5-Apr-12	16%	-	-	$ 400,000.00	100%	$ 400,000.00	$ 22,227,514.90
00037	26-Apr-12	17%	25.00	25.00	$ -	100%	$ -	$ 22,227,514.90
00038	24-May-12	19%	-	-	$ 572,333.73	100%	$ 572,333.73	$ 22,799,848.63
00039	24-May-12	19%	-	-	$ 150,000.00	100%	$ 150,000.00	$ 22,949,848.63
00040	5-Jun-12	20%	-	-	$ 33,922.00	100%	$ 33,922.00	$ 22,983,770.63
00041	28-Jun-12	22%	-	-	$ 9,000.00	100%	$ 9,000.00	$ 22,992,770.63
00042	28-Jun-12	22%	-	-	$ 813,495.00	100%	$ 813,495.00	$ 23,806,265.63
00043	12-Jul-12	23%	-	-	$ 340,000.00	100%	$ 340,000.00	$ 24,146,265.63
00044	31-Aug-12	26%	761.00	761.00	$ 95,000,000.00	100%	$ 95,000,000.00	$ 119,146,265.63
00045	10-Sep-12	27%	-	-	$ 100,000.00	100%	$ 100,000.00	$ 119,246,265.63
00046	10-Sep-12	27%	-	-	$ 410,000.00	100%	$ 410,000.00	$ 119,656,265.63
00047	10-Sep-12	27%	-	-	$ 100,000.00	100%	$ 100,000.00	$ 119,756,265.63
00048	10-Sep-12	27%	-	-	$ 55,000.00	100%	$ 55,000.00	$ 119,811,265.63
00049	10-Sep-12	27%	-	-	$ 120,000.00	100%	$ 120,000.00	$ 119,931,265.63
00050	10-Sep-12	27%	-	-	$ 5,159.42	100%	$ 5,159.42	$ 119,936,425.05
00051	12-Oct-12	29%	-	-	$ 75,000.00	100%	$ 75,000.00	$ 120,011,425.05
00052	12-Nov-12	31%	-	-	$ 25,000.00	100%	$ 25,000.00	$ 120,036,425.05
00053	12-Nov-12	31%	-	-	$ 350,000.00	100%	$ 350,000.00	$ 120,386,425.05
00054	12-Nov-12	31%	-	-	$ 175,000.00	100%	$ 175,000.00	$ 120,561,425.05
00055	12-Nov-12	31%	-	-	$ 67,090.00	100%	$ 67,090.00	$ 120,628,515.05
00056	12-Nov-12	31%	-	-	$ 25,000.00	100%	$ 25,000.00	$ 120,653,515.05
00057	29-Nov-12	32%	-	-	$ 500,000.00	100%	$ 500,000.00	$ 121,153,515.05
00058	29-Nov-12	32%	-	-	$ 150,000.00	100%	$ 150,000.00	$ 121,303,515.05
00059	29-Nov-12	32%	-	-	$ 75,000.00	100%	$ 75,000.00	$ 121,378,515.05
00060	29-Nov-12	32%	-	-	$ 500,000.00	100%	$ 500,000.00	$ 121,878,515.05
00061	29-Nov-12	32%	-	-	$ 250,000.00	100%	$ 250,000.00	$ 122,128,515.05
00062	6-Dec-12	33%	-	-	$ 15,000.00	100%	$ 15,000.00	$ 122,143,515.05
00063	6-Dec-12	33%	-	-	$ 25,000.00	100%	$ 25,000.00	$ 122,168,515.05
00064	6-Dec-12	33%	-	-	$ 145,000.00	100%	$ 145,000.00	$ 122,313,515.05
00065	6-Dec-12	33%	-	-	$ 25,000.00	100%	$ 25,000.00	$ 122,338,515.05
00066	6-Dec-12	33%	-	-	$ 5,000.00	100%	$ 5,000.00	$ 122,343,515.05
00067	6-Dec-12	33%	-	-	$ 100,000.00	100%	$ 100,000.00	$ 122,443,515.05
00068	6-Dec-12	33%	-	-	$ 4,500,000.00	100%	$ 4,500,000.00	$ 126,943,515.05
00069	6-Dec-12	33%	-	-	$ 100,000.00	100%	$ 100,000.00	$ 127,043,515.05
00070	6-Dec-12	33%	-	-	$ 2,400,000.00	100%	$ 2,400,000.00	$ 129,443,515.05
00071	14-Dec-12	33%	-	-	$ 750,000.00	100%	$ 750,000.00	$ 130,193,515.05

EXHIBIT 3 – CRYSTAL SPRINGS/SAN ANDREAS TRANSMISSION SYSTEM UPGRADE APPROVED CHANGE ORDERS (THROUGH 12/20/12)

Change Order Information					
CO #	Date of Approval	% Time	Days	CO $	Cumulative
00001	6-Dec-10	1%	-	$ 36,032.00	$ 36,032.00
00002	11-Feb-11	7%	-	$ (676,938.00)	$ (640,906.00)
00003	15-Feb-11	8%	-	$ 2,317.00	$ (638,589.00)
00004	8-Mar-11	10%	-	$ 26,746.00	$ (611,843.00)
00005	14-Mar-11	11%	-	$ 381,953.00	$ (229,890.00)
00016	7-Apr-11	13%	-	$ 7,495.00	$ (222,395.00)
00006	10-May-11	16%	-	$ 46,001.00	$ (176,394.00)
00007	29-Jun-11	21%	-	$ 15,658.00	$ (160,736.00)
00008	29-Jun-11	21%	-	$ 456,051.00	$ 295,315.00
00009	12-Jul-11	23%	-	$ 57,945.00	$ 353,260.00
00010	12-Jul-11	23%	-	$ 13,257.00	$ 366,517.00
00011	12-Jul-11	23%	-	$ 11,660.00	$ 378,177.00
00012	15-Jul-11	23%	-	$ 314,073.66	$ 692,250.66
00013	18-Jul-11	23%	-	$ -	$ 692,250.66
00014	22-Jul-11	24%	-	$ -	$ 692,250.66
00015	26-Jul-11	24%	-	$ 108,200.00	$ 800,450.66
00017	3-Aug-11	25%	-	$ 14,913.00	$ 815,363.66
00018	25-Aug-11	27%	-	$ 3,000.00	$ 818,363.66
00019	31-Aug-11	28%	-	$ -	$ 818,363.66
00020	2-Sep-11	28%	-	$ 55,200.00	$ 873,563.66
00021	8-Sep-11	29%	-	$ 11,616.00	$ 885,179.66
00022	12-Sep-11	29%	-	$ 1,310.00	$ 886,489.66
00023	12-Sep-11	29%	-	$ 6,800.00	$ 893,289.66
00024	19-Sep-11	30%	-	$ 100,000.00	$ 993,289.66
00025	20-Sep-11	30%	-	$ 840,000.00	$ 1,833,289.66
00026	5-Oct-11	31%	-	$ 45,309.00	$ 1,878,598.66
00027	7-Oct-11	32%	-	$ 31,233.00	$ 1,909,831.66
00030	6-Oct-11	32%	-	$ 83,138.00	$ 1,992,969.66
00028	11-Oct-11	32%	-	$ 48,448.00	$ 2,041,417.66
00029	1-Nov-11	34%	-	$ 3,973.73	$ 2,045,391.39
00031	23-Nov-11	36%	-	$ (238,252.00)	$ 1,807,139.39
00032	2-Dec-11	37%	-	$ 10,480.00	$ 1,817,619.39
00033	13-Dec-11	39%	-	$ 19,086.00	$ 1,836,705.39
00034	15-Dec-11	39%	-	$ 146,089.00	$ 1,982,794.39
00035	16-Dec-11	39%	-	$ 87,000.00	$ 2,069,794.39
00036	16-Dec-11	39%	-	$ 10,972.00	$ 2,080,766.39
00037	21-Dec-11	39%	-	$ 39,241.00	$ 2,120,007.39
00038	11-Jan-12	41%	-	$ 30,425.00	$ 2,150,432.39

Change Order Information					
CO #	Date of Approval	% Time	Days	CO $	Cumulative
00039	11-Jan-12	41%	-	$ 44,970.00	$ 2,195,402.39
00040	13-Jan-12	42%	-	$ 31,181.00	$ 2,226,583.39
00042	3-Feb-12	44%	-	$ 25,323.00	$ 2,251,906.39
00041	8-Feb-12	44%	-	$ 34,600.00	$ 2,286,506.39
00043	22-Feb-12	46%	-	$ 467,300.00	$ 2,753,806.39
00044	28-Feb-12	46%	-	$ 250,000.00	$ 3,003,806.39
00045	6-Mar-12	47%	-	$ (192,000.00)	$ 2,811,806.39
00046	22-Mar-12	49%	-	$ 71,981.00	$ 2,883,787.39
00047	2-Apr-12	50%	-	$ -	$ 2,883,787.39
00048	9-Apr-12	51%	-	$ 277,465.00	$ 3,161,252.39
00049	20-Apr-12	52%	-	$ 43,601.00	$ 3,204,853.39
00050	20-Apr-12	52%	-	$ 62,469.00	$ 3,267,322.39
00052	7-May-12	53%	-	$ 19,110.00	$ 3,286,432.39
00051	8-May-12	54%	-	$ 29,200.00	$ 3,315,632.39
00053	25-May-12	55%	-	$ 53,188.00	$ 3,368,820.39
00054	25-Jun-12	58%	-	$ 8,820.00	$ 3,377,640.39
00055	22-Jun-12	58%	-	$ 1,391.00	$ 3,379,031.39
00056	22-Jun-12	58%	-	$ 3,889.00	$ 3,382,920.39
00057	25-Jun-12	58%	-	$ 2,357.00	$ 3,385,277.39
00058	25-Jun-12	58%	-	$ 2,347.00	$ 3,387,624.39
00059	5-Jul-12	59%	-	$ 8,414.00	$ 3,396,038.39
00062	2-Jul-12	59%	-	$ 43,492.00	$ 3,439,530.39
00060	10-Jul-12	60%	-	$ 7,675.00	$ 3,447,205.39
00061	10-Jul-12	60%	-	$ 6,515.00	$ 3,453,720.39
00063	11-Jul-12	60%	-	$ 7,148.00	$ 3,460,868.39
00064	12-Jul-12	60%	-	$ 2,290.00	$ 3,463,158.39
00065	16-Jul-12	61%	-	$ 3,407.00	$ 3,466,565.39
00066	18-Jul-12	61%	-	$ 4,443.00	$ 3,471,008.39
00067	20-Jul-12	61%	-	$ 18,560.00	$ 3,489,568.39
00068	24-Jul-12	61%	-	$ 4,545.00	$ 3,494,113.39
00069	30-Jul-12	62%	-	$ 18,567.00	$ 3,512,680.39
00070	2-Aug-12	62%	-	$ (12,876.00)	$ 3,499,804.39
00071	2-Aug-12	62%	-	$ 2,673.00	$ 3,502,477.39
00072	8-Aug-12	63%	-	$ 9,000.00	$ 3,511,477.39
00073	17-Aug-12	64%	-	$ 128,162.00	$ 3,639,639.39
00074	29-Aug-12	65%	-	$ 16,500.00	$ 3,656,139.39
00075	4-Sep-12	66%	-	$ 10,824.00	$ 3,666,963.39
00076	5-Sep-12	66%	-	$ 4,473.00	$ 3,671,436.39
00077	7-Sep-12	66%	-	$ 5,379.00	$ 3,676,815.39
00078	11-Sep-12	66%	-	$ 14,000.00	$ 3,690,815.39
00079	12-Sep-12	66%	-	$ 155,052.00	$ 3,845,867.39
00080	19-Sep-12	67%	-	$ 5,300.00	$ 3,851,167.39
00081	1-Oct-12	68%	-	$ 1,217.00	$ 3,852,384.39
00082	1-Oct-12	68%	-	$ 2,014.00	$ 3,854,398.39

Change Order Information					
CO #	Date of Approval	% Time	Days	CO $	Cumulative
00083	4-Oct-12	69%	-	$ 6,738.00	$ 3,861,136.39
00084	9-Oct-12	69%	-	$ 30,500.00	$ 3,891,636.39
00085	15-Oct-12	70%	-	$ 25,060.00	$ 3,916,696.39
00086	24-Oct-12	71%	-	$ 100,000.00	$ 4,016,696.39
00087	24-Oct-12	71%	-	$ 10,371.00	$ 4,027,067.39
00088	7-Nov-12	72%	-	$ 33,425.00	$ 4,060,492.39
00089	10-Dec-12	76%	-	$ 1,467.00	$ 4,061,959.39
00090	10-Dec-12	76%	-	$ 5,540.00	$ 4,067,499.39

RW Block Consulting, Inc.

EXHIBIT 4 – CRYSTAL SPRINGS/SAN ANDREAS TRANSMISSION SYSTEM UPGRADE TRENDS (THROUGH 12/14/12)

Trend Information								
Trend #	Date	% Time	Days	Trended Days	Value	Likelihood	Trend $	Cumulative
00001	3-Dec-10	0%	-	-	$ (550,000.00)	95%	$ (522,500.00)	$ (522,500.00)
00002	3-Dec-10	0%	-	-	$ -	95%	$ -	$ (522,500.00)
00003	3-Dec-10	0%	-	-	$ -	95%	$ -	$ (522,500.00)
00004	22-Dec-10	2%	-	-	$ 62,563.00	95%	$ 59,434.85	$ (463,065.15)
00005	3-Jan-11	3%	-	-	$ 100,000.00	0%	$ -	$ (463,065.15)
00006	13-Jan-11	4%	-	-	$ 500,000.00	0%	$ -	$ (463,065.15)
00007	14-Jan-11	4%	-	-	$ 80,000.00	0%	$ -	$ (463,065.15)
00008	21-Jan-11	5%	-	-	$ 102,190.00	0%	$ -	$ (463,065.15)
00009	4-Feb-11	7%	-	-	$ 100,000.00	0%	$ -	$ (463,065.15)
00010	14-Mar-11	11%	-	-	$ 20,000.00	0%	$ -	$ (463,065.15)
00011	14-Mar-11	11%	-	-	$ 70,000.00	0%	$ -	$ (463,065.15)
00012	30-Mar-11	12%	-	-	$ 15,000.00	90%	$ 13,500.00	$ (449,565.15)
00013	30-Mar-11	12%	-	-	$ 15,000.00	90%	$ 13,500.00	$ (436,065.15)
00014	8-Apr-11	13%	-	-	$ 80,000.00	95%	$ 76,000.00	$ (360,065.15)
00015	10-May-11	16%	-	-	$ 15,000.00	99%	$ 14,850.00	$ (345,215.15)
00016	10-May-11	16%	-	-	$ 50,000.00	99%	$ 49,500.00	$ (295,715.15)
00017	10-May-11	16%	-	-	$ 50,000.00	75%	$ 37,500.00	$ (258,215.15)
00018	10-May-11	16%	-	-	$ 100,000.00	99%	$ 99,000.00	$ (159,215.15)
00019	25-May-11	18%	-	-	$ 250,000.00	90%	$ 225,000.00	$ 65,784.85
00020	13-Jun-11	20%	-	-	$ 50,000.00	0%	$ -	$ 65,784.85
00021	15-Jun-11	20%	-	-	$ 30,000.00	0%	$ -	$ 65,784.85
00022	17-Jun-11	20%	150.00	-	$ 1,000,000.00	0%	$ -	$ 65,784.85
00023	17-Jun-11	20%	-	-	$ 490,000.00	80%	$ 392,000.00	$ 457,784.85
00024	13-Jul-11	23%	-	-	$ 1,000,000.00	0%	$ -	$ 457,784.85
00025	26-Jul-11	24%	-	-	$ 1,000,000.00	0%	$ -	$ 457,784.85
00026	15-Aug-11	26%	-	-	$ 50,000.00	0%	$ -	$ 457,784.85
00027	25-Aug-11	27%	-	-	$ 500,000.00	99%	$ 495,000.00	$ 952,784.85
00028	25-Aug-11	27%	-	-	$ 90,000.00	75%	$ 67,500.00	$ 1,020,284.85
00029	25-Aug-11	27%	-	-	$ -	0%	$ -	$ 1,020,284.85
00030	25-Aug-11	27%	-	-	$ 600,000.00	75%	$ 450,000.00	$ 1,470,284.85
00031	14-Sep-11	29%	-	-	$ (1,000,000.00)	0%	$ -	$ 1,470,284.85
00032	4-Oct-11	31%	-	-	$ 50,000.00	0%	$ -	$ 1,470,284.85
00033	25-Oct-11	34%	-	-	$ 30,000.00	0%	$ -	$ 1,470,284.85
00034	25-Oct-11	34%	-	-	$ 100,000.00	50%	$ 50,000.00	$ 1,520,284.85
00035	25-Oct-11	34%	-	-	$ 150,000.00	50%	$ 75,000.00	$ 1,595,284.85
00036	25-Oct-11	34%	-	-	$ 10,000.00	50%	$ 5,000.00	$ 1,600,284.85
00037	25-Oct-11	34%	-	-	$ 30,000.00	25%	$ 7,500.00	$ 1,607,784.85
00038	25-Oct-11	34%	-	-	$ 440,000.00	50%	$ 220,000.00	$ 1,827,784.85
00039	15-Nov-11	36%	-	-	$ 579,230.00	50%	$ 289,615.00	$ 2,117,399.85
00040	16-Nov-11	36%	-	-	$ 350,000.00	0%	$ -	$ 2,117,399.85

Trend Information								
Trend #	**Date**	**% Time**	**Days**	**Trended Days**	**Value**	**Likelihood**	**Trend $**	**Cumulative**
00041	22-Nov-11	36%	-	-	$ 40,000.00	0%	$ -	$ 2,117,399.85
00042	9-Dec-11	38%	-	-	$ 400,000.00	80%	$ 320,000.00	$ 2,437,399.85
00043	9-Dec-11	38%	-	-	$ 100,000.00	80%	$ 80,000.00	$ 2,517,399.85
00044	9-Dec-11	38%	-	-	$ 25,000.00	0%	$ -	$ 2,517,399.85
00045	16-Dec-11	39%	-	-	$ 50,000.00	50%	$ 25,000.00	$ 2,542,399.85
00046	11-Jan-12	41%	-	-	$ 100,000.00	80%	$ 80,000.00	$ 2,622,399.85
00047	19-Jan-12	42%	-	-	$ 50,000.00	15%	$ 7,500.00	$ 2,629,899.85
00048	19-Jan-12	42%	-	-	$ 100,000.00	75%	$ 75,000.00	$ 2,704,899.85
00049	30-Jan-12	43%	-	-	$ 50,000.00	0%	$ -	$ 2,704,899.85
00050	14-Feb-12	45%	30.00	-	$ 100,000.00	0%	$ -	$ 2,704,899.85
00051	23-Feb-12	46%	-	-	$ 200,000.00	0%	$ -	$ 2,704,899.85
00052	7-Mar-12	47%	-	-	$ 150,000.00	99%	$ 148,500.00	$ 2,853,399.85
00053	7-Mar-12	47%	-	-	$ 200,000.00	50%	$ 100,000.00	$ 2,953,399.85
00054	13-Apr-12	51%	-	-	$ (290,000.00)	99%	$ (287,100.00)	$ 2,666,299.85
00055	13-Apr-12	51%	-	-	$ 500,000.00	99%	$ 495,000.00	$ 3,161,299.85
00056	13-Apr-12	51%	-	-	$ 500,000.00	99%	$ 495,000.00	$ 3,656,299.85
00057	18-May-12	55%	-	-	$ 170,000.00	75%	$ 127,500.00	$ 3,783,799.85
00058	21-May-12	55%	-	-	$ 50,000.00	99%	$ 49,500.00	$ 3,833,299.85
00059	18-Jun-12	58%	-	-	$ 4,600,000.00	50%	$ 2,300,000.00	$ 6,133,299.85
00060	20-Jun-12	58%	-		$ 100,000.00	99%	$ 99,000.00	$ 6,232,299.85
00061	3-Jul-12	59%	-		$ 100,000.00	50%	$ 50,000.00	$ 6,282,299.85
00062	21-Sep-12	67%	-		$ 300,000.00	0%	$ -	$ 6,282,299.85
00063	1-Nov-12	72%	-		$ 3,099,363.00	50%	$ 1,549,681.50	$ 7,831,981.35
00064	1-Nov-12	72%	-		$ 900,000.00	50%	$ 450,000.00	$ 8,281,981.35
00065	1-Nov-12	72%	-		$ 500,000.00	50%	$ 250,000.00	$ 8,531,981.35
00066	27-Nov-12	74%	-		$ 100,000.00	0%	$ -	$ 8,531,981.35
00067	12-Dec-12	76%	-		$ 320,000.00	0%	$ -	$ 8,531,981.35
00068	13-Dec-12	76%	-		$ 200,000.00	0%	$ -	$ 8,531,981.35
00069	13-Dec-12	76%	-		$ 270,000.00	0%	$ -	$ 8,531,981.35

EXHIBIT 5 – HARRY TRACY WATER TREATMENT PLANT CHANGE ORDERS (THROUGH 12/18/12)

Change Order Information					
CO #	Date of Approval	% Time	Days	CO $	Cumulative
00001	12-Oct-11	15%	-	$ 2,231.00	$ 2,231.00
00002	29-Feb-12	24%	-	$ 20,397.00	$ 22,628.00
00003	7-Mar-12	25%	-	$ 2,616.00	$ 25,244.00
00005	2-Apr-12	27%	-	$ 32,586.00	$ 57,830.00
00006	6-Apr-12	27%	-	$ 3,249.00	$ 61,079.00
00007	9-Apr-12	27%	-	$ 3,200.00	$ 64,279.00
00008	9-Apr-12	27%	-	$ 3,615.00	$ 67,894.00
00009	9-Apr-12	27%	-	$ 28,084.00	$ 95,978.00
00010	26-Apr-12	28%	-	$ 96,632.00	$ 192,610.00
00011	7-May-12	29%	-	$ (8,226.00)	$ 184,384.00
00012	8-May-12	29%	-	$ 440.00	$ 184,824.00
00013	16-May-12	30%	-	$ 41,056.00	$ 225,880.00
00014	16-May-12	30%	-	$ 200,000.00	$ 425,880.00
00015	6-Jun-12	31%	-	$ 49,836.00	$ 475,716.00
00016	6-Jun-12	31%	-	$ 72,563.00	$ 548,279.00
00017	14-Jun-12	32%	-	$ 7,050.00	$ 555,329.00
00018	12-Jun-12	31%	-	$ (5,060.00)	$ 550,269.00
00019	15-Jun-12	32%	-	$ 42,237.00	$ 592,506.00
00020	19-Jun-12	32%	-	$ -	$ 592,506.00
00021	19-Jun-12	32%	-	$ 2,409.00	$ 594,915.00
00022	20-Jun-12	32%	-	$ 34,821.48	$ 629,736.48

Change Order Information					
CO #	Date of Approval	% Time	Days	CO $	Cumulative
00023	21-Jun-12	32%	-	$ 2,288.00	$ 632,024.48
00024	27-Jun-12	32%	-	$ 4,519.00	$ 636,543.48
00025	2-Jul-12	33%	-	$ 34,125.00	$ 670,668.48
00026	6-Jul-12	33%	-	$ 8,000.00	$ 678,668.48
00027	10-Jul-12	33%	-	$ 20,998.00	$ 699,666.48
00028	10-Jul-12	33%	-	$ 58,115.00	$ 757,781.48
00029	19-Jul-12	34%	-	$ 78,258.00	$ 836,039.48
00030	16-Jul-12	34%	-	$ 30,387.00	$ 866,426.48
00031	18-Jul-12	34%	-	$ 2,350.00	$ 868,776.48
00032	24-Jul-12	34%	-	$ 2,255.00	$ 871,031.48
00033	1-Aug-12	35%	-	$ 108,120.00	$ 979,151.48
00034	3-Aug-12	35%	-	$ -	$ 979,151.48
00035	8-Aug-12	35%	-	$ 3,911.00	$ 983,062.48
00004	14-Aug-12	36%	-	$ 7,197.00	$ 990,259.48
00036	15-Aug-12	36%	-	$ 15,612.00	$ 1,005,871.48
00037	17-Aug-12	36%	-	$ 169,376.00	$ 1,175,247.48
00038	7-Sep-12	37%	-	$ 2,398.00	$ 1,177,645.48
00039	18-Sep-12	38%	-	$ 5,856.00	$ 1,183,501.48
00040	19-Sep-12	38%	-	$ 149,374.00	$ 1,332,875.48
00041	20-Sep-12	38%	-	$ 10,826.00	$ 1,343,701.48
00042	1-Oct-12	39%	-	$ 53,941.00	$ 1,397,642.48
00043	1-Oct-12	39%	-	$ 86,865.00	$ 1,484,507.48
00044	9-Oct-12	40%	-	$ 6,155.00	$ 1,490,662.48
00045	12-Oct-12	40%		$ 100,000.00	$ 1,590,662.48

Change Order Information					
CO #	Date of Approval	% Time	Days	CO $	Cumulative
			-		
00046	16-Oct-12	40%	-	$ 71,566.00	$ 1,662,228.48
00047	18-Oct-12	40%	-	$ 134,975.00	$ 1,797,203.48
00048	29-Oct-12	41%	-	$ 1,255.00	$ 1,798,458.48
00049	31-Oct-12	41%	-	$ 29,712.00	$ 1,828,170.48
00050	31-Oct-12	41%	-	$ 555.00	$ 1,828,725.48
00051	31-Oct-12	41%	-	$ 445.00	$ 1,829,170.48
00052	5-Nov-12	42%	-	$ 16,131.00	$ 1,845,301.48
00053	13-Nov-12	42%	-	$ 11,577.00	$ 1,856,878.48
00054	27-Nov-12	43%	-	$ 2,286.00	$ 1,859,164.48
00055	3-Dec-12	43%	-	$ 5,442.00	$ 1,864,606.48
00056	6-Dec-12	44%	-	$ 9,553.00	$ 1,874,159.48
00057	13-Dec-12	44%	-	$ 2,722.00	$ 1,876,881.48
00058	13-Dec-12	44%	-	$ 3,262.00	$ 1,880,143.48
00059	18-Dec-12	45%	-	$ 16,368.00	$ 1,896,511.48

EXHIBIT 6 – HARRY TRACY WATER TREATMENT PLANT TRENDS

Trend Information								
Trend #	Date	% Time	Days	Trended Days	Value	Likelihood	Trend $	Cumulative
00001	3-Oct-11	14%	-	-	$ 100,000.00	50%	$ 50,000.00	$ 50,000.00
00002	17-Oct-11	15%	-	-	$ 35,000.00	80%	$ 28,000.00	$ 78,000.00
00003	17-Oct-11	15%	-	-	$ 10,000.00	20%	$ 2,000.00	$ 80,000.00
00004	17-Oct-11	15%	-	-	$ 21,000.00	90%	$ 18,900.00	$ 98,900.00
00005	17-Oct-11	15%	-	-	$ 5,000.00	90%	$ 4,500.00	$ 103,400.00
00006	17-Oct-11	15%	-	-	$ (8,000.00)	0%	$ -	$ 103,400.00
00007	17-Oct-11	15%	-	-	$ 1,000.00	90%	$ 900.00	$ 104,300.00
00008	18-Oct-11	15%	-	-	$ 12,000.00	10%	$ 1,200.00	$ 105,500.00
00009	18-Oct-11	15%	-	-	$ 100,000.00	90%	$ 90,000.00	$ 195,500.00
00010	14-Dec-11	19%	-	-	$ (50,000.00)	90%	$ (45,000.00)	$ 150,500.00
00011	16-Dec-11	19%	-	-	$ 90,000.00	80%	$ 72,000.00	$ 222,500.00
00012	11-Jan-12	21%	-	-	$ 120,000.00	90%	$ 108,000.00	$ 330,500.00
00013	6-Feb-12	23%	-	-	$ 150,000.00	60%	$ 90,000.00	$ 420,500.00
00014	7-Feb-12	23%	-	-	$ 150,000.00	70%	$ 105,000.00	$ 525,500.00
00015	7-Feb-12	23%	-	-	$ 100,000.00	90%	$ 90,000.00	$ 615,500.00
00016	7-Feb-12	23%	40.00	20.00	$ 1,000,000.00	50%	$ 500,000.00	$ 1,115,500.00
00017	1-Mar-12	24%	-	-	$ 40,000.00	90%	$ 36,000.00	$ 1,151,500.00
00018	1-Mar-12	24%	-	-	$ 5,000.00	90%	$ 4,500.00	$ 1,156,000.00
00019	1-Mar-12	24%	-	-	$ 4,478.00	90%	$ 4,030.20	$ 1,160,030.20
00020	1-Mar-12	24%	-	-	$ 5,000.00	90%	$ 4,500.00	$ 1,164,530.20
00021	11-Apr-12	27%	-	-	$ 200,000.00	90%	$ 180,000.00	$ 1,344,530.20
00022	11-Apr-12	27%	-	-	$ 40,000.00	60%	$ 24,000.00	$ 1,368,530.20
00023	11-Apr-12	27%	-	-	$ 330,000.00	10%	$ 33,000.00	$ 1,401,530.20
00024	11-Apr-12	27%	-	-	$ 75,000.00	90%	$ 67,500.00	$ 1,469,030.20
00025	19-Jun-12	32%	-	-	$ 100,000.00	90%	$ 90,000.00	$ 1,559,030.20
00026	10-Jul-12	33%	-	-	$ 28,084.00	40%	$ 11,233.60	$ 1,570,263.80
00027	8-Aug-12	35%	-	-	$ 25,000.00	90%	$ 22,500.00	$ 1,592,763.80
00028	8-Aug-12	35%	-	-	$ 88,315.00	0%	$ -	$ 1,592,763.80
00029	8-Aug-12	35%	-	-	$ 41,495.00	0%	$ -	$ 1,592,763.80
00030	8-Aug-12	35%	-	-	$ 100,000.00	90%	$ 90,000.00	$ 1,682,763.80
00031	8-Aug-12	35%	-	-	$ 14,971.00	50%	$ 7,485.50	$ 1,690,249.30
00032	8-Aug-12	35%	-	-	$ 50,000.00	90%	$ 45,000.00	$ 1,735,249.30
00033	8-Aug-12	35%	-	-	$ 45,336.00	80%	$ 36,268.80	$ 1,771,518.10
00034	8-Aug-12	35%	-	-	$ 100,000.00	70%	$ 70,000.00	$ 1,841,518.10
00035	8-Aug-12	35%	-	-	$ 30,000.00	50%	$ 15,000.00	$ 1,856,518.10
00036	8-Aug-12	35%	-	-	$ 42,984.00	25%	$ 10,746.00	$ 1,867,264.10
00037	8-Aug-12	35%	-	-	$ 14,895.00	90%	$ 13,405.50	$ 1,880,669.60
00038	8-Aug-12	35%	-	-	$ 9,917.00	50%	$ 4,958.50	$ 1,885,628.10
00039	28-Aug-12	37%	-	-	$ 174,378.00	10%	$ 17,437.80	$ 1,903,065.90
00040	25-Sep-12	39%	-	-	$ 30,000.00	60%	$ 18,000.00	$ 1,921,065.90
00041	19-Nov-12	43%	-	-	$ 75,000.00	0%	$ -	$ 1,921,065.90
00042	19-Nov-12	43%	-	-	$ 175,000.00	0%	$ -	$ 1,921,065.90
00043	27-Nov-12	43%	-	-	$ 150,000.00	10%	$ 15,000.00	$ 1,936,065.90
00044	17-Dec-12	44%	-	-	$ 500,000.00	0%	$ -	$ 1,936,065.90

(THROUGH 12/17/12)

EXHIBIT 7 – NEW IRVINGTON TUNNEL CHANGE ORDERS (THROUGH 12/3/12)

Change Order Information						
CO #	Date of Approval	% Time	Days	Total Days	CO $	Cumulative
00001	21-Jul-10	0%	400.00	400.00	$ -	$ -
00002	21-Jul-10	0%	-	400.00	$ -	$ -
00003	30-Sep-10	5%	-	400.00	$ 60,000.00	$ 60,000.00
00004	7-Oct-10	5%	-	400.00	$ 106,279.00	$ 166,279.00
00005	11-Nov-10	8%	-	400.00	$ 66,667.00	$ 232,946.00
00006	30-Dec-10	11%	-	400.00	$ 21,638.92	$ 254,584.92
00007	7-Jan-11	12%	-	400.00	$ 188,583.06	$ 443,167.98
00008	21-Jan-11	13%	-	400.00	$ 3,333.35	$ 446,501.33
00009	19-Apr-11	19%	-	400.00	$ 218,230.00	$ 664,731.33
00010	10-May-11	21%	-	400.00	$ 861,983.00	$ 1,526,714.33
00011	4-May-11	20%	-	400.00	$ 1,058.84	$ 1,527,773.17
00012	11-May-11	21%	-	400.00	$ (32,170.00)	$ 1,495,603.17
00013	18-May-11	21%	-	400.00	$ 5,315.28	$ 1,500,918.45
00014	1-Jun-11	22%	-	400.00	$ -	$ 1,500,918.45
00015	3-Jun-11	22%	-	400.00	$ 25,000.00	$ 1,525,918.45
00016	28-Jun-11	24%	-	400.00	$ -	$ 1,525,918.45
00017	25-Aug-11	28%	-	400.00	$ -	$ 1,525,918.45
00018	29-Aug-11	28%	-	400.00	$ 11,824.79	$ 1,537,743.24
00019	29-Aug-11	28%	12.00	412.00	$ 9,799.00	$ 1,547,542.24
00020	6-Sep-11	29%	-	412.00	$ 74,243.00	$ 1,621,785.24

Change Order Information						
CO #	Date of Approval	% Time	Days	Total Days	CO $	Cumulative
00021	7-Sep-11	29%	-	412.00	$ 86,836.00	$ 1,708,621.24
00022	8-Sep-11	29%	-	412.00	$ 25,522.00	$ 1,734,143.24
00023	8-Sep-11	29%	-	412.00	$ 54,026.00	$ 1,788,169.24
00024	8-Sep-11	29%	-	412.00	$ 21,159.00	$ 1,809,328.24
00025	13-Sep-11	29%	-	412.00	$ 3,423.00	$ 1,812,751.24
00026	15-Sep-11	29%	-	412.00	$ -	$ 1,812,751.24
00027	19-Sep-11	30%	-	412.00	$ -	$ 1,812,751.24
00028	3-Oct-11	31%	27.00	439.00	$ -	$ 1,812,751.24
00029	24-Oct-11	32%	38.00	477.00	$ -	$ 1,812,751.24
00030	22-Nov-11	34%	25.00	502.00	$ -	$ 1,812,751.24
00031	12-Dec-11	36%	28.00	530.00	$ 299,110.36	$ 2,111,861.60
00032	14-Dec-11	36%	6.00	536.00	$ 324,732.00	$ 2,436,593.60
00033	23-Feb-12	41%	-	536.00	$ 21,661.00	$ 2,458,254.60
00034	24-Feb-12	41%	-	536.00	$ -	$ 2,458,254.60
00035	27-Feb-12	41%	-	536.00	$ 15,291.14	$ 2,473,545.74
00036	27-Feb-12	41%	67.00	603.00	$ 16,365.00	$ 2,489,910.74
00037	27-Feb-12	41%	-	603.00	$ 21,846.84	$ 2,511,757.58
00038	8-Mar-12	42%	-	603.00	$ 2,800,000.00	$ 5,311,757.58
00039	5-Mar-12	42%	-	603.00	$ 13,805.98	$ 5,325,563.56
00040	8-Mar-12	42%	-	603.00	$ -	$ 5,325,563.56
00041	21-Mar-12	43%	-	603.00	$ 397,303.34	$ 5,722,866.90
00042	4-Apr-12	44%	14.00	617.00	$ 1,780,405.73	$ 7,503,272.63
00043	12-Apr-12	44%	-	617.00	$ 3,063,026.83	$ 10,566,299.46
00044	19-Apr-12	45%	-		$ 40,171.96	$ 10,606,471.42

Change Order Information						
CO #	Date of Approval	% Time	Days	Total Days	CO $	Cumulative
				617.00		
00045	19-Apr-12	45%	12.00	629.00	$ 4,959.00	$ 10,611,430.42
00046	19-Apr-12	45%	-	629.00	$ -	$ 10,611,430.42
00047	15-May-12	47%	-	629.00	$ 1,849.65	$ 10,613,280.07
00048	22-May-12	47%	7.00	636.00	$ 40,000.00	$ 10,653,280.07
00049	29-May-12	48%	-	636.00	$ 413,322.13	$ 11,066,602.20
00050	5-Jun-12	48%	-	636.00	$ 725,755.05	$ 11,792,357.25
00051	5-Jun-12	48%	-	636.00	$ -	$ 11,792,357.25
00052	7-Jun-12	48%	-	636.00	$ 495,720.00	$ 12,288,077.25
00053	10-Jul-12	50%	-	636.00	$ 75,637.00	$ 12,363,714.25
00054	10-Jul-12	50%	-	636.00	$ 5,843.00	$ 12,369,557.25
00055	12-Jul-12	51%	-	636.00	$ 7,738.00	$ 12,377,295.25
00056	21-Aug-12	53%	-	636.00	$ 14,468.00	$ 12,391,763.25
00057	21-Aug-12	53%	-	636.00	$ 13,627.00	$ 12,405,390.25
00058	17-Sep-12	55%	-	636.00	$ 4,011.00	$ 12,409,401.25
00059	17-Sep-12	55%	-	636.00	$ 6,955.40	$ 12,416,356.65
00060	17-Sep-12	55%	-	636.00	$ 7,459.00	$ 12,423,815.65
00061	20-Sep-12	56%	-	636.00	$ -	$ 12,423,815.65
00062	8-Oct-12	57%	-	636.00	$ 4,236,893.78	$ 16,660,709.43
00063	8-Oct-12	57%	21.00	657.00	$ 495,720.00	$ 17,156,429.43
00064	8-Oct-12	57%	22.00	679.00	$ -	$ 17,156,429.43
00065	12-Oct-12	57%	-	679.00	$ 136,917.10	$ 17,293,346.53
00066	12-Oct-12	57%	23.00	702.00	$ 232,705.84	$ 17,526,052.37
00067	22-Oct-12	58%	-	702.00	$ 54,994.64	$ 17,581,047.01

Change Order Information						
CO #	Date of Approval	% Time	Days	Total Days	CO $	Cumulative
00068	7-Nov-12	59%	-	702.00	$ 38,943.00	$ 17,619,990.01
00069	7-Nov-12	59%	-	702.00	$ -	$ 17,619,990.01
00070	14-Nov-12	59%	-	702.00	$ 3,646.00	$ 17,623,636.01
00071	3-Dec-12	61%	30.00	732.00	$ -	$ 17,623,636.01
00072	3-Dec-12	61%	-	732.00	$ 495,720.00	$ 18,119,356.01

EXHIBIT 8 – NEW IRVINGTON TUNNEL TRENDS (THROUGH 12/4/12)

Trend Information								
Trend #	Date	% Time	Days	ended Da	Value	Likelihood	Trend $	Cumulative
00001	20-Jul-10	0%	-	-	$ 75,000.00	100%	$ 75,000.00	$ 75,000.00
00002	17-Aug-10	2%	-	-	$ 435,000.00	75%	$ 326,250.00	$ 401,250.00
00003	30-Aug-10	3%	-	-	$ -	75%	$ -	$ 401,250.00
00004	4-Oct-10	5%	-	-	$ 110,000.00	75%	$ 82,500.00	$ 483,750.00
00005	5-Oct-10	5%	-	-	$ (2,550.00)	0%	$ -	$ 483,750.00
00006	12-Nov-10	8%	-	-	$ 710,000.00	50%	$ 355,000.00	$ 838,750.00
00007	23-Nov-10	9%	-	-	$ 85,500.00	75%	$ 64,125.00	$ 902,875.00
00008	10-Dec-10	10%	-	-	$ 21,200.00	100%	$ 21,200.00	$ 924,075.00
00009	2-Feb-11	14%	-	-	$ 300,000.00	75%	$ 225,000.00	$ 1,149,075.00
00010	21-Feb-11	15%	-	-	$ 4,500.00	75%	$ 3,375.00	$ 1,152,450.00
00011	21-Feb-11	15%	-	-	$ 125,000.00	100%	$ 125,000.00	$ 1,277,450.00
00012	0-Jan-00	0%	-	-	$ -	0%	$ -	$ 1,277,450.00
00013	0-Jan-00	0%	-	-	$ -	0%	$ -	$ 1,277,450.00
00014	19-Apr-11	19%	-	-	$ 0.01	75%	$ 0.01	$ 1,277,450.01
00015	16-May-11	21%	-	-	$ 500,000.00	75%	$ 375,000.00	$ 1,652,450.01
00016	16-May-11	21%	-	-	$ 47,500.00	75%	$ 35,625.00	$ 1,688,075.01
00017	21-Jun-11	23%	-	-	$ 1,800,000.00	100%	$ 1,800,000.00	$ 3,488,075.01
00018	23-Jun-11	24%	-	-	$ 60,000.00	75%	$ 45,000.00	$ 3,533,075.01
00019	6-Dec-11	35%	11.00	11.00	$ 3,500,000.00	100%	$ 3,500,000.00	$ 7,033,075.01
00020	7-Dec-11	35%	-	-	$ 100,000.00	50%	$ 50,000.00	$ 7,083,075.01
00021	7-Dec-11	35%	61.00	45.75	$ 1.00	75%	$ 0.75	$ 7,083,075.76
00022	7-Dec-11	35%	-	-	$ 400,000.00	75%	$ 300,000.00	$ 7,383,075.76
00023	23-Jan-12	39%	6.00	3.00	$ 1,000,000.00	50%	$ 500,000.00	$ 7,883,075.76
00024	26-Mar-12	43%	-	-	$ 800,000.00	75%	$ 600,000.00	$ 8,483,075.76
00025	29-Mar-12	43%	50.00	37.50	$ 2,000,000.00	75%	$ 1,500,000.00	$ 9,983,075.76
00026	30-Mar-12	43%	-	-	$ -	0%	$ -	$ 9,983,075.76
00027	30-Mar-12	43%	124.00	93.00	$ 991,440.00	75%	$ 743,580.00	$ 10,726,655.76
00028	27-Apr-12	45%	-	-	$ 250,000.00	75%	$ 187,500.00	$ 10,914,155.76
00029	22-May-12	47%	-	-	$ 297,000.00	75%	$ 222,750.00	$ 11,136,905.76
00030	4-Dec-12	61%	-	-	$ (1,000,000.00)	50%	$ (500,000.00)	$ 10,636,905.76

EXHIBIT 9 – BAY DIVISION PIPE LINE CHANGE ORDERS (THROUGH 12/4/12)

Change Order Information					
CO #	Date of Approval	% Time	Days	CO $	Cumulative
00001	24-Jun-10	5%	-	$ -	$ -
00002	1-Dec-10	13%	-	$ 49,645.75	$ 49,645.75
00003	3-Dec-10	13%	-	$ 4,672.50	$ 54,318.25
00004	8-Dec-10	14%	-	$ 70,000.35	$ 124,318.60
00006	8-Dec-10	14%	-	$ 4,672.50	$ 128,991.10
00007	28-Mar-11	19%	-	$ 35,182.57	$ 164,173.67
00008	30-Jun-11	25%	-	$ -	$ 164,173.67
00009	6-Jul-11	25%	-	$ 18,800.00	$ 182,973.67
00010	2-Aug-11	26%	-	$ -	$ 182,973.67
00011	3-Aug-11	26%	-	$ (200,000.00)	$ (17,026.33)
00013	19-Oct-11	30%	-	$ (495.94)	$ (17,522.27)
00012	16-Nov-11	32%	-	$ -	$ (17,522.27)
00014	20-Dec-11	34%	-	$ -	$ (17,522.27)
00016	9-Feb-12	37%	-	$ -	$ (17,522.27)
00015	1-Mar-12	38%	-	$ 23,048.46	$ 5,526.19
00017	22-Jun-12	44%	-	$ 2,906.00	$ 8,432.19
00018	6-Nov-12	51%	-	$ -	$ 8,432.19

EXHIBIT 10 – BAY DIVISION PIPE LINE TREND TRENDS (THROUGH 12/4/12)

Trend Information								
Trend #	Date	% Time	Days	ended Da	Value	Likelihood	Trend $	Cumulative
00001	31-Jan-11	16%	-	-	$ 950,000.00	80%	$ 760,000.00	$ 760,000.00
00002	9-Feb-11	17%	-	-	$ 36,000.00	50%	$ 18,000.00	$ 778,000.00
00003	9-Feb-11	17%	-	-	$ 37,500.00	50%	$ 18,750.00	$ 796,750.00
00102	10-Mar-11	18%	-	-	$ 36,000.00	50%	$ 18,000.00	$ 814,750.00
00103	10-Mar-11	18%	-	-	$ 37,500.00	50%	$ 18,750.00	$ 833,500.00
00104	10-Mar-11	18%	-	-	$ 22,000.00	75%	$ 16,500.00	$ 850,000.00
00105	15-Mar-11	19%	-	-	$ 3,500.00	75%	$ 2,625.00	$ 852,625.00
00106	16-Mar-11	19%	-	-	$ 52,500.00	50%	$ 26,250.00	$ 878,875.00
00107	12-May-11	22%	-	-	$ 120,000.00	70%	$ 84,000.00	$ 962,875.00
00108	24-Oct-11	31%	-	-	$ 450,000.00	50%	$ 225,000.00	$ 1,187,875.00
00109	5-Jan-12	35%	-	-	$ 360,000.00	95%	$ 342,000.00	$ 1,529,875.00
00110	15-Feb-12	37%	-	-	$ 98,000.00	75%	$ 73,500.00	$ 1,603,375.00
00111	7-Mar-12	38%	-	-	$ 950,000.00	95%	$ 902,500.00	$ 2,505,875.00
00112	23-Mar-12	39%	-	-	$ 606,000.00	95%	$ 575,700.00	$ 3,081,575.00
00113	31-Aug-12	48%	-	-	$ 1,870,000.00	50%	$ 935,000.00	$ 4,016,575.00

RW Block Consulting, Inc.

EXHIBIT 11 – SOFT COST EVALUATION OF FIVE MEGAPROJECTS

(Data extracted from WSIP management staffing plans provided to RWBC)

			YEAR					
	Forecast Construction (RWBC Projection)	Remaining Construction - (Expenditures through) (12/31/12)	2013	2014	2015	2016	2017	2018
Construction Costs	**466,112,820**	**316,956,717**	**64,811,878**	**64,811,878**	**64,811,878**	**64,811,878**	**57,709,206**	**-**
CDR-Soft Costs	**Expended Through 2012**	**Total Remaining (2013-2017)**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
SFPUC	16,124,970	7,725,038	1,802,248	1,802,248	1,802,248	1,083,194	935,202	299,899
Other City Departments	5,081,887	5,574,706	1,249,005	1,031,145	1,013,079	730,979	608,397	942,101
Consultants	47,687,105	52,181,219	10,350,207	10,507,882	10,983,484	10,727,662	9,611,985	-
Total Soft Costs:	**68,893,962**	**65,480,963**	**13,401,460**	**13,341,274**	**13,798,810**	**12,541,835**	**11,155,584**	**1,242,000**
As % of Construction		**10.61%**	5.54%	7.81%	16.89%	19.35%	19.33%	n/a
FTE SFPUC			6	6	6	4	3	1
FTE Other City Departments			4	4	4	3	2	3
FTE Consultants			37	37	39	38	34	-
TOTAL FTE CDR:			**48**	**47**	**49**	**44**	**40**	**4**
Remaining Construction/Remaining Soft Costs:		**4.84**						
Remaining Construction/Sum FTE:		**$ 1,365,004**						

			YEAR					
	Forecast Construction (RWBC Projection)	Remaining Construction - (Expenditures through) (12/31/12)	2013	2014	2015	2016	2017	2018
Construction Costs	**132,725,576**	**44,993,970**	**44,993,970**	**-**	**-**	**-**	**-**	**-**
CSSA-Soft Costs	**Expended Through 2012**	**Total Remaining (2013-2017)**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
SFPUC	15,556,436	835,962	344,422	491,540	-	-	-	-
Other City Departments	2,560,994	2,649,090	2,645,585	3,506	-	-	-	-
Consultants	22,021,180	3,449,557	3,449,557	-	-	-	-	-
Total:	**40,138,610**	**6,934,610**	**6,439,564**	**495,046**	**-**	**-**	**-**	**-**
As % of Construction		**15.41%**	14.31%	n/a	n/a	n/a	n/a	n/a
FTE SFPUC			1	2				
FTE Other City Departments			11	2	-	-	-	-
FTE Consultants			12	-	-	-	-	-
TOTAL FTE CSSA:			**24**	**3**	**n/a**	**n/a**	**n/a**	**n/a**
Remaining Construction/Remaining Soft Costs:		**6.49**						
Remaining Construction/Sum FTE:		**$ 1,632,866**						

			YEAR					
	Forecast Construction (RWBC Projection)	Remaining Construction - (Expenditures through) (12/31/12)	2013	2014	2015	2016	2017	2018
Construction Costs	**199,161,732**	**136,824,110**	**63,376,650**	**63,376,650**	**10,070,810**	**-**	**-**	**-**
HTWT-Soft Costs	**Expended Through 2012**	**Total Remaining (2013-2017)**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
SFPUC	18,603,435	11,946,174	4,923,306	4,923,306	2,099,562	-	-	-
Other City Departments	2,702,550	2,589,568	1,162,237	1,162,237	265,095	-	-	-
Consultants	26,655,125	14,565,820	6,544,451	6,874,967	1,146,402	-	-	-
Total:	**47,961,109**	**29,101,562**	**12,629,993**	**12,960,510**	**3,511,058**	**-**	**-**	**-**
As % of Construction		**21.27%**	19.93%	20.45%	34.86%	n/a	n/a	n/a
FTE SFPUC			17	17	7	-		
FTE Other City Departments			4	4	1	-	-	-
FTE Consultants			23	24	4	-	-	-
TOTAL FTE HTWT:			**45**	**46**	**12**	**-**	**-**	**-**
Remaining Construction/Remaining Soft Costs:		**4.70**	(Dollars of remaining construction/Dollars of Remaining Soft Costs)					
Remaining Construction/Sum FTE:		**$ 1,325,853**	(Dollar of remaining construction/Total Staffing Planned to complete work)					

			YEAR					
	Forecast Construction (RWBC Projection)	Remaining Construction - (Expenditures through) (12/31/12)	2013	2014	2015	2016	2017	2018
Construction Costs	**257,009,312**	**70,163,542**	**48,229,177**	**21,934,365**	**-**	**-**	**-**	**-**
NIT-Soft Costs	**Expended Through 2012**	**Total Remaining (2013-2017)**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
SFPUC	17,384,631	1,693,225	686,736	686,736	296,090	23,663	-	-
Other City Departments	3,059,064	2,098,193	751,031	751,031	401,194	194,937	-	-
Consultants	29,941,329	11,889,000	5,553,709	5,474,470	860,821	-	-	-
Total:	**50,385,024**	**15,680,418**	**6,991,476**	**6,912,237**	**1,558,105**	**218,600**	**-**	**-**
As % of Construction		**22.35%**	14.50%	31.51%	n/a	n/a	n/a	n/a
FTE SFPUC			2	2	1	-	-	-
FTE Other City Departments			3	3	1	1	-	-
FTE Consultants			20	19	3	-	-	-
TOTAL FTE NIT:			**25**	**25**	**6**	**1**	**-**	**-**
Remaining Construction/Remaining Soft Costs:		**4.47**						
Remaining Construction/Sum FTE:		**$ 1,263,743**						

			YEAR					
	Forecast Construction (RWBC Projection)	Remaining Construction - (Expenditures through) (12/31/12)	2013	2014	2015	2016	2017	2018
Construction Costs	**216,316,611**	**48,022,288**	**20,597,103**	**20,597,103**	**6,828,081**	**-**	**-**	**-**
BDPL-Soft Costs	**Expended Through 2012**	**Total Remaining (2013-2017)**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
SFPUC	10,648,369	2,617,330	1,098,873	807,499	710,959	-	-	-
Other City Departments	2,862,592	2,748,296	914,571	1,121,900	711,825	-	-	-
Consultants	24,220,460	12,937,567	5,564,465	5,526,681	1,846,422	-	-	-
Total:	**37,731,421**	**18,303,194**	**7,577,908**	**7,456,080**	**3,269,206**	**-**	**-**	**-**
As % of Construction		**38.11%**	36.79%	36.20%	47.88%	n/a	n/a	n/a
FTE SFPUC			4	3	3			
FTE Other City Departments			3	4	3	-	-	-
FTE Consultants			20	20	7	-	-	-
TOTAL FTE BDPL:			**27**	**26**	**12**	**-**	**-**	**-**
Remaining Construction/Remaining Soft Costs:		**2.62**						
Remaining Construction/Sum FTE:		**$ 739,886**						

EXHIBIT 12 – CS-254 SCOPE COMPLETION MATRIX

SCOPE OF WORK:	REPORT REFERENCE
Task A - SAC/EAC	
Does the EAC/SAC analysis of the representative projects suggest that these projects are on schedule and within the budget?	Executive summary and detailed project analysis provide answers to this question.
Does the EAC/SAC analysis suggest that the overall WSIP program is on schedule/budget?	Executive summary and detailed project analysis provide answers to this question.
What issues/actions, if any, should be addressed and/or put in place to improve the project/program method for forecasting completion budgets and schedules?	In addition to preparing the confidence level for each project (the primary objective of this engagement) RWBC provides project specific and overall recommendations
What is the likelihood that the represented projects and the overall WSIP will be on time and within budget when compared to the SFPUC's currently forecasted cost and schedule at completion?	This information is provided for each project under the applicable detailed analysis.
Review SFPUCs EAC/SAC analysis for the five projects	This was done by reviewing existing practices and additionally preparing an independent estimate of cost at completion for each project.
Review SFPUC forecasting process from beginning to end for each project and assess the thoroughness and accuracy of the EAC/SAC's generated as part of the process	RWBC's independent estimate was within 3% of that prepared by WSIP which provides an independent validation of the process. Detailed CRR/TRR analyzes were performed, throughput analysis, project criticality analysis and associated calculations were also included in the detailed project reviews.
Review SFPUC cost estimating and cost forecasting methodology, assumptions, accuracy, processes used to determined forecast final project cost at completion	RWBC's independent estimate was within 3% of that prepared by WSIP which provides an independent validation of the process. Detailed CRR/TRR analyzes were performed, throughput analysis, project criticality analysis and associated calculations were also included in the detailed project reviews.
Review SFPUC schedule completion forecast schedule at completion	RWBC's independent estimate was within 3% of that prepared by WSIP which provides an independent validation of the process. Detailed CRR/TRR analyzes were performed, throughput analysis, project criticality analysis and associated calculations were also included in the detailed project reviews.
Spot check key approved change orders for contract and process compliance	Performed as part of CRR and TRR analysis
Spot check pending and potential Change Orders for reasonableness and within industry norms.	This was done as part of TRR and CRR analysis
Review project trends for time and cost	This was done as part of TRR and CRR analysis
Confirm that all approved, pending, and potential CO and trends are included in the SFPUC's cost and time completion forecast	RWBC's independent estimate was within 3% of that prepared by WSIP which provides an independent validation of the process. Detailed CRR/TRR analyzes were performed, throughput analysis, project criticality analysis and associated calculations were also included in the detailed project reviews.
Review project risk registers to determine if all reasonable risks are assessed and accounted for.	RWBC reviewed risk registers, however, the validation of the existing forecasting process was accomplished with an independent preparation of cost to completion given that risks are not included in the forecasting process. RWBC believes that the identification of risks is a tool for management purposes but not for forecasting purposes. Further the WSIP management team needs to use a more consistent approach to use of Risk. Field interviews show that construction management personnel do not use risks in the same manner which may yield varying degrees of data accuracy. The use of a Monte Carlo probability analysis is really only as good as the data into the system and does not necessarily create a higher level of accuracy.
Assess how best to bring greater visibility and clarity to the potential schedule impacts that may result from WSIP's highest probability risks. Explain your rationale and analysis used to develop your opinion.	Risks are not part of cost forecasting process. Trends are the least defined element of cost projection which are both forecast as part of monthly progress reporting. Trends are shown as having a 1:1 time impact (which is a conservative case) in schedule impacts.
Review all project contingencies to determine if there will be sufficient contingencies to cover all costs at completion	This was accomplished in estimate to completion calculation for each project evaluated.
Interview prime contractor for each of the five projects reviewed	This was performed for each project in December 2012.
Present a comprehensive written report to the RBOC giving the details and analysis leading to the consultant's findings and recommendations	Provided as applicable.
Provide specific actions that should be taken to provide more accurate EAC/SAC if findings indicate the need for revisions to the SPFUC current forecasting process	Provided as applicable.

SCOPE OF WORK:	REPORT REFERENCE
TASK B - PROGRAM DELIVERY COSTS	
How reasonable are the SFPUC's forecasted delivery costs based on the size and complexity of the WSIP?	Reference Task B and recommendations contained therein.
How doe the SPFUC's forecasted delivery costs compare with delivery costs of already completed projects?	See Task B analyzes
How doe the SPUC's delivery costs compare with industry standards or other comparable programs?	Recommendations on evaluation of remaining program delivery costs are provided in Task B.
What recommendations can you make that enable the SPUC to more accurately forecast delivery costs, help reduce these costs, and phase out resources no longer necessary as the WSIP program nears completion?	Recommendations on evaluation of remaining program delivery costs are provided in Task B.
Examine the process by which the SFPUC controls and forecasts remaining delivery costs	Provided in soft costs review
Review forecast delivery costs	Provided in soft costs review
Fully address the definition of delivery costs	Provided in soft costs review
Compare forecast SFPUC forecasted delivery costs of active projects with the actual delivery costs to date for completed projects to allow for a project-level comparison of delivery costs approved as part of the July 2011 Revised WSIP program Budget	See Figures 42-45 in Task B.
Provide specific actions that should be taken to more accurately forecast or control delivery costs	Provided as applicable under Task B.

EXHIBIT 13 - GLOSSARY OF DOCUMENTS REVIEWED

1. WSIP PROGRESS SCHEDULES

a. Original Scheduled Folders
   i. Bay Division Pipeline Reliability Upgrade Tunnel Contractors P6
      1. BT August 2012 Update
      2. BT July 2012 Update
      3. BT September 2012
   ii. P6 Native Cm Contractor Progress Schedules
      1. Harry Tracy July_Aug_Sep
      2. NIT July_Aug_Sep
      3. CSSA July
      4. CDR July_Aug_Sep
      5. CSSA Aug_Sep
      6. Bay Tunnel July_Aug_Sep
   iii. Crystal Springs/San Andreas (CSSA) Transmission Upgrade Contractors P6
      1. July 25, 2012 Monthly Update
      2. August 25, 2012 Monthly Update
      3. September 2012 Monthly Update - Final
   iv. Calaveras Dam Replacement Contractors P6
      1. September Update Schedule – 09.25.2012
      2. August Update 08.2012
      3. July Update Schedule 07.25.2012
   v. Harry Tracy Water Treatment Plant (HTWTP) Long Term Improvements Contractors P6
      1. Submittal 01310-012, Monthly Revision, Schedule update, for August 2012
      2. Submittal 01310-010, Monthly Revision, Schedule update, for September 2012
   vi. New Irvington Tunnel Contractors P6
      1. NIT Schedule Update for August 25, 2012
      2. NIT Schedule Update for September 25, 2012
      3. NIT Schedule Update for July 25, 2012
   vii. Quarterly P6
      1. September 2012 Quarterly
      2. June 2012 Quarterly
   viii. Schedule Reports
      1. New Irvington Tunnel
         a. September 2012 – CUW35901 Schedule
         b. September 2012 – Var Report
         c. July 2012 – CUW35901 Var Report
         d. July 2012 – CUW35901 Schedule
         e. August 2012 – CUW35901 Schedule
         f. August 2012 – CUW35901 Car Report
      2. CS SA Transmission Upgrade

a. September 2012 – CUW37101 Schedule
b. September 2012 – CUW37101 Var Report
c. July 2012 – CUW37101 Var Report
d. July 2012 – CUW37101 Schedule
e. August 2012 – CUW37101 Var Report
f. August 2012 – CUW37101 Schedule

3. HTWTP Long Term Improvements
    a. September 2012 – CUW36701 Schedule
    b. September 2012 – CUW36701 Var Report
    c. July 2012 – CUW36701 Schedule
    d. July 2012 – CUW36701 Var Report
    e. August 2012 – CUW36701 Schedule
    f. August 2012 – CUW36701 Var Report
4. BDPL Reliability Upgrade Tunnel
    a. September 2012 – CUW36801 Schedule
    b. September 2012 – CUW36801 Var Report
    c. July 2012 – CUW36801 Var Report
    d. July 2012 – CUW36801 Schedule
    e. August 2012 – CUW36801 Schedule
    f. August 2012 – CUW36801 Var Report
5. Calaveras Dam Replacement
    a. September 2012 – CUW37401 Schedule
    b. September 2012 – CUW37401 Var Report
    c. July 2012 – CUW37401 Var Report
    d. July 2012 – CUW37401 Schedule
    e. August 2012 – CUW37401 Schedule
    f. August 2012 – CUW37401 Var Report

b. Detailed Cost Reports
    i. New Irvington Tunnel Construction Documents
        1. NIT PCS – July 13, 2012
        2. NIT Trends – July 13, 2012
        3. 2012.07 NIT – PCS – August 17, 2012
        4. 2012_08 NIT – Change Order Log August 2012
        5. CUW35901 NIT – August 2012
        6. CUW35901 NIT – September 2012
        7. CUW35901 NIT Contract Summary Report
        8. 2012.09 NIT – Change Order Log September 2012
        9. 2012.07 NIT – Trends August 17, 2012
        10. 2012.08 NIT – PCS – September 12, 2012
        11. 2012.09 NIT – Risk Register – Top 10 – September 24, 2012
        12. 2012.08 NIT – Contract Summary
        13. 2012.09 NIT – Risk Register – Top 10 – August 28, 2012
        14. 2012.09 NIT – Trends – November 6, 2012
        15. 2012.08 NIT – Trends – September 12, 2012
        16. 2012.07 NIT – July Change Order Log
        17. 2012.07 NIT – Risk Register – Top 10 – July 25, 2012
        18. 2012.09 NIT Contract Summary Report

19. 2012.09 NIT – PCS – November 6, 2012
20. CUW35901 NIT – July 2012

ii. Harry Tracy Water Treatment Plant (HTWP) Long Term Improvements
1. HTWTP PCS – July 13, 2012
2. HTWPT Trends – July 13, 2012
3. 2012.07 – HTWTP LT Contract Summary Report
4. CUW36701 HTWTP – September 2012
5. 2012.09 HTWTP LT Change Order Log – September 2012
6. 2012.08 HTWTP LT Trends – September 12, 2012
7. 2012.08 HTWTP PCS – September 12, 2012
8. 2012.09 HTWTP LT Contract Summary Report
9. CUW36701 HTWTP – July 2012
10. 2012.08 HTWTP Risk Register – Top 10 – August 2012
11. 2012.08 HTWTP LT Contract Summary Report
12. 2012.07 HTWTP LT PCS – August 17, 2012
13. 2012.09 HTWTP Trends – November 6, 2012
14. 2012.09 HTWTP PCS – November 6, 2012
15. 2012.07 HTWTP LT Change Order Log – July 2012
16. 2012.09 HTWTP LT Risk Register – Top 10 – September 24, 2012
17. CUW36701 – HTWTP – August 2012
18. 2012.07 HTWTP LT Risk Register – Top 10 – July 30, 2012
19. 2012.08 HTWTP LT Change Order Log – August 2012
20. 2012.07 HTWTP LT Trends – August 17, 2012

iii. Crystal Springs – San Andreas (CSSA) Transmission Upgrade
1. CSSA PCS – July 13, 2012
2. CSSA Trends – July 13, 2012
3. 2012.08 CSSA August Change Order Log
4. 2012.07 CSSA Contract Summary Report rev1
5. 2012.08 CSSA Trends – September 12, 2012
6. 2012.09 CSSA Risk Register – Top 10 – September 19, 2012
7. 2012.08 CSSA Contract Summary Report
8. 2012.09 CSSA PCS – November 6, 2012
9. 2012.08 CSSA PCS – September 12, 2012
10. 2012.07 CSSA Trends – August 17, 2012
11. 2012.09 CSSA Contract Summary Report
12. CUW37101 CSSA – September 2012
13. 2012.07 CSSA PCS – August 17, 2012
14. CU237101 CSSA – July 2012
15. 2012.09 CSSA September Change Order Log
16. 2012.07 CSSA July Change Order Log
17. 2012.08 CSSA Risk Register – Top 10 – August 2012
18. 2012.07 CSSA Risk Register – Top 10 – July 2012
19. CUW37101 CSSA – August 2012
20. 2012.09 Trends – November 6, 2012

iv. Calaveras Dam Replacement Construction Documents
1. CDRP PCS – July 13, 2012
2. CDRP Trends – July 12, 2012

3. 2012.07 CDRP Contract Summary
4. 2012.07 CDRP July Change Order Log
5. 2012.09 CDRP Contract Summary Report
6. 2012.08 CDRP Contract Summary Report
7. CUW37401 CDRP – August 2012
8. 2012.08 CDRP PCS – September 12, 2012
9. 2012.08 CDRP August Change Order Log
10. CUW37401 CDRP August Change Order Log
11. CUW37401 CDRF July 2012
12. 2012.09 CDRP PCS – November 6, 2012
13. 2012.09 CDRP Risk Register – Top 10 – 30 September 2012
14. 2012.09 CDRP September Change Order Log
15. 2012.08 CDRP Risk Register – Top 10 – August 31, 2012
16. 2012.07 CDRP PCS – August 17, 2012
17. 2012.09 CDRP Trends – November 6, 2012
18. CUW37401 CDRP – September 2012
19. 2012.07 CDRP Trends – August 17, 2012
20. 2012.07 CDRP Risk Register – Top 10 – July 27, 2012
21. 2012.08 CDRP Trends – September 12, 2012

v. Bay Division Pipeline Reliability Upgrade Tunnel
1. BDPL PCS – July 13, 2012
2. BDPL Trends – July 13, 2012
3. 2012.08 BDPL Risk Register – Top 10 – August 23, 2012
4. 2012.08 BDPL Contract Summary
5. 2012.07 BDPL PCS – August 17, 2012
6. 2012.09 BDPL Risk Register – Top 10 – September 18, 2012
7. 2012.07 BDPL Trends – August 17, 2012
8. 2012.08 BDPL August Change Order Log
9. CUW36801 BDPL – September 2012
10. 2012.09 BDPL Trends – November 6, 2012
11. 2012.07 BDPL Risk Register – Top 10 – July 23, 2012
12. 2012.09 BDPL September Change Order Log
13. 2012.08 BDPL PCS – September 12, 2012
14. 2012.07 BDPL July Change Order Log
15. 2012.09 BDPL Contract Summary Report
16. CUW36801 BDPL – July 2012
17. 2012.07 BDPL Contract Summary Report
18. 2012.08 BDPL Trends – September 12, 2012
19. CUW36801 BDPL – August 2012
20. 2012.09 BDPL PCS – November 6, 2012

2. Detailed Cost Reports

a. New Irvington Tunnel Construction Documents
i. 2012.07 NIT Trends – August 17, 2012
ii. 2012.08 NIT PCS – September 12, 2012

iii. 2012.09 NIT Risk Register – Top 10 – September 24, 2012
iv. 2012.08 NIT Contract Summary Report
v. 2012.08 NIT Risk Register – Top 10 – August 28, 2012
vi. 2012.09 NIT Trends – November 6, 2012
vii. 2012.08 NIT Trends – September 12, 2012
viii. 2012.07 NIT July Change Order
ix. 2012.07 NIT Risk Register – Top 10 – July 25, 2012
x. 2012.09 NIT Contract Summary Report
xi. 2012.09 NIT PCS – November 6, 2012
xii. CUW35901 NIT – July 2012

b. Harry Tracy Water Treatment Plant (HTWP) Long Term Improvements
i. HTWTP PCS – July 13, 2012
ii. HTWTP Trends – July 13, 2012
iii. 2012.07 HTWTP LT Contract Summary Report
iv. CUW36701 HTWTP – September 2012
v. 2012.09 HTWTP LOT Change Order Log – September 2012
vi. 2012.08 HTWTP LT PCS – September 12, 2012
vii. 2012.09 HTWTP LT Contract Summary Report
viii. CUW36701 HTWTP – July 2012
ix. 2012.08 HTWTP LT – Risk Register – Top 10 – August 23, 2012
x. 2012.08 HTWTP LT Contract Summary Report
xi. 2012.07 HTWTP LT PCS – August 17, 2012
xii. 2012.09 HTWTP Trends – November 6, 2012
xiii. 2012.09 HTWTP PCS – November 6, 2012
xiv. 2012.07 HTWTP LOT Change Order Log – July 2012
xv. 2012.09 HTWTP LOT – Risk Register – Top 10 – September 24, 2012
xvi. CUW36701 HTWTP – August 2012
xvii. 2012.07 HTWTP LT – Risk Register – Top 10 – July 30, 2012
xviii. 2012.08 HTWTP LT Trends – August 17, 2012

c. Crystal Springs – San Andreas (CSSA) Transmission Upgrade
i. CSSA PCS – July 13, 2012
ii. CSSA Trends – July 13, 2012
iii. 2012.08 CSSA August Change Order Log
iv. 2012.07 CSSA Contract Summary Report Rev1
v. 2012.08 CSSA Trends – September 12, 2012
vi. 2012.09 CSSA Risk Register – Top 10 – September 19, 2012
vii. 2012.08 CSSA Contract Summary Report
viii. 2012.09 CSSA PCS – November 6, 2012
ix. 2012.08 CSSA PCS – September 12, 2012
x. 2012.07 CSSA Trends – August 17, 2012
xi. 2012.09 CSSA Contract Summary Report
xii. CUW37101 CSSA – September 2012
xiii. 2012.07 CSSA PCS – 17 August 2012
xiv. CUW37101 CSSA – July 2012
xv. 2012.09 CSSA September Change Order Log
xvi. 2012.07 CSSA July Change Order Log
xvii. 2012.08 CSSA Risk Register – Top 10 – August 17, 2012

xviii. 2012.07 CSSA Risk Register – Top 10 – July 20, 2012
xix. CUW37101 CSSA – August 2012
xx. 2012.09 CSSA Trends – November 6, 2012

d. Calaveras Dam Replacement Construction Documents
   i. CDRP PCS – July 13, 2012
   ii. CDRP Trends – July 13, 2012
   iii. 2012.07 CDRP Contract Summary Report
   iv. 2012.07 CDRP July Change Order Log
   v. 2012.09 CDRP Contract Summary Report
   vi. 2012.08 CDRP Contract Summary Report
   vii. CUW37401 CDRP – August 2012
   viii. 2012.08 CDRP PCS – September 12, 2012
   ix. 2012.08 CDRP August Change Order Log
   x. CUW37401 CDRP – July 2012
   xi. 2012.09 CDRP PCS – November 6, 2012
   xii. 2012.09 CDRP Risk Register – Top 10 – September 30, 2012
   xiii. 2012.09 CDRP September Change Order Log
   xiv. 2012.08 CDRP Risk Register – Top 10 – August 2012
   xv. 2012.07 CDRP PCS – August 17, 2012
   xvi. 2012-09 CDRP Trends – November 6, 2012
   xvii. CUW37401 CDRP Trends – August 17, 2012
   xviii. 2012.07 CDRP Risk Register – Top 10 – July 27, 2012
   xix. 2012.08 CDRP Trends – September 12, 2012

e. Bay Division Pipeline Reliability Upgrade Tunnel
   i. BDPL PCS – July 13, 2012
   ii. BDPL Trends – July 13, 2012
   iii. 2012.08 BDPL Risk Register – Top 10 – August 23, 2012
   iv. 2012.08 BDPL Contract Summary Report
   v. 2012.07 BDPL PCS – August 17, 2012
   vi. 2012.09 BDPL Risk Register – Top 10 – September 18, 2012
   vii. 2012.07 BDPL Trends – August 17, 2012
   viii. 2012.08 BDPL August Change Order Log
   ix. CUW36801 BDPL – September 2012
   x. 2012.09 BDPL Trends – November 6, 2012
   xi. 2012.07 BDPL Risk Register – Top 10 – July 2012
   xii. 2012.09 BDPL September Change Order Log
   xiii. 2012.08 BDPL PCS – September 12, 0102
   xiv. 2012.07 BDPL July Change Order Log
   xv. 2012.09 BDPL Contract Summary Report
   xvi. CUW367801 BDPL – July 2012
   xvii. 2012.07 BDPL Contract Summary Report
   xviii. 2012.08 BDPL Trends – September 12, 2012
   xix. CUW36801 BDPL – August 2012
   xx. 2012.09 BDPL PCS – November 6, 2012

3. **WSIP Construction Contract Documents**
    a. Crystal Springs – San Andreas (CSSA) Transmission Upgrade
        i. Executed Contract
            1. SFPUC - 871171
        ii. Contract No. WD 2601 Plan Vol.1 of 2
        iii. Notice to Users of this DVD
        iv. Contract No. WD 2601 Spec vol.1 of 3
        v. Contract No. WD 2601 Plan vol.2 of 2
        vi. Contract No. WD 2601 Spec vol3 of 3
        vii. Contract No. WD 2601 Spec vol.2 of 3
    b. Bay Division Pipeline Reliability Upgrade Tunnel
        i. Executed Contract
            1. SFPUC - 841160
        ii. Bay Division Pipelines Reliability Upgrade – WD-2531 11x17
        iii. WD-2531 Contract Specs vol.1 of 2
        iv. WD-2531 Contract Specs vol.1 of 2
    c. Calaveras Dam Replacement Construction Documents
        i. Executed Contract
            1. SFPUC - 841163
        ii. Plans WD 2551
        iii. Contract WD 2551 vol.1
        iv. Notice to Users of this CD
        v. Contract No WD 2551 vol.2
    d. Harry Tracy Water Treatment Plant (HTWP) Long Term Improvements
        i. WD-2596 Reference Documents
            1. Haz Mat
                a. SCA – April 2009
            2. Geotechnical
                a. 7 GTC – July 2009
                b. 6 GTC – July 2009
                c. 5 GTC – July 2009
                d. 4 GTC – June 2009
                e. 3 GTC – April 2009
                f. 2 GTC – May 2009
                g. 1 GTC_GDR – Dec 2009
            3. Disclaimer
                a. Notice to Users of this CD
        ii. Executed Contract
        iii. WD-2596 Specs vol.2 of 4
        iv. WD-2596 Specs vol.4 o 4
        v. WD-2596 Specs vol.3 of 4
        vi. WD-2596 Specs vol.1 of 4
        vii. WD-2596 Plans vol.2 of 4
        viii. WD-2596 Plans vol.4 of 4
        ix. WD-2596 Plans vol.3 of 4
        x. Notice to Users of this CD
        xi. WD-2596 Plans vol.1 of 4

e. New Irvington Tunnel Construction Documents
    i. Executed Contract
        1. SFPUC - 841169
    ii. Contract No. WD-2581 vol.1 of 4 -01.06.10
    iii. WD-2581 NIT
    iv. Contract no. WD-2581 – 12.24.09
    v. GBR Final PDF for Print 2010.01.04

4. Project Photos

a. Calaveras Dam Replacement Construction Documents
    i. Photos
        1. MG 7584 1
        2. MG 7386 1
        3. MG 7359 1
        4. MG 7380 1
        5. MG 7350 1
        6. MG 7356 1
    ii. Calaveras Dam 3
    iii. Calaveras Dam 8
    iv. Calaveras Dam 4
    v. Calaveras Dam 5
b. New Irvington Tunnel Constructions Documents
    i. NITO
    ii. NIT5
    iii. NIT8
    iv. NIT2
    v. NIT6
c. Bay Division Pipeline Reliability Upgrade Tunnel
    i. Bay Tunnel0
    ii. Bay Tunnel8
    iii. Bay Tunnel6
    iv. Bay Tunnel TBM
    v. Bay Tunnel1
d. Harry Tracy Water Treatment Plant (HTWP) Long Term Improvements
    i. HTWTP10
    ii. HTWTP4
    iii. HTWTP7
    iv. HTWTP2
    v. HTWTP8
e. Crystal Springs – San Andreas (CSSA) Transmission Upgrade
    i. CSSA5
    ii. CSSA2
    iii. CSSA4
    iv. CSSA9
    v. CSSA0

f. ASCE Montreal 2012 – Tunnels

5. Daily Project Progress QA Reports

a. HTWTP July thru September Daily Reports
b. CSSA Upgrade July thru September Daily Reports
c. Calaveras Dam July through September Daily QA Reports Log
d. NIT July thru September Daily Report Log
e. Bay Tunnel July thru September Daily QA Report Log
f. Report Example BDPL Tunnel No. 0271 – 09.30.2012

6. Applications for Payments

a. Bay Division Pipeline Reliability Upgrade Tunnel
    i. Bay Tunnel Application for Payment – August 2012
    ii. Bay Tunnel Application for Payment - July 2012
    iii. Bay Tunnel Application for Payment – September 2012
b. Calaveras Dam Replacement Construction Documents
    i. CDRP Application for Payment – August 2012
    ii. CDRP Application for Payment – July 2012
    iii. CDRP Application for Payment – September 2012
c. Crystal Springs – San Andreas (CSSA) Transmission Upgrade
    i. CSSA Application for Payment – July 2012
    ii. CSSA Application for Payment – September 2012
    iii. CSSA Application for Payment – August 2012
d. Harry Tracy Water Treatment Plant (HTWP) Long Term Improvements
    i. HTWTP LT Application for Payment – July 2012
    ii. HTWTP LT Application for Payment – August 2012
    iii. HTWTP LT Application for Payment – September 2012
e. New Irvington Tunnel Construction Documents
    i. NIT Application for Payment – August 2012
    ii. NIT Application for Payment – September 2012
    iii. NIT Application for Payment – July 2012

7. Change Orders

a. Calaveras Dam Replacement Change Orders
    i. CDRP CO #25
        1. CDRP CO #25
    ii. CDRP CO #27
        1. CDRP CO #27
    iii. Calaveras PCO #20 Estimates
        1. PCO #20 Tabs 1-18
            a. Tab 4
                i. Tab 20 Contract Drawings
            b. Tab 18
                i. Tab 18 Time Related Pricing
            c. Tab 17
                i. Tab 17 Standby Pricing
            d. Tab 16
                i. Tab 16 Acceleration Pricing
            e. Tab 15
                i. Tab 15 Project Escalator Pricing

f. Tab 14
    i. Tab 14 DSC Discover Explore Pricing
g. Tab 13
    i. Tab 13 Environmental Costs
h. Tab 12
    i. Tab 12 Embankment Pricing
i. Tab 11
    i. Tab 11 Disposal Site Pricing
j. Tab 10
    i. Tab 10 Stilling Basin Pricing
k. Tab 9
    i. Tab 9 Spillway Exc. Pricing
l. Tab 8
    i. Tab 8 New Contract Unit Pricing
m. Tab 7
    i. Tab 7 PCO 20 Contract Unit Price Details
n. Tab 6
    i. Tab 6 PCO 20 Pricing Summary
o. Tab 5
    i. Tab 5 RBL1 Summary Bar Compare BL 120612
p. Tab 3
    i. Tab 3 PCO 20 Disposal Site Drawings
q. Tab 1
    i. Tab 1 City Letter No. WD_2551-00129 PCO No. 20
r. Tab 2
    i. Tab 2 Proposal 10.17.12

2. PCO #20 Appendix 2 Contractor's Schedule Detailed Activities by WBS
3. PCO No. 20 Cost Estimate
4. PCO #20 Appendix 1 Contractors Schedule Summary Bar Chart by WBS
5. SFPUC 325 PCO #20 Contractors Cost Proposal

iv. Tech Memo
1. CDRP Final TMs for Commission on Observation Hill Issue Presented at Commission Meeting 11.13.2012

v. Slides
1. SFPUC CDRP Presentation – Nov 2012
2. Left Abutment Slides – Revised Sunol CAC

vi. CDRFP CO #13
1. 9. CDRP Rev Spec Sec 02266 CO #13 Attachment 3
2. 19. CDRP Approved Change Order 2 with Revised Drawings CO #13 Attachment D
3. 18. CDRP URS Analyses CO #13 Attachment C
4. 17. CDRP Engineers Schedule & Contractors As-Bid Schedule CO #13 Attachment B
5. 16. CDRP Contract Drawings As-Bid CO #13 Attachment A
6. 15. CDRP New Design Drawing FD-16.1 CO #13 Attachment 8
7. 13. CDRP Rev Design Drawing FD-15.R1 CO #13 Attachment 7
8. 12. CDRP Rev Design Drawing FD-2.R1 CO #13 Attachment 6

9. 11. CDRP Rev Spec Sec 00802 CO #13 Attachment 5
10. 2. CDRP Comparative Schedule CO #13 Attachment H
11. 20. CDRP Executed CO #13
12. CDRP CO #13 Attachments TOC
13. 8. CDRP Rev Specs Sec 02227 CO #13 Attachment 2
14. 5 CDRP Evaluation of CCO CO #13 Attachment 1
15. 6. CDRP Cross Section and Profile CO #13 attachment F
16. 1. CDRP Contractor Proposal CO #13 Attachment G
17. 4. CDRP Approved CCO 3 with Rev Dwgs CO #13 Attachment E
18. 3. CDRP Escrow Verification CO #13 Attachment J
19. 21. CDRP Letter CO #13
20. 10. CDRP Rev Spec Sec 03300 CO #13 Attachment 4

vii. CDRP CO Log sort by number from CMIS – 02.20.13
viii. CDRP CO Log from CMIS download – 02.20.13
ix. CDRP Executed CO #17
x. CDRP Executed CO #03

b. Harry Tracy Water Treatment Plant (HTWP) Long Term Improvements Change Orders
   i. HTWTP CO #30
      1. HTWTP CO #30 PCO 0084 Initial Price Proposal MSB 1 Breakers
      2. HTWTP CO #30 PCO 84 City Serial Letter No. 249
      3. HTWTP CO #30 Summary
   ii. HTWTP CO #16 Summary
   iii. HTWTP CO #10
c. New Irvington Tunnel Construction Documents
   i. NIT CO #43
      1. 3. NIT CO #34 – Summary Report with Attachments
      2. 2. NIT CO #43 – Signed by DM
      3. 1. NIT CO #43 – Fully Executed
   ii. NIT CO #32
      1. 3. NIT #32 – Summary Report
      2. 2. NIT CO #32 – Signed by DM
      3. 1. NIT CO #32 – Fully Executed
   iii. NIT CO #31
      1. 3. NIT CO #31 - CO Summary Report
      2. 2. NIT CO #31 – Signed by DM
      3. 1. NIT CO #31 – Fully Executed
   iv. NIT CO #10
      1. 8 NIT CO #10 – Appendix H – All American Rental Cost Breakup
      2. NIT CO #10 – Back up Documents TOC
      3. 9. NIT CO #10 – Appendix 1 – Cresco Cost Breakup
      4. 5. NIT Co #10 – Appendix E Economy Trucking Cost Backup
      5. 7. NIT CO #10 – Appendix G – Apex Testing Lab Cost Breakup
      6. 2. NIT CO #10 – Appendix B – Signed Backup for Malcolm Drilling Cost Break up
      7. 4. NIT CO #10 – Appendix D – Hernandez Engineering Cost Backup
      8. 3. NIT CO #10 – Appendix C – R&W Concrete Cost Backup
      9. 26. NIT CO #10 Secant Pile Negotiation Spreadsheet

10. 25. NIT #10 – STP OG Lette No.027 Vargas Shaft Secant Pile T and M Back
11. 24. NIT CO #23 – STP Cost Proposal – Accepted email
12. 23. NIT CO #10 Vargas Shaft – DSC Cost
13. 22. NIT CO #10 Vargas Shaft – Bid Cost
14. 21. NIT CO #10 SFPUC Letter #9 – Response to Alleged Vargas Shaft Differing Cond.
15. 20. NIT CO #10 SFPUC Letter #9 Response to Alleged Vargas Shaft Differing Cond.
16. 1. NIT CO #10 Appendix A – STOP Direct Cost Backup
17. 19. NIT CO #10 Transmittal to KC
18. 18. NIT CO #10 Summary
19. 17. NIT CO 10 Original Voided Signed by DM and MC
20. 16. NIT CO #10 Revised Signed by DMMC 5.10.11
21. 15. NIT CO #10 Executed b
22. 14. NIT CO #10 Force Account Log by STP
23. 13. NIT CO #10 CM Estimate for Secant Pile T&M
24. 12. NIT CO #10 Negotiation Summary
25. 11. NIT CO #11 Appendix K-CEMEX Cost Backup
26. 10. NIT CO #10 Appendix J-Adler Rentals Cost Breakup

v. CIT CO #38
1. 3. NIT CO #38 – Summary Rev 1
2. 2. NIT CO #38 – Signed by DM Rev 1
3. 1. NIT CO #38 – Fully Executed

vi. NIT CO #15
1. 2. NIT CO #15 – Force Account Reports – Temp Slope Protection at IP
2. NIT CO #15 Attachments TOC
3. 4. NIT CO #15 SFPUC Letter 038 – Slope Protection at Irv Portal
4. NIT CO #15 Force Account Log
5. 1. NIT CO #15 Fully Executed

d. Crystal Springs – San Andreas (CSSA) Transmission Upgrade Change Orders

i. CCSA CO #25
1. 1. CO #25 – Request for Construction Contract Modification #7
2. 2. CO #25 – Access Road Cut & Fill Quantities
3. 3. CSSA CO #25 – C Letter 074 & PCO 011
4. 4. CSSA CO #25 – Summary Form 12 PCO 011
5. 5. CSSA CO #25 – K Quantities Summary
6. 6. CSSA CO #25 – PCO 011A K Cut Quantity Adjustment
7. 7. CSSA CO #25 – PCO 011B K Fill Quantity Adjustment Estimate
8. 8. CCSA CO #25 – PCO-011B Rev 1-Cut Fill Bid Items 5-305.4
9. CSSA #25 – Attachments TOC

ii. CSSA CO #12
1. 1. CSSA CO #12 – Telecommunication System Upgrades
2. 2. CSSA CO #12 – Request to Modify Construction Contract #4

iii. CSSA CO #44
1. 2. CSSA CO #44 Request for Construction Contract Modification #14
2. 1. #44 Summary (Form 12 PCO 31)

iv. CSSA CO #08
1. 1. CSSA CO #08 – Flange Gaskets
2. 2. CSSA CO #08 – Request to Modify Construction Contract #9

v. CSSA CO #52
1. CSSA CO #52 – Attachments TOC
2. 6. CSSA CO #52 – K letter 564 Main Relay Panel Change
3. 2. CSSA CO #52 – Request to modify Construction Contract #16
4. 5. CSSA CO #52 – Summary Form 12
5. 4. CSSA CO #52 – Email WL to MPS 07may12
6. 1. CSSA CO #52 – Request for Mod #16 Rev. 06.06.12

e. Bay Division Pipeline Reliability Upgrade Tunnel Change Orders
i. BDPL CO #11
1. BDPL CO #11 – Attachments TOC
2. 6. BDPL CO #11 - Updated Contractor Estimate
3. 7. BDPL CO #11 – Contractor COR Package
4. 5. BDPL CO #11 CM Credit Evaluation
5. 4. BDPL CO #11 Summary Ravenswood Jet Grout Final -09.26.2011
6. 2. BDPL CO #11 – Ravenswood Jet Grout – Approved
7. 3. CO #11 – RCB Leung Supplemental Analysis 08.22.11 – Supplement Credit Evaluation
8. 1. BDPL CO #11 Ravenswood Jet Grout SFPUC Certification

ii. BDPL CO #004 Training for New Tunnel Workers

8. Soft Cost Documents

a. Current Staffing Plans
i. WSIP Overall Regional Projects Staffing Plan – excluding support projects
1. RW overall excluding support projects

ii. Project Staffing Plans – 5 Mega Projects
1. NIT Staffing Plan – 35901
2. HTWP Staffing Plan – 36701
3. CSSA Staffing Plan – 37101
4. BDPL Staffing Plan – 36801
5. CDRP Staffing Plan - 37401

iii. Pre-construction Project Staffing Plans
1. Staffing Plan – 38802
2. Staffing Plan – 36702
3. Staffing Plan – 37403
4. Staffing Plan – 35201
5. Staffing Plan – 30103

b. CM Services Actual Cost and Forecast Report
i. New Irvington Tunnel
1. 2012.09 CM Financial Report Forecast Sep2012
2. 2012.08 CS918 CM Financial Report Forecast Aug2012
3. 2012.07 CS918 CM Financial Report Forecast 01Feb12 thru 31Oct14

ii. HTWTP Long Term Improvement
1. 2012.09 CS919$ HTWTP Monthly Forecast Sep2012
2. 2012.07 CS919R HTWTP July 2012
3. 2012.08 CS919R HTWTP August 2012

iii. Crystal Springs An Andreas Transmission Upgrade
1. 2012.09 CS916 CM Services Attachment Sep2012
2. 2012.08 CS916 CM Services Attachment Aug2012
3. 2012.07 CS916 Peninsula Region Attachment July 2012

iv. Calaveras Dam Replacement
1. 2012.09 CS911 R Monthly CM Services Sep2012
2. 2012.08 CS911R Monthly CM Services Rev Aug2012
3. 2012.07 CDRP Resources Loaded Schedule Rev July2012

v. BDPL Reliability Upgrade Tunnel
1. 2012.08 BT Budget CM Services Report August 2012
2. 2012.09 BT Budget CM Services Report Sep 2012
3. 2012.07 BT Budget CM Services Report July 2012

c. CM Services Progress Report
i. New Irvington Tunnel
1. 2012.09 CS918 NIT CM Services Report
2. 2012.08 WD2581 CM Services Report
3. 2012.07 CS918 CM Services Monthly Report

ii. HTWTPOP Long Term Improvement
1. 2012.09 CS919R CM Services Progress Report 017 Sep2012
2. 2012.08 CS919R CM Services Progress Report 016 August 2012
3. 2012.07 CS-919R CM Services Progress Report 015 July 2012

iii. Crystal Springs San Andreas Transmission Upgrade
1. 2012.09 CS916 Peninsula Regional Monthly CM Services Report
2. 2012.08 CS916 CM Services Report 032 August 2012
3. 2012.07 CS916 CM Services Progress Report 031 July 2012

iv. Calaveras Dam Replacement
1. 2012.09 CS911R CDRP CM Services Report Sep2012
2. 2012.08 CS911R CDRP CM Services Report Aug2012
3. 2012.07 002 CDRP CM Services Report July 2012

v. BDPL Reliability Upgrade Tunnel
1. 2012.09 CS-913 BT Monthly CM Report Sep2012
2. 2012.07 CS-913 BT Monthly CM Report July2012
3. 2012.08 CS-913 BT Monthly CM Report August2012

d. WSIP Staffing Plan 39201 as 12.24.12 November Forecast

9. WSIP Policies (including Cost, Schedule & Forecast)

a. CM Plan Revision 3
b. WSIP Safety App 013108

10. WSIP Policies (including Cost, Schedule & Forecast)

a. CMIS
i. CMIS User Manual Version 3

b. Cost and Schedule Report Workflow
i. P6 CMB Design Document Rev
ii. P6 Implementation Project Charter – With Signatures as of November 5, 2009
iii. Final Training Manual CMB Submitted

c. Procedures

i. CM PM065 Rev 2 Quarterly Project Review Meeting 23Dec10
ii. CM P071 Rev 0 Ombudsman Program 07Mar11
iii. CM P064 Rev 1 CM Services Monitoring and Reporting 03Nov09
iv. CM P062 Rev 0 New and Revised Task Orders Processing 03Jun09
v. CM P061 Rev 0 Manual Timesheet and Invoice Processing 01Apr09
vi. CM P058 Rev0 Envir Daily Inspection Reports 20Feb09
vii. CM P057 Rev 0 Environmental Daily Monitoring Log 19Feb09
viii. CM P056 Rev 0 Environmental Quarterly Compliance Report Tale 18Feb09
ix. CM P055 Rev 0 Monthly Environmental Compliance Report 18Feb09
x. CM P054 Rev 0 Envir MPD 18Feb09
xi. CM P035 Rev 0 Certified Payroll Reports 06Apr09
xii. CM P053 Rev 0 Envir NCN 24feb09
xiii. CM P052 Rev 0 Envir Inspection and Special Envir Monitoring 18Feb09
xiv. CM P051 Rev 0 Environmental Requirements Table 19Feb09
xv. CM P041 Rev 1 Informal Partnering 28Aug09
xvi. CM P040 Rev 1 Pla 28Aug09
xvii. M P038 Rev 1 Site Security 27Aug09
xviii. CM P036 Rev 0 Administration of Force Accounts 11Aug09
xix. CM P034 Rev 2 Risk Management Plan 23Mar11
xx. CM P033 Rev 1 Record Documents Maintenance and Submittal 26May10
xxi. CM 032 Rev 3 Contract Close Out 23July12
xxii. CM P031 Rev 1 Dispute Resolution Advisor DRA 26Aug09
xxiii. CM P022 Rev 5 System Shutdowns 17Feb12
xxiv. CM 030 Rev 1 Project History Lessons Learned 26Aug09
xxv. Cm P028 Rev 1 Weekly Construction Progress Reports 10Oct12
xxvi. CM P027 Rev 1 Public Outreach 18Sep09
xxvii. CM P026 Rev 0 SQS Surveillance Report 19Aug09
xxviii. CM P025 Rev 3 Emergency Response 24Feb11
xxix. CM P024 Rev 0 Formal Partnering 16Feb09
xxx. CM P023 Rev 1 CMIS Access and Help Request 24Sep09
xxxi. Cm P021 Rev 0 Request for Substitution 10Jun09
xxxii. CM P020 Rev 3 Monthly Project Construction Progress Reports 22Dec10
xxxiii. CM P018 Rev 1 Pre Construction and Post Construction Site Survey 18Aug09
xxxiv. CM P019 Rev 1 Dispute Review Board 25Aug09
xxxv. CM P017 Rev 1 City Furnished Equipment 20Aug09
xxxvi. CM P010 Rev 2 Applications for Payment 01May11
xxxvii. CM P010 Rev 2 Applications for Payment 01May11
xxxviii. Cm P016 Rev 8 Construction Change Management 14Aug09
xxxix. CM P014 Rev 1 Drawing Control 12Aug09
xl. CM P013 Rev 1 Construction Claims Management 23Mar11
xli. CM P012 Rev 2 Safety Reporting Procedures 06Aug09
xlii. CM P009 Rev 0 Noncompliance Notices Quality 26Mar09
xliii. CM P006 Rev 0 Project Doc and Correspondence Ctrl 17Feb09
xliv. CM P008 Rev 1 Preconstruction Conference 20Aug09
xlv. Cm P007 Rev 2 Daily QA Inspection Reports 19Jun12
xlvi. CM P003 Rev 0 VECP 24Feb09
xlvii. Cm P005 Rev 1 Meeting Minutes 11Aug09

xlviii. Cm P004 Rev 1 Submittals 07Aug09
xlix. Cm P001 Rev 0 Prep and Doc Control CM Procedures 04Feb09
l. CM P002 Rev 1 Request for Information RFI 09Sep09
li. CM TOC SWIP CM Procedures revisions 33 10Oct12
lii.

d. Cost and Schedule Workflows
    i. CM Process 004c Rev 0 Applications for Payment 09Feb09
    ii. Cm Process 004b Rev 0 Envir Compliance Field Reporting 12Feb09
    iii. CM Process 003b Rev 0 Drawing Control 12Feb09
    iv. CM Process 004a Rev 0 Punch list and NCN 12Feb09
    v. CM Process 002b Rev 0 Doc Control and Mgmt and Correspondence 12Feb09
    vi. Cm Process 003a Rev 1 Contract and Change Management 03Sep09
    vii. CM Process 002a Rev 0 Meeting Minutes and Daily QA Inspection Reports 12Feb09
    viii. CM Process oo1c Rev 0 VECEP 12Feb09
    ix. CM Process 001b Rev 0 RFS 12Feb09
    x. CM Process 001a Rev 0 Submittals an RFI 12Feb09
    xi. 000 Process rev 0 Project Start Up 16Mar09
    xii. 00 Preface Rev 0 Business Process 01Apr09
    xiii. 00 Rev 1 Table of Contents Business processes 09Sep09

11. WSIP Policies (including Cost, Schedule & Forecast)

a. Monthly Cost Report
    i. WSIP Actuals to date by fiscal month 02.08.13 sr v1 showing 5 projects only
    ii. WSIP Actuals to date by Fiscal month 02.08.13
b. Trends vs CO's
    i. Open and closed Tends with Time Impact form JKinnen vs Sr Original with associated CO info
    ii. Open and Closed Trends with Time Impact form JKinnen
    iii. Trends vs. Change Orders V2
c. Backup to Certain Cos
    i. HTWTP Back Up Docs from CMIS
        1. CO #18 CM #37
            a. HTWTP KIW SFPUC 0143 Pricing for PCO0063 Area 02 Baffle Wall Waterproofing Coating Basins 1, 2 and 5
            b. WD-2596 – City Serial Letter No. 0136
            c. WD-2596 – City Serial Letter No. 0028
            d. Co #16 Estimate
        2. CO #16 CM #26
            a. HTWTP KIW SFPUC 0143 Pricing for PCO0063 Area 2 Baffle Wall Water proofing Coating Basins 1, 2 & 5
            b. WD2596 City Serial Letter No. 0136
            c. CO#16 Estimate
        3. CO #13 CM #33
            a. PCO 064 Attachments 1 thru 6
            b. WD2596 City Serial Letter No. 0155

c. HTWTPOP KIW SFPUC 0244 PCO 64 Valve T11 Piping Valve Installations Part 1

4. CO #15 CM #35
    a. WD2596 City Serial Letter No. 0083
    b. HTWTP KIW SFPUC 0279 PCO 0045 Changes to Hach Filter trak Turbidimeters Rev1
    c. HTWP KIW SFPUC 0142 Pricing for PCO 0045 Change to Hach Filter trak
    d. CO #15 Estimates
5. CO #12 CM #32
    a. Letter 80 Attachment 1 PCO Mis Ltg Fixture Mounting Changes
    b. WD2596 City Serial Letter No. 0080
    c. Letter 80 Attachment 2 PCO Misc. Ltg Fixture Mounting Changes
    d. HTWTP KIW SFPUC 0224 PCO 0043 Price Proposal
6. CO #10 CM #17
    a. HTWTP KIW SFPUC 0240 PCO 40 Area 14 H Pile Additional Reserves
    b. WD2596 City Serial Letter No 0069
    c. CO 10 Estimate
7. CO #11 CM #31
    a. WD2596 City Serial Letter No 0079
    b. HTWTP KIW SFPUC 0211 Pricing for PCO #30 Motorized Butterfly Valve Changes
    c. CO #11 Estimates
8. CO #08 CM #29
    a. WD2596 City Serial Letter No. 0142
    b. WD2596 City Serial Letter No. 0062
    c. HTWTP KIW SFPUC 0137 Pricing for PCO #34 Area Electric Golf Carts for CM Staff
9. CO #07 CM #28
    a. WD2596 City Serial Letter No. 0119
    b. WD2596 City Serial Letter No. 0097
    c. Letter #97 Attachment Revised Hydro Tank Inlet Outlet Piping
10. CO #05 CM #22
    a. WD2596 City Serial Letter No. 0142
    b. HTWTP KIW SFPUC 0137 Pricing for PCO #34 Area 00 Electric Golf Carts for CM Staff
    c. WD2596 City Serial Letter No. 0062
    d. CO No. 5 and 8 Estimate
11. HTWTP LT Backup Information for a few COs

ii. NIT
1. NIT CO 31 with Backup
2. NIT CO 32 with Backup

iii. Bay Tunnel
1. SFPUC Directive and Estimate for PC03
2. PC03 Training for New Tunnel Workers
3. CO4 Training for New Tunnel Workers Approved

d. Project Risk Docs from Susan Hou per Site Visit Requests Week of 12.10.12 (FTP docs)
    i. CDRP
        1. Risk Register
            a. CUW37401 – Calaveras Dam Replacement – Risk Register – 31Aug12
        2. CUW37401 - Calaveras Dam Replacement – Risk Register 30Sep12
        3. CUW37401 – Calaveras Dam Replacement – Risk Register 29Feb12
        4. CUW37401 - Calaveras Dam Replacement – Risk Register 27July12
        5. CDRP S Curve Heat Map Seat 2012
        6. CDRP S Curve Heat Map July 2012
        7. CDRP S Curve Heat Map Aug 2012
    ii. NIT
        1. NIT S Curve Heat Map Sep2012
        2. NIT S Curve Heat Map July 2012
        3. NIT S Curve Heat Map Aug 2012
        4. CUW35901 – New Irvington Tunnel – Baseline – June 2012
        5. CUW35901 35901 0 New Irvington Tunnel – Risk Register 28 – August 2012
        6. CUW35901 – New Irvington Tunnel – Risk Register – 25 July 2012
        7. CUW35901 – New Irvington Tunnel – Risk Register – 24 September 2012
    iii. HTWTP
        1. HTWTP S Curve Heat Map Sept 2012
        2. HTWTP S Curve Heat Map July 2012
        3. HTWTP S Curve Heat Map Aug 2012
        4. CUW36701 – HTWTP – Baseline Register – August 2011
        5. CWU36701 – Harry Tracy Water Treatment Plant – Risk Register – 30 July 2012
        6. CUW36701 – Harry Tracy Water Treatment Plant – Risk Register – 24 September 2012
        7. CUW36701 – Harry Tracy Water Treatment Plant – Risk Register 23 August 2012
    iv. CSSA
        1. CUW37101 – CSSA – Baseline Register – August 2011
        2. CUW37101 – Crystal Springs San Andreas – Risk Register – 20 July 2012
        3. CUW37101 – Crystal Springs San Andreas – Risk Register – 19 Augusts 2012
        4. CSSA S Curve Heat Map Sep 2012
        5. CSSA S Curve Heat Map July 2012
        6. CSSA S Curve Heat Map Aug 2012
    v. BAY TUNNEL
        1. CUW36801 – Bay Tunnel – Baseline Register – November 2010
        2. CUW36801 – Bay Tunnel – Risk Register – 23 July 2012
        3. CUW36801 – Bay Tunnel – Risk Register – 23 August 2012
        4. CUW6801 – Bay Tunnel – Risk Register – 18 September 2012
        5. Bat Tunnel S Curve Heat Map Sept 2012
        6. Bay Tunnel S Curve Heat Map July 2012
        7. Bay Tunnel S Curve Heat Map Aug 2012

e. CDRP Issues and Trends Logs
    i. CERP Audit Info – Issues and Trend R1
f. CDRP Factsheets
    i. Calaveras Dam Project Update – Winter 2012
    ii. Calaveras Dam Fact Sheet November 2012
g. WSIP Documents per Site Visit Request Week of 12.3.12 (emailed docs)
    i. Sunol – September 2012
    ii. WSIP September 2012
    iii. Status of Active Contracts – Table – September 2012
    iv. NIT Summary Reports 09.2.12
    v. Status of Active Contracts – Cos & Risks vs. Contingency – September 2012 V3
    vi. NIT Time Ex Cos
    vii. NIT Summary Report 06.29.12
    viii. NIT Summary Report 8.30.12
    ix. NIT Project Status JS
    x. NIT Progress Profile 11.27.12
    xi. NIT Bid Item 10e Monthly Summary JS
    xii. NIT Bid Item 10 Accounting Spreadsheet
    xiii. CUW35901 – New Irvington Tunnel – Risk Register 28 August 2012
    xiv. CUW35901 – New Irvington Tunnel – Risk Register 25 July 2012
    xv. CUW39501 – New Irvington Tunnel – Risk Register 24 September 2012
    xvi. CUW39501 – New Irvington Tunnel – Risk Register 21 November 2012
    xvii. CDRP DFS JV Employee Contact List
    xviii. CDRP CM Contact List
h. Pre Bid Presentations
    i. RBOC Evaluation of WSIP – Pre-Submittal Conference JLL
i. Bid History
    i. SFPUC 844164 Crystal Springs San Andreas Transmission
    ii. SFPUC 844163 Harry Tracy Water Treatment Plant
    iii. SFPUC 844162 New Irvington Tunnel
    iv. SFPUC 844161 Calaveras Dam
    v. SFPUC 587389v Bay Tunnel

EXHIBIT 14 – ANSWERS TO SUBMITTED QUESIONS

What follows are comments/questions/observations received by RWBC in response to its "Preliminary Draft Report" issued on March 4, 2013. This version of the RWBC CS-254 report was a pre-edited version and issued to gather preliminary feedback on its contents.

COMMENT	SOURCE	RWBC RESPONSE
GENERAL		
We support the overall methodology and analyses conducted by RWBC and in general find the observations and recommendations in the Draft Report to be in alignment with our own assessment of where we stand on the 5 mega projects evaluated. We do however have comments on some particular premises, calculations and assumptions. The SFPUC general comments that stand out are summarized below.	WSIP	Noted. Final forecast prepared by RWBC for projects reviewed within 3% of bottoms up analysis performed by WSIP management.
a. Does the current WSIP methodology for forecasting cost and schedule provide realistic, sound, and reliable projections? (Purpose is to understand how well the current forecasting methodology is working (or not).	RBOC	Yes, based on the latest comparable forecast presented on the March 22, 2013 Notice of Public Hearing RWBC's independent projections are within 3% of WSIP projections for the five projects evaluated. An acceptable threshold for establishing reasonability used by the Department of Transportation is 10%. Results are well within this threshold, and more importantly, independently prepared. Reference EXECUTIVE SUMMARY in report for details of this calculation and results.
b. What is the confidence level that the program will be completed within the currently approved WSIP schedule and cost? (It is noted that while the consultant did address the "likelihood" of the 5 major projects meeting schedule and budget, the consultant did not opine on the overall likelihood of the program being completed on time, on budget. This is specific ally mentioned in the Main Objectives section under Task 1, page 1, and under Section III- Scope of Work, #10 Note: addressing this latter issue may be problematic since it depends on what projects are currently still in the WSIP program.)	RBOC	RWBC used a weighted value based on project cost to create and aggregated probability range. Results of this calculation are shown in the EXECUTIVE SUMMARY and show that the resulting weighted percent likelihood is 77% placing the overall program in the "Somewhat Likely" category for completion on budget. Given the time extension required in the Calaveras Dam Replacement project the WSIP will not complete within time performance requirements.
It is strongly recommended that the Consultant review the scope of work to ensure that the report is responsive to the specific tasks listed for Tasks A and B. The BAWSCA representative from RBOC will be reviewing the report to ensure the scope was adhered to. Finally, it is recommended that the scope be included in the appendix.	RBOC	See report exhibit pertaining to scope.

COMMENT	SOURCE	RWBC RESPONSE
Recommendations - I think I saw more in terms of how to save $ to make up for cost overruns than how to catch up time wise, but haven't read enough to know whether time line is much of an issue or not, the! e way we know that cost is. (I didn't understand the "bottoms up" staffing recommendation as a way to save $, but that's me.) Does the report detail how much $ could be made up via their recommendations, and is it enough to meet the projected gap?	RBOC	The scope of this project was limited to evaluation of the five project assigned. Estimate costs to completion were performed for each of the five projects but not for all remaining projects in WSIP as this was not part of project scope.
Findings re likelihood of meeting budgets and timelines are surprising - this is a comment for RBOC/SFPUC, not Block. If we agree with Block's methodologies for arriving at their findings, then we have a lot to learn from the report and it will clearly have been a valuable exercise for us to have undertaken.	RBOC	No response required
The overall analysis appears sound and we agree generally agree with the conclusions drawn for CDRP and NIT.	WSIP	No response required
The report states the project status as of Sept 30, 2012 data date. However, we note that the value of many of the trends changed between the data date and the publication of RWB draft report, and that RWB actually used the updated numbers. It may be good to clarify this in the report.	WSIP	RWBC tried to accommodate requests made by RBOC to make data as current as possible. RWBC provided this added data points as a courtesy given that 9/30/12 was the agreed upon data date and RWBC is not required to add data subsequent to this agreed upon data date.
RWBC question our use of risks and recommend more clarity on that aspect of the WSIP. For the record, we do not use risk values for WSIP cost forecasting. We do show 80% Risk values on some charts and presentations for comparison with allocated contingencies. The primary intent of our risk management program is to identify risks early so we can put in place mitigation measures to provide risks from becoming trends and change orders. The secondary use is to help establish and adjust construction contingencies as needed based on risk levels, which is being done in the ongoing revision to the WSIP (Change Notice to be issued on March 22). Communication with risk experts from various engineering firms confirms that our risk management approach is consistent with that used by many others in the industry	WSIP	Noted. Reference other responses below presented by RWBC in replies to questions pertaining to risks.

COMMENT	SOURCE	RWBC RESPONSE
For each of the project under Task A, RWBC presents a budget table that includes a forecasted budget calculated using the CRR ratio and a specified contingency level. The WSIP team just completed a thorough assessment of the budget for those same projects using extensive bottoms up estimates. Contingency levels for these latest SFPUC forecasts took into consideration the 50% and 80% risk levels, the amount and type of work remaining and the contractor's approach and behavior to date on the project. As a result of this assessment, the SFPUC will publish a Change Notice on March 22 that will include proposed budget revisions for all active WSIP projects. These proposed budgets will be different than those in the RWBC report. It is very important that RBOC and others understand the difference in the level of accuracy between the two sets of forecasts. As indicated in an earlier comment, the purpose of the RWBC CRR/TRR analysis was not to generate revised forecasts but to determine the level of likelihood a project can be delivered on time and within schedule based on past behavior related to the forecasting and conversion of trends to actual change orders. The SFPUC feels very strongly that given the approximate nature and limitations of the forecasted cost values in the RWBC report, those values should not be used for a side-by-side comparison with the soon to be published forecasts developed by the SFPUC using detailed bottoms up estimates for all remaining project activities.	WSIP	RWBC's analysis was performed for the sole purpose of establishing a basis to recommend the likelihood that a project would be completed on time and on budget. RWBC's analysis is not intended to replace any of the work performed by the WSIP management team preparation of its own forecasts of time and cost to completion. We do note that RWBC's values were close to those forecast by WSIP management team (3%).
Executive Summary and Approach to Workplan		
Key questions to be addressed in Task A include but are not limited to:	RBOC	No response required
a. Does the EAC/SAC analysis of the *representative projects* suggest that these projects are on schedule and within the budget?	RBOC	Narrative provide in Executive Summary and with the detailed analysis of each project.
b. Does the EAC/SAC analysis suggest that the *overall* WSIP program is on schedule/budget?	RBOC	Narrative provided in Executive Summary and with the detailed analysis of each project.

COMMENT	SOURCE	RWBC RESPONSE
The EAC and SAC criteria and approach for Task A seem reasonable with the exception of how risks are handled. RWBC's analysis does not include risk despite the SFPUC's experience that risk does translate to added cost and schedule for WSIP projects. RWBC's report should directly address how risks might be quantified for use in the WSIP program cost and schedule.	RBOC	RWBC prepared an independent evaluation of costs to complete. The overall forecast shows that RWBC's independent calculation is within 3% of that forecast by WSIP management team. Risks are not used by WSIP management team to forecast costs. Further, interviews with field construction managers and other WSIP staff shows that risks are used as a management tool but not a tool to forecast costs. The way risks are currently used to justify contingency by the WSIP management may provide a conflicting message and may create the appearance that there is a higher probability of occurring. RWBC dealt with these parameters by preparing an independent forecast which addresses the overall engagement objective whether current EAC/SAC are representative of project conditions which we believe they are.
RWBC was presented with four possible "confidence level" scenarios ranging from 70-100% under which to assess each project with the "Unlikely" scenario being anything less than 70%. With a program of this magnitude, this range appears too broad for defining a level of likeliness of occurrence. A smaller window of acceptability (from 80-100%) is more appropriate to be used when examining the complete WSIP given the magnitude of the potential budget and schedule impact.	RBOC	RWBC provided recommendations based on engagement requirements which provided the specific parameters used. RWBC was not involved with the preparation of these ranges. If a different set of parameters is to be evaluated, this can be accomplished under a separate effort that includes this scope.
Figure 1 presents the results of Task A for each project evaluated. Unfortunately, the report narrative does not quantitatively explain how the results presented in Figure 42 are converted to the identified confidence levels shown for each project in Figure 1. For example, the results for CSSA seem to favor an "Unlikely" rating based on how large the calculated Budget Performance Variance is, yet the project is actually rated "Somewhat Likely". The exact process for assigning a confidence level to each project should be presented clearly in the report such that the reader fully understands all the parameters that are encompassed in the presented results.	RBOC	See CONCLUSION section for each project. CSSA adjusted to "UNLIKELY" based on review of data and discussions about project with WSIP management team. RWBC used a quantitative approach to generate data and results for various aspects of each project. These results were qualitatively compiled into our overall CONCLUSION using data results for each parameter evaluated.
RW Block concludes in the executive summary that the five projects under study can be classified as follows: (see figure 1 – page 4). Using this classification and plotting the addition of Approved, Pending, and Potential Change Orders, together with Trends and 80% Risk Values against approved contingencies as of end of February 2013, the CSSA Project is projected to run out of contingency and accordingly could be classified together with CDRP as "Unlikely" to complete under budget. Otherwise, we concur with the assessment of the other four projects. (See Reference No.1 Tab)	WSIP	RWBC has reviewed additional data provided and has adjusted the probability of CSSA to "Unlikely" to finish on time/budget.

COMMENT	SOURCE	RWBC RESPONSE
The discrepancy with our assessment of CSSA is due to the fact that there has been a significant increase in trends starting in November 2012, which was outside the time frame of this report. The figure below shows the forecast history of CSSA for the last 8 months which clearly illustrates this increase. (See Reference No.2 Tab)	WSIP	No response required. Clarification.
Page 4: Figure 1: I agree with Julie's comment, to estimate that both CSSA and HTWTP LT with an equal confidence rate surprises me given the challenges of the underwater work for CSSA and the current delay. For HTWTP even though it's a remodel of an existing facility, once we get the Operations Building behind us the unknowns significantly decrease. For example, at Raw Water since we demolished complete electrical systems so the interface with existing work is less of an issue.	WSIP	RWBC has reviewed additional data provided and has adjusted the probability of CSSA to be Unlikely to finish on time/budget.
a. For CSSA and CDR costs include significant environmental inspection and monitoring costs.	WSIP	No response required
Page 5: Typo - bullet 3, 4th line: incorrect ":" after word year	RBOC	Adjusted
Page 5: "2. Re-evaluate CDR and HTWTP projected staffing levels for opportunities to reduce costs through use of SFPUC staff and by reduction in overall staffing levels."	WSIP	This is a statement. No comment required
a. The use of City to replace Consultant will only result in increasing the cost. While there is not a big difference between the City base salary and the consultant's, the City multiplier is over 3.3 while most of our CM consultants have a 2.0 effective multiplier.	WSIP	This opinion would need to be tested against actual costs. It is unclear what an 'effective multiplier' is comprised of as it pertains to this analysis. Other factors that may come to bear also include the corporate knowledge that could be gained within SFPUC by using its own staff which would also improve internal capabilities in existing or subsequent programs.
b. I agree with reducing the CDRP CM team (we have done this in the new forecast for the budget realignment effort. But I do not agree with reducing it for HTWTP as the project is complex, widely spread and the challenges we are experiencing with the contractor (Kiewit).	WSIP	Noted
Page 5: "3. As a benchmark to the existing staffing model, consider development of a soft cost staffing model that is bottoms up using actual costs for each staff. The staffing models provided used an annual budgetary threshold against which an annual full time equivalent (FTE) cost ($282,000/year) was applied to extract the number of FTEs needed in a given year:.	WSIP	No response required

COMMENT	SOURCE	RWBC RESPONSE
a. huge effort was used to put in place a detailed bottom up staffing plan for all CM positions. This exercise was conducted for each project using the best available construction schedule at that time to appropriately fill every position needed by role and responsibility, classification and by every month for the period this position was required. Positions were also identified by either City or consultant and appropriately calculated.	WSIP	Additional data was reviewed subsequent to the issuance of the preliminary draft report. Applicable sections in the report have been updated to reflect that a bottoms up analysis was performed. RWBC does note that it may be a worthwhile effort to perform a site by site independent review of project management staff to validate WSIP management's analysis. We also note that there is a wide range of categories included in soft costs which are above and beyond what would be included: it is important to understand this if comparing soft costs to ensure a more accurate comparison.
Page 7: paragraph 5, line 2: "for r"	RBOC	Adjusted
Page 8: The report should clarify why these specific 5 projects were chosen for this analysis (e.g., large projects in construction with completion between x and y %, rep's representing a spectrum of construction activity).	RBOC	RWBC was not involved in project selection. The five projects selected were part of the engagement scope of work.
COST REALIZATION RATE (CRR) AND TIME REALIZATION RATE (TRR) METHODOLOGIES FOR ANALYZING FORECAST PERFORMANCE:	WSIP	No comment required.
a. The CRR ratio is an innovative methodology to assess the accuracy of the forecasting effort by the CM Project Team. However, the way we collect WSIP information on Trends is not ideal for the use of this methodology. A trend record in our Trend log is not to be confused with a log entry into an accounting database. While the record for the trend has a date field, which records the date the trend was entered, the value associated with the trend is the latest iteration of the forecast, and could have been completely different at the time the trend was created. For example, the trend for PCO 20 in the CDR project has had several values through its history and it would be a mistake to assume that Trend #00044 was $95M on August 31, 2012, as EXHIBIT 2 – CDR TRENDS (THROUGH 12/14/12) assumes.	WSIP	CRR and TRR was developed to test book ends of cost realization: trend being the least defined and an approved change order the most defined. CRR and TRR are tools developed show different project behaviors such as how close final changes are realized compared to costs. Use of multiple trend entries is just part of the ck Consulting, Inc. (RWBC) was engaged by the City and County of San Francisco (City) Airport Commission's CRR and TRR were developed to evaluate book ends of manifestation of costs.
b. In order for this methodology to be invariably valid WSIP would have to revise our procedures so trends are recorded more as an accounting log, where the initial trend would have to be followed by additional entries to the log as debit or credits to either increase or decrease the value. This would produce a more accurate representation of the evolution of the forecasts and how they relate to the approved change orders.	WSIP	CRR and TRR were devised for answering a specific engagement requirement. RWBC would recommend that on future programs procedures be structured in a manner that allows for measurement of CRR and TRR as these are valuable executive management evaluation tools that not only highlight cost realization, but also work in progress (those changes that are more defined than trends but not yet finalized as an executed change order).

COMMENT	SOURCE	RWBC RESPONSE
c. Furthermore, many of our Change Orders are not entered first as a trend, as they may be are entered directly in the Change Management module. Therefore they only get included in the formula when they are approved, distorting the calculations of this ratio as they were never entered in Trends. Again, in order for this ratio to be always valid, we would need to change our procedures so change orders are invariably identified and entered first as Trends.	WSIP	If trends are to be used as a forecasting tool then all changes need to be first entered as a trends as this is the leading indicator. Else there may be a temporary understatement of costs to completion.
d. We also note that the Trend values appear to have been discounted by RWB by applying the percentage or fraction shown in the corresponding "Likelihood" field. This is not consistent with the way the CM Teams are using the "Likelihood" field. WSIP accounts for all identified Trends at face value.	WSIP	RWBC believes that incorporating this data more accurate reflects the project team's thinking and attitude towards the realization of cost. This approach is further validated that RWBC calculated forecast to completion to be within 3% of WSIP management team's forecast for the five projects evaluated. RWBC reserves the right to use data and adjust data as required to prepare its independent estimate.
e. In summary, this CRR ratio could be of significant value going forward and WSIP management could consider revising the procedure for entering trends so this ratio can be accurately and consistently calculated in the future. However, the ratio as currently calculated in the RWB Draft Report should be used with caution considering the above described characteristics of the underlying WSIP data.	WSIP	No response required
f. Page 12: The paragraph is missing a discussion of Potential Change Orders.	WSIP	No adjustment required
g. Page 14: Second paragraph second line has a typo: "CRR rends"	WSIP	Adjusted
The CRR/TRR ratios represent an innovative methodology to assess the accuracy of the WSIP's team forecasting efforts. However there are some weaknesses in that methodology based on how we collect and manage change order and trend data. It is therefore critical that the limitations and purpose of the CRR/TRR analyses be clearly understood. Those ratios should not be used for actual forecasting purposes as may be implied since RWBC uses those ratios to calculate the budget forecasts presented in Figures 10, 18, 25, 35 and 40. We believe that it is acceptable to use the CRR/TRR ratios to reach general conclusions on the likelihood of completing projects on time or within budget, but feel strongly that they should not be considered a substitute for bottom-up estimates of schedule and cost FACs because of the following limitations:	WSIP	TRR and CRR methodologies were developed to accomplish certain tasks within this engagement. One of the key features of this approach is that it captures the book-ends of costs from least defined to most defined. Another key feature is that this methodology is intended to show project cost definition behaviors throughout the project lifecycle. Ultimately, if structured properly, CRR/TRR provides a very useful management tool of project/program management's ability to forecast costs.

COMMENT	SOURCE	RWBC RESPONSE
For the CRR/TRR to be an accurate representation of our forecasting efforts, WSIP's trends would have to be recorded more as an accounting log, where an initial trend is recorded followed by additional entries to the log as debits and credits to either increase or decrease the trend value as new information becomes available. This would present a more accurate representation of the evolution of our forecasts and how they relate to approved change orders. For example, a trend can be closed without being moved to a proposed change order, and be re-create later. RWBC's calculations account for that same trend twice, which skews the CRR/TRR ratio down.	WSIP	A simpler approach is to simply have a direct link between trends and change orders (one-to one and one-to-many relationships) with three fields to capture original value of trend, current value of trend and value of trend at the time it was closed. This structure would provide added information on the ability to forecast costs over time in a manner that is directly linked to changes (the ultimate manifestation for construction cost impacts). The other feature is that if trends are to be a leading indicator then there should be a trend identified prior to issuance of any change order, else the project cost (time) at completion may be temporarily underestimated.
Many change orders are not entered first as a trend. For example Owner's initiated changes are normally entered directly in the Change Management module. Therefore, those changes are only accounted for as a change order (not as a trend), which distort the calculation of the CRR/TRR ratios up.	WSIP	This practice of not using trends as leading indicators may result in a temporary underestimation of project costs to completion. RWBC recommends that if trends are the leading indicator of costs then such should be presented prior to the issuance of a change order, regardless of source.
The trend values are also being inappropriately discounted by applying the percentage or fraction shown in the corresponding "Likelihood" field. This is not consistent with the definition of that field, which accounts for the level of certainty of the value assigned to a trend, not the probability of occurrence of that trend. In our forecasts, we account for all identified trends at face value. Including those percentages inaccurately drives the CRR/TRR ratios higher.	WSIP	It is RWBC's discretion how to treat forecast values in preparation of its independent forecast to completion. RWBC decided to use a discount based on review of CMIS tables, discussions with project teams, and its own assessments of the forecast cost. Results of our independent analysis are within 3% of WSIP's forecast costs.
Page 14, paragraph 1, line 5: "tile" should be "time"	RBOC	Adjusted RWBC agrees that for CRR and TRR to be used as a forecasting tool modifications would have to be made to existing processes in order to calibrate this metric for such purposes.
Page 14: paragraph 1, line 8: "date" should be "data"	RBOC	No adjusted required
Page 14: paragraph 2, line 1: "analyzes" should be "analyses"	RBOC	Modified
Page 14: paragraph 2, line 2: "rends" should be "trends"	RBOC	Modified
The RWBC Throughput analysis is presented in a theoretical frame of reference even though the projects all have actual S-Curves which provide an actual, historical measure of Throughput. We have questions on the validity of the Throughput curves for CDR and HTWTP based on the actual S-Curves for those projects. We are currently working with RWBC to identify the reasons for the discrepancy. In the case of CDR, our Throughput analysis shows that actual performance is well inside the envelope between the early and late curve, which is not the case for the RWBC analysis.	WSIP	Throughput calculations for CDR and HTWTP were adjusted. RWBC used the S-curves prepared by the WSIP management team with the modification that throughput (versus cost) is plotted over time.

COMMENT	SOURCE	RWBC RESPONSE
a. The Throughput calculation basically compares the percent complete to a theoretical percent complete assuming a straight line distribution where the project achieves progress proportionally to the amount of time spent. This calculation is very effective in giving a gross approximation of the health of a project when other more accurate performance parameters are not present. Usually this calculation is superseded when a cost-loaded CPM schedule is available, since the planned percent complete can then be precisely determined using the baseline schedule. On the WSIP we are also calculating the late curve of the baseline schedule and actual performance is compared against both the early and the late expected value from the baseline schedule.	WSIP	The throughput calculations used by RWBC used cost loaded CPM values extracted from CMIS. As shown in each project analysis no straight-line throughput calculation was used.
b. Below is a comparison of a traditional S curve against the straight line distribution that generates the Throughput of 1. (See Reference No.3 Tab)	WSIP	No response required
c. The figure below plots the Throughput of a typical S curve. The ratio is quite low at the beginning of the project and achieves a value of 1 at the 50% elapsed time mark. If a value of 1 is considered healthy, then projects that follow a standard S curve progress curve would be deemed unhealthy until 50% of the time has elapsed. Considering that many of our construction projects follow a theoretical S curve then this methodology is not useful for our application. (See Reference No. 4 Tab)	WSIP	RWBC used data from CMIS which was generated from a cost loaded schedule generated value.
d. Even though that we have planned early and late data available for WSIP projects, RW Block calculates the Throughput of both these curves and then compares it to the actual Throughput. While this is mathematically correct, it might be simpler to compare the actual percent complete versus the early and late planned value without having to normalize it against a straight line.	WSIP	Straight line was not used. No response required.
e. Page 20: "In calculation of throughput, the $133M/761 day impact was not included in the calculation given the variability of resulting pricing at the end of negotiations."	WSIP	No response required
f. Page 20: Footnote to Throughput Graph: Trends and Potential Change orders are included in the graph only in the At Completion curve. They are not included in the Early and Late Planned curve or in the Actual curve, so we are not sure what RW Block is saying when they are not including the $133M Potential Change Order.	WSIP	No response required
a. We concur with the methodology used to evaluate Project Criticality and Schedule. The standard WSIP Monthly Construction Progress Report includes a section where this ratio of criticality is calculated using the same formula.	WSIP	No response required
Cost Realization Rate and Time Realization Rate (Page 12-17)		
Equations 1, 2, 2A, 3, 3A and 4 that were developed by RWBC seem to be a reasonable approach to evaluating the final cost at completion, cost projections, time (schedule) projections, work "throughput", and criticality of schedule with two notes of caution as follows:	RBOC	No response required

COMMENT	SOURCE	RWBC RESPONSE
a. None of the formulas include any impacts resulting from projected "risks" from the risk list. These potential risks can definitely have an impact on schedule and cost as discussed on Page 57 of the report. An additional term should be added to the formula to represent risks.	RBOC	Risks are not used to forecast costs. RWBC prepared an independent calculation of costs to completion which was within 3% of WSIP forecast values for same projects.
b. The formulas are based on existing trends. It is unclear if RWBC discussed with staff and the contractors the probability or likelihood that additional trends might be forthcoming that aren't currently on the risk list.	RBOC	This will always be a possibility until the work is complete and accepted. RWBC reviewed the best and latest information available at time work was performed and such is contained in RWBCs forecast.
Page 12: Equation 1: FAC= Original Contract Value + Approved and Pending Change Orders + Potential Change Orders + Trends"	WSIP	No response required
a. Equation 1 takes into consideration all open trends which reflect an accurate forecast number. Equation 2 captures all trends including closed ones. Closed ones might have been moved to potential or deleted completely because the trend was found to have no merit to contractor, or reopened as a new trend because of scope change(s) to add another issue related to that trend which will result in double counting.	WSIP	No response required
b. Equation 1 takes into consideration pending change orders which are considered approved changes awaiting controller's office certification. They should be added to the total approved change orders.	WSIP	No response required
Page 12: & Equation 2: CRR= (Cumulative Value of Approved Change Orders)/(Cumulative Value of Expected Trends)" - We see a difference between the two equations:	WSIP	No response required
a. Equation 2 ignores completely pending change orders.	WSIP	Yes this was done by design as CRR is intended to evaluated book ends of costs. Pending and other interim (not fully approved costs) are reflected as either separation of the trend curve vs. actual curve or as a step function when these interim steps are realized as a fully executed change.
Page 13: "Given that trends are leading indicators of potential costs, it would follow that under a theoretical case the cumulative value of expected trends over time, when graphically shown, would be a step function leading realized costs (change orders)"	WSIP	No response required
a. Not all change orders start with Trends. The CM team may issue a PCO directly to the contractor without having created a trend for it. Example: Owner's requested changes.	WSIP	If trends are used as leading indicators then all changes should be captured by trends else the possibility of temporarily understating a project forecast is introduced.
b. A closed trend does not mean necessarily that it moved into a CO.	WSIP	No response required
c. The same trend can be recreated again after being closed. This might cause double counting of the same trend (example the Control Building in Bay Tunnel got added twice in calculating the total trends which accounted for 950K twice).	WSIP	This was addressed above in RWBC's response to the use of CRR and TRR.
Page 13: "Using this approach we extracted change order data (date, amount) and trend data (trend value, probability of occurring, date) for each of the five projects evaluated."	WSIP	No response required

COMMENT	SOURCE	RWBC RESPONSE
a. The likelihood % (not probability of occurrence) used in the trends is the confidence level of how detailed the estimated value of the trend is. In some cases and when the team was confident that the estimated value is somehow in the range, the likelihood was left blank, which resulted in a zero value in RWBC analysis thus resulting in a zero value in the total trend. We find that it is pertinent to consider the total estimated amount of each trend in the forecast.	WSIP	This was addressed above in RWBC's response to the use of CRR and TRR.
Page 14: The CRR can be applied to FAC to test, based on the specific project team's experience, whether a premium or credit should be expected based on the CRR value through the date analyzed. The CRR captures the specific attributes of each project team: how they capture information, the management experience used in assigning probabilities to an event occurring, in short it is a metric that captures the specific behaviors of the project management team in forecasting costs."	WSIP	No response required
a. The likelihood % (not probability of occurrence) used in the trends is the confidence level of how detailed the estimated value of the trend is. In some cases and when the team was confident that the estimated value is somehow in the range, the likelihood was left blank, which resulted in a zero value in RWBC analysis thus resulting in a zero value in the total trend. We find that it is pertinent to consider the total estimated amount of each trend in the forecast.	WSIP	This was addressed above in RWBC's response to the use of CRR and TRR.
b. It is very important to highlight the fact that RWBC calculated total trend is less than SFPUC total trend. Therefore there will be a difference in forecasting numbers. While the SFPUC is based on total trends value and RWBC is based on a percentage value of each trend and sometime it was valued at zero.	WSIP	RWBC believed that this was a more accurate representation of the forecast cost. Given that RWBC was within 3% of WSIP's estimate we don't believe this approach needs to be modified.
Page 14: EQUATION 2A: TRR=(Cumulative Value of Approved Time Extensions)/(Cumulative Value of Time Identified in Trends)	WSIP	No response required
a. When time extension is identified in the trends the team estimates the time it takes to perform this work or the total time period of the delay caused by this particular trend. When this trend moves to potential the impact of this period whether it was a duration of all activities required to perform the out of scope work or the delay caused by the trend is calculated by performing a time impact analysis to the schedule and the critical path to take into consideration all the project schedule elements: milestones, floats, interrelated activities….etc.	WSIP	No response required
Page 15: All highlighted words should be 'time' not 'costs'. - "A TRR ratio of 1.0 is considered to be the uniform condition where forecast costs and realized costs are the same. A TRR ratio less than 1.0 is considered to be a conservative condition as realized costs (approved change orders) are less than forecast costs (trends). A TRR greater than 1.0 means that realized costs are higher than forecast costs (non-conservative conditions)."	WSIP	No response required
Calaveras Dam Replacement (Page 17-26)		

COMMENT	SOURCE	RWBC RESPONSE
CRR and TRR for CDRP showed a rate less than 1.0 in the beginning of the project because the different site condition potential change order which was accounted for in RWBC calculations as an approved change orders did not get into account until later.	WSIP	No response required. CRR and TRR uses are discussed above.
Pages: 24 and 25 note that there are many currently unknown costs that may materialize. It would be helpful for RWBC to give a best estimate of how much the costs might be given their detailed evaluation of the project. Is the 10% contingency enough to cover all reasonably foreseeable costs? What is the cost breakdown of how the 10% was determined? Soft costs should not be included in construction contingency. Are soft costs accounted for as part of the estimated presented?	RBOC	Estimate to completion is provided for this project including contingency. We believe that the 10% contingency is adequate given reported completion (35%), complexity of work, previously identified trends, pending change orders, and approved change orders. The 10% was the result of an initial contingency set based on the Construction Cost Engineering Handbook (Patrascu) adjusted for complexity of work, size of project, opportunity for additional unforeseen conditions, opportunity to accelerate work, and working relationship between owner management team and general contractor management team. Regardless of contingency method used, there will always be an opportunity to realized unforeseen costs. Soft costs are accounted in the estimate to completion projection.
Pages: 25, item #4, line 2: Please correct the incorrect dollar figure. This is the Q2 Forecasted cost. The current approved budget for CDR is $532.6M as shown in Figure 10.	RBOC	Adjusted
Did RWBC discuss and identify possible future trends and risks with the contractor? What was the outcome?	RBOC	Yes. No modifications to existing ledgers.
Note that there are no risks included in the analysis. Is more funding needed to cover risks?	RBOC	RWBC prepared an independent estimate to completion for each project to be all inclusive. RWBC does not believe additional costs are needed, however, 100% probability of final costs cannot be realized until the project is complete.
Page 18: paragraph 1, line 7: "fending" should be "fencing"	RBOC	Adjusted
Page 18: paragraph 2, line 4: "Ref" should be replaced with the correct citation	RBOC	Adjusted
Page 18: under characteristic of project. Revise second sentence as follows: "Over 1 million cubic yards of excavated soil and rock materials (insert missing words in bold) will have to be double handled; schedule delays required the project team to work with regulatory agencies to amend existing permits to accommodate for changes, and delays associated with protected species found on site and maintenance of environmental fencing, present a few of the challenges the project team has to overcome when performing the work."	WSIP	Adjusted
2nd para on pg 18, 3rd line, suggest changing "project end date" to "construction final completion" (project end date in WSIP includes the closeout period).	WSIP	Adjusted

COMMENT	SOURCE	RWBC RESPONSE
Page 18: Project Status as of September 30, 2012 Data Date. Several numbers presented in this section appear inaccurate when compared to the Sept 28, 2012 contract summary reports and the 10/12/2012 Project Cost Summary (this may be due to RWB use of updated numbers as stated in General Comment #2 above): "As of the data date, there were ~~29~~ 23 approved change orders with a total value of ~~$20,059,881.85~~ $19,022,881.85 and additional time totaling 69 days, ….. As of September 2012, the project was 26.29% completed (~~$74,974,499~~ $72,974,499) earned against a contract value total$278,594,731.85.	WSIP	Timing differences but modified data to correlate to month end.
Suggest replacing the last two sentences on pg 18 with the following: "Previous geotechnical investigations performed during the planning and design phases did not fully reveal conditions which were encountered. Between June and September 2012, several previously unknown geologic features were found within the cut slope excavation of the 700-ft high slope known as Observation Hill on the left side of the valley above the future dam and spillway. These are shown as "Geologic Features A and B" in Figure 4. "Geologic Feature A" is now considered to be an ancient landslide, whereas the specific origin of "Geologic Feature B" is less definitive. In addition, a fault zone previously known to exist was found to occur approximately 200 feet further west than previously known, placing it within a critical location within the designed excavation cut slope shown in Figure 4.	WSIP	Language modified
Bottom of page 19: Suggest clarifying that $133M is the contractor's proposed cost and that the final cost is in negotiation.	WSIP	Clarified that $133M is contractors proposed pricing.
On Figure 4 (page 20), the label "Unexpected geologic" is not correct. Suggest removing it. The text above refers the reader to the labels already provided on the figure.	WSIP	Modified to "Encountered geologic" condition.
On Figure 5 (page 20), suggest revising the label to state: "Unexpected Geologic Features Encountered within Observation Hill"	WSIP	Label adjusted
Page 20: first paragraph. Suggest: "As of Feb 2013, the project team and the general contractor still continue to negotiate ~~of~~ this change. "	WSIP	Language modified
Page 21: under Project Criticality Analysis, second sentence. In our view, the delay between June 2012 and September 2012 was caused by the geotechnical exploratory work performed to investigate the issue, and not due to a material increase to activities on the critical path. The critical path of the job essentially became obsolete once this issue arose, and we now have a new re-sequenced and re-baselined schedule.	WSIP	Noted but language not modified.
Page 21: under CRR Analysis. "We fully recognize that this trend has not formally been approved…work have been authorized under change orders #17(inserted) 25, ~~26~~, 27, and presented to …"	WSIP	Adjusted

COMMENT	SOURCE	RWBC RESPONSE
Page 21: A decision was made by RWBC to include trend 00044 (the unexpected geologic condition) as an approved change with a value of $133 million and a time extension of 25 months (761 days) as an approved change."	WSIP	No response required. CRR and TRR uses are discussed above.
Page 21: The $133M Potential Change Order was included as an approved Change Order in the calculation of the CRR ratio, but was excluded in the Throughput calculation, which seems inconsistent.	WSIP	Time extension associated with this change is not yet stable enough to include in a throughput analysis and would have artificially skewed throughput results.
Page 23: the TRR Analysis uses $133M and 25 months of delay for analysis, yet the trend at that time only reflects $90M/$95M and ~19months delay. If $133M and 25 months are used, then clarification needs to be added to Page 18, Project Status as of September 30, 2012 of the report.	WSIP	This was done to accommodate RBOC request to use latest data.
Page 24: Figure 9, if 25 months delay is used, the delay should be equivalent to 761 days, not 750 days as depicted on the text box	WSIP	Modified Figure 9 language
Page 25: Item 4. The current approved budget is $532.6M (not $574M).	WSIP	Adjusted
Page 26: Figure 10: The Current Approved Budget citation is not from the Current Forecast column as stated; figure is from the "Current Approved Budget" column in the Q2 report. This incorrect citation is also carried in to the Projected Budget tables for the other 4 projects.	RBOC	Language adjusted
Page 26: first table – Total Construction cost. Should be noted that over $100M of work has been completed to date, so 10% contingency on remaining work would be significantly less than the contingency value stated in the table. It does not seem appropriate to include contingency on work already completed.	WSIP	Contingency is based on an overall budget for construction based on known and unknown conditions. This is RWBC's estimate of work that could be encountered, for other issues such potential litigation resulting from $133M encountered condition if not negotiated and similar items. RWBC used the % of total cost methodology to estimate its own assessment of additional costs beyond those already identified and forecast.
Page 26, second table – Total forecast: It should be noted that this does NOT include other construction contracts within the project budget that total over $20M. Therefore, if the reader tries to compare this table to the SFPUC's quarterly report, they will not be comparing "apples to apples". Furthermore, the recent budget forecasting includes some additional soft costs not included in this table.	WSIP	This is an independent forecast not intended to replicate WSIP estimated values or for any other purpose but to answer the questions posed in the scope of work for this engagement.
Page 27: paragraph 2, line 9: "a" should be "as"	RBOC	Adjusted
Page 28: "This project is in construction and is 49.5% complete as of the September 30, 2012 data date."	WSIP	No response required
Page 28: We disagree with this statement. The project as of 9/30/12 was 58.53% complete, with $60,382,226.26 earned over a revised contract of $103,167,345.39.	WSIP	CSSA data updated

COMMENT	SOURCE	RWBC RESPONSE
Page 28: "PROJECT STATUS AS OF SEPTEMBER 30, 2012 (DATA DATE): - "This project is in construction and is '49.5%' - should be '59%.	WSIP	Adjusted
Page 30: however the project performance remains flat,"	WSIP	No response required
Page 30: We disagree with this statement. In fact, in December 2012 the project advanced 5.74% during the month resulting in one of the best months to date.	WSIP	CSSA data updated
Page 30: paragraph 1, line 7: "not" should be "note"	RBOC	Adjusted
Page 30: paragraph 1, line 8: "increase" should be "increased"	RBOC	Adjusted
Page 31: paragraph 1, line 11: "there" should be "the"	RBOC	Adjusted
Page 33: OVERALL OBSERVATIONS CDR: - Title should read 'CSSA' and not 'CDR'	WSIP	Adjusted
RW Block calculated an initial CCR of 1.66 for NIT. Then they backed this down to 1.12. It is not clear how the adjustment was made.	WSIP	Provided in CRR analysis (CO #1 - 400 days).
TRR Analysis: RW Block found no trend associated with change order #1 which added 400 days to the contract. The 400 days was treated as a time allowance mostly for drilling and grouting days granted the contractor whenever he was engaged in these activities instead of mining. The trend could have been forecast for the 400 days from when the change order was contemplated and approval was requested.	WSIP	No response required
RW Block calculated an initial TRR of 3.85 for NIT. Then they backed this down to 1.75. It is not clear how the adjustment was made.	WSIP	Read applicable section TRR in report.
Overall Observations: RW Block uses the TRR of 1.75 to calculate a total required performance period of 1,903 days which is 113 days longer than the current allowable 1,790 days. Our own detail risk analysis, which was a bottom up evaluation, in Feb. 2013 produced an estimate of only 53 days beyond the current allowable, which we think is more realistic.	WSIP	Different approaches used to evaluate data. No response required.
Overall Recommendation: we concur with RW Block's overall view of the NIT: "…very likely that this project will finish within budget and on time."	WSIP	No response required.
We also concur with their observation that "throughput performance has been well within acceptable rates." But NIT throughput performance may be a more useful measurement than either the CRR or TRR, which does not measure the extra effort expended by the NIT team to overcome obstacles and challenges on a daily basis to give the project a fighting chance to meet schedule and budget.	WSIP	No response required

COMMENT	SOURCE	RWBC RESPONSE
We finally concur with their observation that "there are mitigating contractual circumstances that may improve performance." It was not clear what they meant by mitigating contractual circumstances. We would like to think they were referring to the use of the NIT environmental allowance and the contractual requirement that we grant a contract day for each 8 hours spent on drilling & grouting for groundwater control. Although RW Block was critical of this in their TRR analysis, the use of allowances and grouting day grants with set unit prices saved a lot time that would otherwise be spent arguing over inflated quotations and negotiations that would have ensued had we used the conventional change order process. The NIT cost and schedule would have been adversely impacted if we had to negotiate a change from scratch for every use of the allowance and especially each time we had to grant grouting days.	WSIP	No response required
Crystal Springs/San Andreas Transmission Upgrade (Page 34 - 35)		
Page 34: item #4, line 1: Please correct the incorrect budget shortfall value. Figure 18 shows $18.1M.	RBOC	Adjusted
What are RWBC's recommendations for resolving the "strained" contractor/CM team relations?	RBOC	We found that WSIP management team has taken proactive steps such as partnering, dispute resolution/avoidance and other similar activities that have not appeared to yield desired results. Ultimately, the adversarial positioning between general contractor and owner is a feature of a low bid/fixed price delivery and contracting method.
What are RWBC's recommendations to resolve the important trend challenges with the contractor?	RBOC	Ensure that it can process the information received from contractor in a timely manner; maintain WSIP executive focus on issue resolution; and ensure adequate resources are available on owner side to maintain pace of document review and issue resolution.
Did RWBC interview the contractor about 1 and 2 above? What was the result?	RBOC	Yes. No additional information from that contained in report was found: basically general contractor stated that the issues found on CSSA were no different than any other project of such nature.

COMMENT	SOURCE	RWBC RESPONSE
It appears that many issues exist on the project. Why is the contingency recommended at only 5%? How was this amount determined?	RBOC	Estimate to completion is provided for this project including contingency. We believe that the 5% contingency is adequate given reported completion (45%), complexity of work, previously identified trends, pending change orders, and approved change orders. We note that $16M of trends is already included in the forecast and the proposed contingency is above and beyond this value. The 5% was the result of an initial contingency set based on the Construction Cost Engineering Handbook (Patrascu) adjusted for complexity of work, size of project, opportunity for additional unforeseen conditions, opportunity to accelerate work, and working relationship between owner management team and general contractor management team. Regardless of contingency method used, there will always be an opportunity to realized unforeseen costs. Soft costs are accounted in the estimate to completion projection.
Did RWBC discuss and identify possible future trends and risks with the contractor? What was the outcome?		Yes. This was discussed with contractor during interview, but contractor did not provide any information pertaining to project financials or disputed items.
Note that no risks are included in the analysis. Is more funding needed to cover risks?	RBOC	RWBC prepared its own independent estimate of project costs at completion not using risks. This approach mirrors WSIP's approach but was prepared in a manner that is different than that used by WSIP as well as independently of WSIP. Final results show that overall costs forecast by RWBC for the five mega projects were within 3% of WSIP's estimate.
Page 34: item #2, line 3: "side" should be "site"	RBOC	Adjusted
Page 34: item #4, line 1: "that the" should be "an"	RBOC	Adjusted
Page 34: "As of February 25, 2013, this project was shown as 35% completed"	WSIP	No response required
Page 34, We disagree with this statement. The project as of 2/25/12 was 33.76% complete, with $59,171,102.03 earned over a revised contract of $ 175,293,309.	WSIP	2/25/12 data was not used. Reported progress as of 2/26/13 was 66% completed (per 2/25/13 Contract Summary Report - CSSA)
We question the equal rating of a "Somewhat Likely" confidence level that both the CSSA and HTWTP will be completed on time or within budget. Our own assessment and in depth knowledge of both projects indicate that the HTWTP is definitely more likely to be completed as planned. We will provide additional data confirming that assertion in our March 15 comments. RWBC may want to look at the data for these two projects and consider upgrading HTWTP to "Very Likely" (while leaving CSSA the same) or downgrading CSSA to "Unlikely" (while leaving HTWTP the same).	WSIP	RWBC reviewed additional information provided and modified recommendation for CSSA to 'Unlikely'. Project analysis updated to reflect this recommendation.

COMMENT	SOURCE	RWBC RESPONSE
Harry Tracy Water Treatment (Page 37 - 41)		
Page 37: paragraph 1, line 3: "Figure 12" should be "Figure 20"	RBOC	Adjusted
Page 37: (Planned (EARLY) = 1.41, Planned (LATE) = 1.02, ACTUAL = 0.69)."	WSIP	No response required
Page 37: Our calculations yield a different result: Planned Early: 1.30, Planned Late: 0.77, Actual: 0.69	WSIP	Data reviewed: Actual 0.69, Planned Early (used 3/1 as 2/26 is closest to 3/1) Planned early - 1.41, Planned late - 0.81).
Page 38: paragraph 1, last sentence: Please change the reference to correctly refer to Figure 21. It is unclear how the 70% is derived as 3373/4884 = 69% (July) but 3162/4922 = 64% (Sept.) which is the most recent. Please provide clarity.	RBOC	Data revised to 64%
Page 40: item #4, line 2: Please correct the current budget approval value. Figure 25 shows this as $276.9M.	RBOC	Adjusted
What are RWBC's recommendations for resolving the "strained" contractor/CM team relations?	RBOC	We found that WSIP management team has taken proactive steps such as partnering, dispute resolution/avoidance and other similar activities that have not appeared to yield desired results. Ultimately, the adversarial positioning between general contractor and owner is a feature of a low bid/fixed price delivery and contracting method.
It appears that many issues exist on the project that could result in costs or schedule problems. Why is the contingency recommended at only 7.5%? How was this amount determined? (Note: 60% of the work remains with only 50% of the time remaining.)	RBOC	Estimate to completion is provided for this project including contingency. We believe that the 7.5% contingency is adequate given reported completion (34%), complexity of work, previously identified trends, pending change orders, and approved change orders. The 7.5% was the result of an initial contingency set based on the Construction Cost Engineering Handbook (Patrascu) adjusted for complexity of work, size of project, opportunity for additional unforeseen conditions, opportunity to accelerate work, and working relationship between owner management team and general contractor management team. Regardless of contingency method used, there will always be an opportunity to realized unforeseen costs. Soft costs are accounted in the estimate to completion projection. HTWTP contingency was also higher than CSSA given the lower value of trends projected and the high probability of disputed costs/time related impacts (e.g. recovery schedule being developed by contractor as of March 2013).
Did RWBC discuss and identify possible future trends and risks with the contractor? What was the outcome?	RBOC	Yes. No additional information from that contained in current forecasts provided.
Note that no risks are included in the analysis. Is more funding needed to cover risks	RBOC	RWBC analysis was an estimated of total costs for the project. No.

COMMENT	SOURCE	RWBC RESPONSE
New Irvington Tunnel (Page 48 - 50)		
Page 46: paragraph 1, line 2: Please change reference to correctly cite Figure 30.	RBOC	Adjusted
Page 47: "400 days approved under change order #1"	WSIP	No comment required
Page 47: The 400 days of time extension from CO #1 is for the Project and not the Contract.	WSIP	Regardless this time extension affects the contract.
Page 47: Note: Figure 32 skipped in figure numbering sequence.	RBOC	Adjusted
Page 48: #3: The data presented does not seem to reconcile with the CMIS data (January 2013 Contract Summary Report) which indicates the project is tracking 623 days late.	RBOC	Data used to generate this chart was extracted directly from CMIS
Did RWBC discuss and identify possible future trends and risks with the contractor? What was the outcome?	RBOC	Yes. No adjustment to any data presented.
Note that no risks are included in the analysis. Is more funding needed to cover risks?	RBOC	RWBC analysis was an estimate of total costs for the project. No additional costs are to be added to this forecast for risks as risks are reflected in the levels of contingency used for each project.
The project scope is out of date. Suggest using a more current scope from the NIT Fact Sheet or the Notice of Change.	WSIP	N/A - RWBC used data date information. We concur that data has changed since data date however maintenance of data beyond data date is not in scope of our engagement.
Page 42: "As of January 1, 2013 the project is 71.7% completed."	WSIP	Updated as of February 2013 at 77% from CMIS reports
Page 42: We disagree with this statement. The project as of end of December was 72.73% complete, with $ 177,665,415 earned over a revised contract of $244,281,336.	WSIP	No such statement made on our report.
Page 43: paragraph 2, line 1: "few project" should be "few projects"	RBOC	Adjusted
The Project Status section calls out the Vargas Shaft as "Thomas" Shaft at the top of page 43. This should be corrected.	WSIP	Original data extracted from WSIP progress report. Shaft reference adjusted.
The Throughput Analysis section calls out Figure 26 at the top of page 45. It should be corrected to call out Figure 28.	WSIP	Adjusted
BDPL Reliability - Tunnel (Page 50 - 56)		
The calculation of projected construction phase cost on Figure 40 (Budget Forecast BDPL) of $216.3M forecast is underestimated as it was based solely on the main WD-2531 Construction contract with Michels/Jay Dee/Coluccio when in fact, there are other construction costs that are part of the Construction phase. These other costs include, among other things, the fiber-optic installation and construction of facilities by PG&E for the temporary interconnection of the 115KV to the Ravenswood Substation , relocation of the 12KV distribution line for SamTrans power connection (to be paid to SamTrams), service connection of the new valve house by PG&E, JOC contracts for those small jobs that cannot be performed under the main WD-2531	WSIP	Noted.

COMMENT	SOURCE	RWBC RESPONSE
contract, environmental mitigation costs that are not paid by the WD-2531 contract such as the purchase of the burrowing owl credits from conservation or preservation banks, etc.		
When counting all trends RWBC double counted Trend 00001 and Trend 00111 for the Control Building at Ravenswood. This was due to a closed and open trend for the same scope. This was an additional 950K added to trends.	WSIP	This was the purpose of CRR/TRR: to capture all global entries for a given cost element and its ultimate realization of cost. It is intended to capture and provide data of project behaviors not to serve as an accounting tool.
The project has not encountered any major approved COs. There were also some negative ones which resulted in only cumulative value of $8.5K approved vs. $4 Mill Tends as calculated by RWBC, thus resulting in a CRR ratio of 0.0021.	WSIP	Noted.
CRR was calculated based on a percentage of the trends. This should be adjusted taking into account the total trend value. Then we would have a more accurate forecast values for FAC.	WSIP	RWBC believes that using this value more accurately reflects project team's attitude towards a specific trend.
Page. 51: under *"Throughput Analysis BDPL"*, states: "throughput for NIT was 1.37" etc. I believe his should read BDPL not the NIT project; likely this is only a "typo"; it appears that the discussion following that "NAI" nomenclature error, and the Throughput Analysis and graph, Figure 36 – BDPL, are correct for BDPL-Tunnel, however this should be verified.	WSIP	Adjusted.
Page 51: paragraph 2, line 3: Please change reference to correctly cite Figure 36.	RBOC	Adjusted.
Page. 53: under *"CRR Analysis For BDPL"* appears to use data from Exhibit 10 for both calculation of CRR values and to produce the Figure 38 graphic. As a result of limitations inherent to the WSIP CMIS system, Exhibit 10, listing BDPL Trends, contains duplicated Trend Values (value of same Trends listed twice), and includes a grossly incorrect value for Trend 00113. Trends 00001, 00002 and 00003 have been duplicated for values of $950,000.00, $36,000.00, and $37,500.00 respectively. This duplication occurred because a correction in the initial trend procedure for CMIS resulted in the need to revise the initial entry and re-input the same trend, but the initial Trend entry could not be deleted from the CMIS Trend Log. The 00113 Trend of $1,870,000.00 (a somewhat unique situation, not fitting the generic Trend mold) was initially opened, while the trended issue was identified as a major environmental emergency Risk situation, using the initial "Contractor claim notice value", when the issue was initiated as a "Potential Claim" (the Cargill Levee Crossing) from the BDPL-Tunnel Const. Contractor; a precarious situation, not considered in the Risk Register for BDPL-Tunnel, that the PCM did not want to undervalue until the extent of the Risk was further understood. The Trend Value was soon after reduced to $540,000; and has been negotiated for resolution at a potential CO settlement (CO not yet certified) of $73,314.00. Trend 00113 of Exhibit 10 should be $540,000.00 not $1,860,000.00; use of the $1,860,000.00 value results in a gross misstatement of Trend value summary used in evaluation calculations rendering the evaluation moot.	WSIP	The purpose of CRR/TRR is to capture book ends of performance. The whole purpose is to capture most extreme data points and how they are converted into realized costs. CRR/TRR were not intended to evaluate how the same trend changed over time as this would entail a different analysis for a different purpose.

COMMENT	SOURCE	RWBC RESPONSE
These 3 duplication corrections, and the adjustment for the incorrect value of Trend 00113, result in a cumulative total Trend Value of $1,666,075.00, not $4,016,575.00 used to calculate CRR and for Figures 38 and 39 graphics; the cumulative Trend Value of $1,666,075.00 should be used for BDPL CRR evaluation.		
Page. 53: *"CRR Analysis For BDPL"*; Do the two curves of Figure 38 align, over time, correctly? Noting that "Issue", or CO resolutions, always lag initiation of the related Trend (trended issues ultimately resolved by Change Order or dropped entirely), it is not clear in Figure 38 that the plot of Cumulative Expected Trend Value is "synchronized", or "indexed" to the same time period, or data date, with the Cumulative CO Value: i. e.; the Cumulative Trend Value curve may, at any given data date along the graph, include trended issues that remain unresolved as Change Orders (or dismissed at no change or cost), that are, at that given data date, yet to be resolved. Do the two curves of Figure 38 align over time correctly?	WSIP	The curves for this project are based on CMIS data. Curves are intended to provide book ends of cost (bookends between least defined and final costs, realized as change orders).
Page 55: item #3: This type of analysis (plotting the CRR) should be performed on other projects in construction to identify where cost savings may be obtained for the realignment.	RBOC	No response required
Page 55: item #4: Recalculate Variance (also in Figure 41) per the following two corrections noted for Figure 40:	RBOC	Adjusted.
a. Incorrect number for Construction Management. The number provided is the Q1 forecast - the Q2 value is $26,447,000.	RBOC	Adjusted.
b. The Current Approved Budget for BDPL (Tunnel) is $307,081,000.	RBOC	Note.
Did RWBC discuss and identify possible future trends and risks with the contractor? What was the outcome?	RBOC	Yes. No adjustments to existing data.
Note that no risks are included in the analysis. Is more funding needed to cover risks?	RBOC	RWBC analysis was an estimated of total costs for the project. No additional costs are to be added to this forecast for risks as risks are reflected in the levels of contingency used for each project.
Page 51: paragraph 1, lines 10 and 11: "TBD" should be "TBM"	RBOC	Adjusted.
Page 56: paragraph 2, line 8: "to" should be "of"	RBOC	Adjusted.
Project Comparison - 5 Projects (Page 56)		
Paragraph 2, Item 3: The WSIP has been designed to meet specific level of service (LOS) goals as adopted by the Commission. A complete evaluation of the impact on the SFPUC's ability to meet the LOS goals would be necessary as part of any de-scoping activity.	RBOC	Noted
Paragraph 2, last sentence: BAWSCA agrees that the next realignment should go to this level of detail (and also accounting for risks in some way) in creating the cost to complete.	RBOC	Noted. Independent calculation of contingency can achieve a validation of risk / Monte Carlo calculations as was done by RWBC in this engagement.
Fig. 41 presents contingency elements for each of the 5 projects evaluated. It is unclear what protocol and metric RWBD used to establish contingency levels for each of the	RBOC	See footnote #16 of report.

COMMENT	SOURCE	RWBC RESPONSE
projects. This should be clarified in the report.		
Fig. 41 shows the 5 project budget deficit of $51M which does not include risks. How much money should be added for risks?	RBOC	None as RWBC used contingency to calculate costs above and beyond trends (equivalent of risks).
What is the projected deficit for the entire WSIP based on the extrapolated formula data? This level of information should be provided as part of the upcoming rebaselining effort.	RBOC	This calculation is outside of RWBC scope for this engagement. RWBC did update the likelihood range that WSIP would finish on time and budget in the Executive Summary.
Use of Risks to Forecast Budget Exposure (Page 57 - 58)		
What are RWBC's recommendations to clarify how risks might be quantified for use in the WSIP program cost and schedule? It appears some allowance is needed to be more accurate about cost and schedule estimates at finish.	RBOC	Suggest that more clarity be provided of what the results mean for the Monte Carlo simulations. It is also important to understand the limitations of Monte Carlo especially on the quality and independency of inputs that may skew output data and how such limitations are dealt with in the modeling effort.
Did RWBC review the risk list for possible cost and schedule impacts?	RBOC	Yes. Reference each project analysis performed.
In RWBC's opinion, what level of risks (likelihood of occurrence or cost impact) should be considered for contingency funding set-aside?	RBOC	This calculation was provided for each project in the applicable section of report.
Figure 42, HTWTP Variance: Please correct the value to -0.13 per Figure 41.	RBOC	Adjusted
Soft Costs (Page 59 - 63)		
Page. 60: *"Figure 43-Soft Cost Analysis Task A Projects"*, under Soft Costs/Construction (Forecast); as it relates to the Task A evaluation; my review of the calculations, tables and projections of the Full time Equivalent (FTEs as defined on Page 5) for Consultant Costs, when compared to our current budget for BDPL-Tunnel Consultant Services, Contract CS-913, and assessing that the BDPL CM budget has been included as the larger cost component of the Consultant Costs; it appears that the CS-913 budget to complete BDPL-Tunnel may have been "miss-evaluated", possibly using a Sept. 2012 CS-913 budget that had not been revised to reflect the very early completion of the BDPL tunnel excavation to "hole-thru, 8 mos. early: As an example, it appears when the RWBC numbers are evaluated as reflected in Figure 43 (and other soft cost calculations and figures) that the "Provisional Sum" of $2,488,669.00 in the CS-913, BDPL-Tunnel, budget, that has not, and will not, be released nor expended under a CM Work Task Order, has been included in the cost totals used for evaluation tables and conclusions. Completion of the BDPL tunnel (78% of the total $215+mm BDPL Const. Contract value, based on	WSIP	No response required. This is a statement made by WSIP management.

COMMENT	SOURCE	RWBC RESPONSE
earned value) approximately 8 mos. early, could not be assured until it was completed (Jan. 11, 2013), thus the CS-913 BDPL CM services budget could not be re-evaluated until that time (the time when all potential tunneling schedule Risks had been overcome).		
A prediction of Soft Costs to complete the BDPL-Tunnel cannot be accurately effective as a WSIP management tool unless this "early completion" schedule, perhaps 365 days earlier than the 1857 contract period date (as much as 20% early) is considered. This probability must be included as an important element of a report to RBOC. (See Reference No. 5 Tab)	WSIP	Noted.
A prediction of Soft Costs to complete the BDPL-Tunnel cannot be accurately effective as a WSIP management tool unless this "early completion" schedule, perhaps 365 days earlier than the 1857 contract period date (as much as 20% early) is considered. This probability must be included as an important element of a report to RBOC. (See Reference No. 5 Tab)	WSIP	Noted.
Page 60: #1, and #3: There are references that using internal staffing "should" be less expensive than using consultants. Did RWBC verify that there would be an actual cost reduction after all overhead and other indirect costs are accounted for on SFPUC labor costs? How much would the saving be?	RBOC	RWBC's scope did not entail a detailed review of multipliers and this information was not readily available in a manner that would allow for a detailed review. RWBC noted that it is an area of study worth pursuing given the existing of follow-on programs where internal staff can be leveraged and where program management resources within SFPUC can be retained in-house.
Is the $282,000 annual cost for the SFPUC FTE fully loaded with overhead and all indirect costs?	RBOC	It is the average annual labor rate assigned to a generic full time equivalent position.
Page 61: #5: BAWSCA agrees with this concept in general however it would be important for the pros and cons of such a proposal were presented as the rationale supporting such an action. What work efficiencies or quality would be lost by eliminating regional oversight? Perhaps the projects that are less than 50% complete would be the best candidates to obtain savings from this approach (Calaveras & HTWTP, and maybe CSSA if its schedule gets significantly extended).	RBOC	Noted.
What work efficiencies or quality would be lost by eliminating the [regional] program management function?	RBOC	Potential loss of knowledge of project histories/issue history, less resources to address construction issues.
RWBC's soft cost evaluation going forward is based on soft cost rates expended on WSIP completed work. There is no determination whether the costs were too high or too low to effectively do the job, or any comparison to industry norms. Nor did RWBC do an independent analysis of how much soft cost RWBC believes is necessary to complete the work. This analysis would be very helpful in establishing a soft cost budget going forward rather than just relying on old soft cost expenditure trends.	RBOC	Independent analysis of soft costs is not part of RWBC engagement scope. RWBC provides recommendations on improving (lowering) soft costs in the applicable section pertaining to Soft Costs - Task B.

COMMENT	SOURCE	RWBC RESPONSE
WSIP program soft costs are programmed at about 45% of construction costs. This seems very high. What is RWBC opinion?	RBOC	WSIP program delivery costs include a wide range of elements including design (all phases), environmental, construction management, project management, department staff, and legal costs to name a few. Budgeted approvals for soft costs (12/31/12) show that the ratio of soft costs to construction costs is 37.3% ($864 M budgeted program delivery costs/$2,315.3 M construction costs). Performance to date for this same ratio is 48% which would appear high ($677M program deliver costs/$1,397M construction cost expended through 12/31/12). Reference Figures 43, 44, and 45 in report for additional information.
Page 62: item #1: "be a value"	RBOC	Noted.
The SFPUC does not agree with the recommendation that the SFPUC should consider development of a soft cost staffing model that is bottoms up using actual costs for each staff. The WSIP Team does use extensive bottoms up estimates with actual costs to forecast all soft costs. RWBC is now reviewing the bottoms up estimates used to forecast all project/program soft costs, which should result in a change of that recommendation.	WSIP	RWBC recommends that an independent bottom up analysis be prepared to compare against WSIP's bottoms up analysis so that both reasonability and rate of ramp down can be validated. It is RWBC's opinion that no comparable benchmarks exist for program delivery costs as structured by WSIP are available (all owners select an agreed upon structure and deliver using that structure). The use of benchmarks introduces biases, creates expectations on delivery costs that may not be applicable, and may not yield intended results. The preparation of an independent bottom up analysis if within a 10% value of that prepared by WSIP management team will provide the most meaningful validation of this value.
A recommendation is made to evaluate opportunities to transfer work currently performed by Consultants to City staff. The SFPUC is proactively pursuing that approach but one needs to understand that this may not lead to significant savings given that in general the SFPUC's multiplier is higher than that of consultants.	WSIP	Noted

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