



VoteCal
Statewide Voter Registration System
Project
Quality Management Plan

April 30, 2010

V1.0

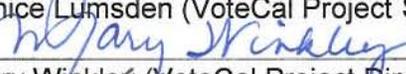
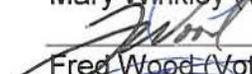
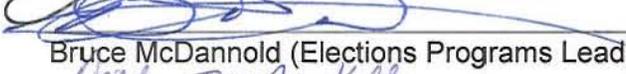
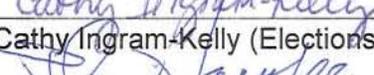
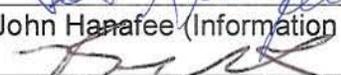
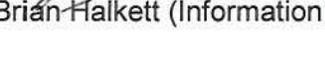
VoteCal Quality Management Plan

Revision History

VRSN	DATE	OWNER	SUMMARY OF CHANGES
0.1	10/15/09	Nishant Agrawal	Initial Draft
0.2	12/04/09	Nishant Agrawal	Updated draft after review
0.3	12/22/09	Pooja Deshmukh	Updated draft (0.2) with comments from independent verification and validation (IV&V) consultant and self.
0.4.1	01/07/10	Pooja Deshmukh	Updated draft (0.3) with comments from Project Manager and IV&V.
0.5	01/08/10	Pooja Deshmukh	Updated draft (0.4) with comments from IV&V.
0.6	01/16/10	Pooja Deshmukh	Updated draft (0.5) to include more metrics for Secretary of State (SOS) per project phase.
0.7	01/18/10	Pooja Deshmukh	IV&V comments from Feb 18 th incorporated in draft version (0.6)
0.8	4/16/10	Chris Moore Jaime E. Soto Steve Turtleaub	Separates Acceptance Test Plan (ATP) ¹ from this Quality Management Plan (QMP); incorporates Project Management Body of Knowledge (PMBOK), independent project oversight consultant (IPOC) and IV&V recommendations; refines standards; adds processes and checklists; coordinates Appendix A, Metrics, under separate cover.
0.9	4/23/10	Chris Moore	Incorporated changes to QMP and Appendix A
1.0	4/30/10	Chris Moore	Final

Approval Signatures

Project: VoteCal Statewide Voter Registration System **Document:** Quality Management Plan (QMP)

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	4/13/2010
Brian Halkett (Information Technology Lead)	Date

¹ Acceptance Test Plan (ATP) material removed from v0.7 is included the DRAFT ATP v0.1

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Quality: The degree to which a set of inherent characteristics fulfill requirements.²

1. INTRODUCTION

Project Quality Management (QM) describes the processes involved in planning for, monitoring, controlling, and assuring that the quality requirements of the VoteCal project (VoteCal, the Project) are achieved. High level processes include plan quality, perform quality assurance and perform quality control.

Managing VoteCal includes balancing the competing project constraints, including but not limited to scope, quality, schedule, budget, resources, and risk—for the Project to be successful, the project team must balance these competing demands. VoteCal success is measured by product and project quality, timeliness, budget compliance, and degree of customer satisfaction.

Project QM addresses the management of the project and the product of the project. Product quality measures and techniques are specific to the type of product (VoteCal system including hardware, software, documents, etc.) produced by the project. While QM of software products uses different approaches and measures than building a nuclear power plant, project QM approaches apply to both. In either case, failure to meet product or project quality requirements can have serious negative consequences for any or all of the project's stakeholders. For example, meeting customer requirements by overworking the project team may result in increased employee attrition, errors, or rework; meeting project schedule objectives by rushing planned quality inspections—or software testing—may result in undetected errors.

SOS' enterprise environmental factors include but are not limited to government (US Department of Justice, USDOJ; and SOS) standards (e.g., regulatory agency regulations, codes of conduct, product standards, quality standards, and workmanship standards). SOS' organizational processes and procedures for conducting work include but are not limited to:

- organizational standard processes such as standards, policies (e.g., safety and health policy, ethics policy, and project management policy), standard product and project life cycles, and quality policies and procedures (e.g., process audits, improvement targets, checklists, and standardized process definitions for use in the organization);
- standardized guidelines, work instructions, proposal evaluation criteria, and performance measurement criteria; templates, guidelines and criteria for tailoring the organization's set of standard processes to satisfy the specific needs of the project; organization communications requirements;
- project closure guidelines or requirements (e.g., final project audits, project evaluations, product validations, and acceptance criteria); financial controls procedures;
- issue and defect management procedures defining issue and defect controls, issue and defect identification and resolution, and action item tracking; change control procedures; risk control procedures; and work authorization procedures.

² PMBoK, Fourth Edition, glossary

1.1. Purpose

The purpose of this Quality Management Plan (QMP, the Plan) is to provide support for Secretary of State's (SOS) commitment to process improvement and quality with quality controls specific to VoteCal. This plan provides a mechanism to provide direction for quality management activities and to communicate performance expectations among SOS' team, the system integration vendor's team (SI), the counties' election management system vendors (EMS) and State oversight organizations. Project QM includes the processes and activities of the VoteCal Team (all participants) that determine quality policies, objectives, and responsibilities so that the Project will satisfy the needs for which it was undertaken, that is, to assure California's compliance with the Help America Vote Act (HAVA). It implements the quality management system (QMS) through policy and procedures with continuous process improvement (CPI) activities conducted throughout, as appropriate. The purpose of project QM is to provide a framework to establish what criteria define satisfactory project processes (project management and software development) and products (deliverables). Quality management also specifies processes and criteria to assess these processes and products during execution of VoteCal. The sections below address VoteCal's QM methodology and approach.

1.2. Background

Section 303 of the Help America Vote Act of 2002 (HAVA) (Public Law 107-22, 107th Congress) mandates that each state implement a uniform, centralized, interactive, computerized voter registration database that is defined, maintained and administered at the state level. This database must contain the name and registration information of every legally registered active or inactive voter in the state. This system will constitute the official record of all registered voters. Unlike the state's current system, the state database must serve as the single system for storing and managing the official list of registered voters in the state. This system must provide a functional interface for counties, which are charged with the actual conduct of elections, to access and update the registration data. Additionally, HAVA mandates the voter registration system coordinate electronically with the DMV, DHS and CDCR for identification and list maintenance purposes. The current system known as Calvoter was augmented during late 2005 with the development of a series of external automated processes. These processes, known collectively as the interim enhancements, were added to achieve an interim level of compliance as required by agreement with the United States Department of Justice to avoid threatened litigation for the state's potential failure to meet HAVA voter registration database requirements by the statutory January 1, 2006 deadline. Although the interim enhancements were completed within the required timeframe the system continues to present a number of business problems that prevent SOS from meeting HAVA requirements. These problems include the inability to meet HAVA general system requirements, list maintenance requirements, or registrant data verification requirements. The existing system also has several technical issues that must be addressed. The new VoteCal system will address all these issues, allowing California to comply with HAVA general system requirements.

1.3. VoteCal Quality Policy

Do the right thing, right, the first time!

1.3.1. SOS Information Technology Division's Vision

"As information technology leaders, we provide exceptional customer service by developing and maintaining innovative solutions which enable customer access to information and increase citizen confidence in our government."

***Our Mission:** "To deliver information services and ensure data integrity by providing technical guidance to implement automated business solutions in partnership with our customers."*

1.3.2. SOS' Guiding Principles for the VoteCal Project, March 6, 2009

Guiding Principles – in order of priority

- A. Uniform implementation of voter registration laws ("Meet HAVA requirements").*
- B. Maximize ability to receive, maintain and provide current, accurate and complete voter registration data.*
- C. Reduce total spending regardless of the funding source (i.e., HAVA, General Fund, county funding).*
- D. Minimize technological risk*
- E. Should the VoteCal EMS be implemented, counties should have a financial investment in the success of the overall project.*

1.4. VoteCal Quality Management³

To ensure VoteCal meets identified business and technical objectives and requirements, the SOS has developed initial quality assurance (QA) and risk management plans based on the Information Technology Project Oversight Framework (ITPOF) Project Management Methodology⁴. These plans will be integrated with the SI vendor's plans to establish the overall VoteCal quality approach. The SOS's plans have the following elements:

- Measurable objectives and functional requirements
- Acceptance testing plan
- Regularly scheduled audits/reviews of key tasks
- Identification of QA responsibility within the Executive Steering Committee (ESC)
- Use of project oversight and independent verification and validation (IV&V) services

NOTE: the SI vendor is also tasked with developing a QMP as defined below. The SI vendor's QMP addresses their quality management lifecycle by describing the specific activities, metrics, and standards to measure VoteCal quality.

³ Special Project Report for State of California Provided by Secretary of State, VoteCal Project, June 23, 2009; para 4.7, Project Quality

⁴ Required by DOF and/or OCIO

Exhibit 4-6: Quality Management Lifecycle⁵



Specifically, the Quality Management phases are:

- Define quality metrics and standards – identifies which quality standards the team will use to measure quality.
- Conduct quality assurance – defines the processes that the team will evaluate on a regular basis to provide confidence that the team follows the project processes.
- Perform quality control– describes the specific measurements that the team will evaluate to determine that project results comply with the relevant quality standards.

The VoteCal Project Management Team will perform or facilitate VoteCal Project QA activities. In addition, as mentioned previously, the QA and QC activities of the VoteCal Project team will be planned and coordinated with the IV&V vendor.

Quality management/assurance is the application of operational techniques and activities to evaluate both processes and products and to eliminate causes of unsatisfactory performance at relevant stages of deliverable production. These quality management processes are used to identify the project’s quality requirements early in the project life cycle and to put the plans and processes in place to ensure that the system solution meets or exceeds SOS’ expectations.

1.5. Document Overview

The VoteCal QMP contains the following sections:

[Section 1.0: Introduction](#) – This section contains an introduction, VoteCal background, the QMP’s purpose, quality policy, and this document overview

[Section 2.0: Roles and Responsibilities](#) – This section summarizes the quality roles and responsibilities of the individuals and teams throughout the Project.

[Section 3.0: Quality Management Approach and Processes](#) – This section contains descriptions and examples of the quality activities for VoteCal. These address but are not limited to the Project’s approach, requirements, standards and guidelines, process descriptions, document management, metrics, and checklists.

[Appendices](#) – Appendices either supplement discussions or provide detail for quality activities including metrics, checklists, corrective action, continuous improvement, and document updates.

⁵ Deliverable 1.3 Quality Assurance Plan v2.1

2. QUALITY MANAGEMENT ROLES AND RESPONSIBILITIES

The VoteCal Quality Assurance Manager (QAM) is responsible and accountable for product and process quality throughout all phases of the Project.

The following descriptions detail project and quality management roles and responsibilities and how VoteCal's stakeholders will be organized to facilitate participation and effective tracking and reporting of Project activities.

2.1. Project Sponsor

The Project Sponsor provides policy leadership and oversight as needed and, as such, is the Chair of the Executive Steering Committee (ESC). The Project Sponsor is responsible for assuring that adequate resources are made available to SOS' project team for successful completion of the Project. The Project Sponsor is also an advocate for VoteCal within the SOS's office. The Project Sponsor resolves issues raised by the Project Director that requires the development or change of SOS policies vis-à-vis VoteCal or that cannot be resolved at a lower level.

- The VoteCal Project Sponsor is responsible for providing the Project with SOS' operational and policy priorities, receiving escalated quality issues from the VoteCal Project Director, and working with the VoteCal Project Director to determine the response to those escalated quality issues.
- The VoteCal Project Sponsor will determine when a quality issue should be elevated to the ESC.

2.2. Executive Steering Committee

The ESC is responsible for oversight of VoteCal, ensuring that deliverables and functionality as defined in the Feasibility Study Report (FSR) and subsequent Special Project Report (SPR) are achieved. The ESC addresses project issues that change the scope, budget, or schedule by ten percent (10%) or more. The ESC also addresses policy, legal and highly sensitive issues. The ESC has oversight responsibility of VoteCal and establishes the priorities between scope, budget, schedule, quality, risk and resources. The ESC is an advocate for VoteCal with external stakeholders and within the SOS' office.

- **The ESC is responsible for reviewing and responding to escalated project quality issues at the VoteCal Project Sponsor's request;**
- The ESC comprises SOS senior management and is chaired by the VoteCal Project Sponsor.

2.3. Project Director

The Project Director is responsible for the overall success of VoteCal and operational direction of project activities. This individual will lead the project management team and have decision-making authority related to PM decisions, and ensures that PM practices are employed appropriately. The Project Director is also responsible for working with control agencies (CA Department of Finance, DOF) and the Legislature to secure support for the Project. The SOS staff responsible for budget and contract management will report directly to the Project Director. The Project Director has responsibility for approving invoices.

- The VoteCal Project Director prioritizes project processes and products to be reviewed.
- The VoteCal Project Director is responsible for addressing critical quality findings and recommendations assuring that quality issues are resolved by responsible stakeholders

2.4. Project Management Team

The PM team (Core Team) is comprised of the VoteCal Project Director, Project Manager, two staff from the Elections Division, and two staff from the Information Technology Division (ITD). The Core Team plans, directs, and oversees the day-to-day activities of SOS' Elections and ITD staff. Additionally, this team serves as the principal interface with the VoteCal SI vendor, responds to change requests as the Change Control Board (CCB), and coordinates VoteCal activities. A dedicated Project Administrator supports this team.

2.5. Project Manager

The PM contractor is responsible for undertaking all activities related to the management of a large systems integration project including the development of all project management plans and overseeing the implementation of those plans. The SOS has contracted for PM services throughout the life of the Project. Since the PM is a contractor, the PM does not have responsibility for approving invoices or overseeing contracts.

- The VoteCal PM has ultimate responsibility for ensuring quality is managed within the constraints of the Project (scope, budget, schedule, risk and resources).
- The VoteCal Project Manager is the initial point of contact for quality assurance (QA) regarding the Project.
- When a quality risk or issue arises, it will be immediately reported to the VoteCal PM. Escalation of unresolved quality issues is the responsibility of the VoteCal PM.
- The VoteCal PM works with the VoteCal Quality Assurance Manager (QAM) to determine processes and products to be reviewed as prioritized by the Project Director.
- The PM receives quality status from the QAM via audit reports, informal weekly (verbal) and formal monthly (written) status reports, and regular meetings.

2.6. Contract Manager

The Contract Manager is responsible for ensuring the terms and conditions of the contract are met by each prime contractor. If the Contract Manager identifies a discrepancy, the Contract Manager will bring it to the attention of the Project Director, to whom the Contract Manager reports.

NOTE: This QMP and QA activities are supplemented through the collaborative use of project oversight (IPOC) and independent verification and validation (IV&V) services described below.

2.7. Independent Project Oversight Consultant

The IPOC contractor reports to the Project Sponsor and DOF, and provides project oversight and reporting per DOF's requirements. The IPOC is responsible for employing oversight and audit activities that make the Project Sponsor, Project Director and Project Manager aware of project management best practices, and encourages employment of these practices through meetings and oversight reports. The IPOC will also provide insight on best practices in quality management employed on other large, State information technology (IT) and systems integration (SI) projects.

2.8. Independent Verification and Validation

The IV&V contractor reviews technical deliverables and audits deliverables against requirements. The IV&V reports to the Project Director and is responsible for requirements traceability and software product quality throughout the software development life cycle (SDLC). The IV&V provides verification and validation of both SOS' and the SI vendor's QA. The IV&V standard, IEEE 1012-2004, Verification and Validation, mandates coordination of V&V results with the developer (SI vendor) and other SDLC quality management participants such as SOS' and the SI vendor's QA, quality control (QC), testing and software configuration management (SCM).

2.9. SI Vendor's Quality Manager

The SI vendor's QA/QC staff are required to manage their team's quality activities and:

- Support SOS' QAM by providing relevant quality records and metrics for the SI vendor's SI vendor's processes and products.
- Support quality audits and assessments of the SI vendor's processes and work products undertaken by SOS' QAM, IV&V and IPOC.

2.10. VoteCal Project Staff

All members of VoteCal Team are responsible for quality. They are expected to be knowledgeable on processes defined in project planning documents and to apply those processes and standards in the performance of their assigned tasks.

2.11. VoteCal Quality Assurance Manager⁶

The SOS' QA contractor develops and maintains project QM processes and plans, and **provides overall management of quality-associated work** to assure that the deliverables of VoteCal meet functional and technical requirements and achieve superior quality and reliability levels. The QAM will provide guidance and direction to the Acceptance Test Lead (ATL) to ensure SOS' acceptance and user acceptance testing (UAT) are consistent with project quality expectations. The QAM also works collaboratively with IV&V and IPOC and will **use project oversight or IV&V services as required**, and the SOS business and technical leads to ensure the VoteCal solution developed by the SI vendor meets SOS' quality expectations for build, test, and implementation. The QAM reports daily to the VoteCal Project Manager. Quality management services are required and planned for VoteCal through June 2012. The QAM produces named deliverables at a fixed price and provides services as needed on an hourly (time and materials, T&M) basis. The QAM establishes, maintains, and oversees QM processes and actions consistent with the VoteCal Quality Management Plan (QMP). The VoteCal quality actions consist of standards, guidelines, metrics, reviews, checklists, tools, and oversight.

⁶ RFO-ITD #09-028 VoteCal Quality Assurance Manager

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The QAM manages the QM tasks identified below to assure defined project quality processes and standards are consistently applied to the development and implementation of SOS' and the SI vendor's deliverables. The QAM is on-site during project working hours unless otherwise approved by the VoteCal Project Manager. Changes to contract scope and direction will also require VoteCal Project Director's approval. The VoteCal activities in the table below require the QAM to provide both time and materials and fixed price services.

NOTE: to capture all contract guidance, the Tasks are numbered as and begin with text from the RFO Exhibit C, Cost Worksheet, followed by the text from Exhibit B, Contractor Tasks, Activities and Deliverables (unless the two texts are nearly verbatim); Responsibilities text comes from Exhibit A, Scope of Work, para 4.0, Contractor's Responsibilities.

Table 2.11, VoteCal Quality Assurance Manager Roles and Responsibilities

QAM TASKS, ACTIVITIES AND DELIVERABLES	QAM RESPONSIBILITIES
<p>Task 1.1 Monitor project processes for compliance with SOS Quality Management Plan and report findings and recommendations on a flow basis to the VoteCal Project Manager.</p>	<p>Responsibility 4. Provide input to the project team about incorporation of quality standards and practices into daily activities and in-progress deliverables.</p> <p>Responsibility 6. Monitor designated project processes and deliverables for compliance with quality standards.</p> <p>Responsibility 8. Undertake quality audits to determine corrective action when observable practices or declining deliverable quality warrants.</p>
<p>Task 1.2. Collect and analyze metric data. Report finding and recommendations to PM. Collect and analyze performance metrics. Report finding and recommendations on a flow basis to the VoteCal Project Manager.</p>	<p>Responsibility 3. Develop performance metrics and targets for QMP-named project management and software development processes and deliverables based on industry best practices.</p> <p>Responsibility 7. Collect and analyze performance data on all work products to measure conformity to adopted standards. Report findings and recommendations to the VoteCal Project Manager.</p>
<p>Task 1.3. Participate in the review of DEDs for SI Vendor Deliverables to ensure incorporation of quality standards and metrics.</p>	<p>Responsibility 5. Provide input on conformance to quality standards at major design reviews.</p>
<p>Task 1.4. Monitor SI Vendor Quality Standards.</p> <p>Task 1.4.1. Monitor and report on quality of SI vendor deliverables. Monitor and report on the incorporation of defined quality standards into these designated SI vendor deliverables for Phase II Design, through Phase VI Deployment and Cutover.</p>	<p>Responsibility 9. Participate in systems integration vendor and EMS vendor deliverables evaluation and report deliverable quality status to the Project Manager prior to approval for formal release to the next phase of development or to the production environment.</p> <p>Responsibility 13. Provide knowledge transfer to the Senior Program Analyst (SPA) regarding quality and performance evaluation techniques for the project deliverables the SPA will be involved in (e.g., code reviews, design reviews, audits etc.).</p> <p>Responsibility 14. Partner with SOS and vendor staff assigned to deliver state and county training to ensure quality measures are defined for and quality factors are built into project training components.</p> <p>Responsibility 15. Provide input on critical success factors for state-wide/multi-county roll-outs, including user preparation for installation of new systems.</p>
<p>Task 1.4.2. Coordinate quality audits and prepare Audit Review Reports. Coordinate quality audits of the SI vendor deliverables when product quality warrants, and prepare and deliver Audit Review Reports per IEEE 1028-2008 or equivalent methodology.</p>	<p>Approach: This task is executed upon specific guidance from the Project Director. Normally, IV&V performs quality reviews as a part of executing IV&V review procedures on deliverables. The Project Director will decide when a Quality Audit by the QAM is warranted.</p>
<p>Task 1.5. Meet with SI vendor technical staff as needed to resolve quality management concerns.</p>	<p>Responsibility 16. Liaise as necessary with county, SI and EMS vendor and external interface agency quality management representatives.</p>

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QAM TASKS, ACTIVITIES AND DELIVERABLES	QAM RESPONSIBILITIES
<p>Task 1.6. Monitor pilot test results and report on outcomes and error correction. Monitor pilot test results for consistency with quality expectations; collect and report on pilot test metrics and provide a written report on quality measures for the test process and outcomes, including the need for and the approach to error correction.</p>	<p>Responsibility 12. Partner with the SOS Acceptance Test Lead consultant and the project's IV&V consultants to ensure project-specific quality processes for testing are applied to produce confirmation of solution readiness for production deployment.</p>
<p>Task 1.7. Monitor corrective actions under CCB control; assist with change analysis if requested. Support the project's change control processes by providing input on quality metrics for individual corrective actions. At the request of the PM, assist with analysis for proposed changes.</p>	<p>Responsibility 10. Conduct analyses as needed to support change requests as these impact quality standards or criteria for specific deliverables.</p>
<p>Task 1.8. Participate in monthly issue management meetings as requested. Meetings normally held once per month for two hours.</p>	
<p>Task 1.9. Collaborate with IV&V consultants to ensure the UAT consultant and the SOS Senior Programmer Analyst are versed in quality standards and metrics relevant to their respective positions and tasks.</p>	<p>Approach: The acceptance test consultant RFO has not been finalized. The anticipated approach to Task 8 will be to meet with the AT Consultant, SOS Senior Programmer, QAM and IV&V to verify roles and responsibilities for all testing activities. Primary responsibilities include: all parties evaluate the Unit, System, Integration Testing, End to End Testing and Performance Testing performed by the SI. AT and Senior Programmer validate the testing scripts and Scenarios, QAM the approach per Quality Standards and IV&V per defined procedures per 1012-2004; AT consultant and Senior Programmer develop Acceptance Test Plan, Scripts and scenarios; QAM validate use of quality standards and approach to testing; IV&V validate test planning methodology, scripts and scenarios; and all members of group assist in execution of testing.</p>
<p>Task 1.10 As directed by the Project Manager, provide quality assurance training to the VoteCal project team.</p>	<p>Approach: The QAM will be available to conduct training on all topics within this QMP, with emphasis on Section 3, Quality Management Approach and Processes—particularly para 3.6, Metrics, and sub-para 3.6.1, Tools—and Appendix D, Continuous Improvement.</p>
<p>Task 1.11. Confirm technical deliverables are maintained under configuration management and that all change records for accepted deliverables are complete and up to date. Confirm with the SI vendor that each SOS-accepted technical deliverable (including source code, compiled code, documentation, hardware and software configurations) is under configuration management and that all change records for accepted deliverables are complete and up to date. Repeat confirmation as changes are made or at least at the end of each project phase. Report configuration management anomalies to the VoteCal Project Manager.</p>	<p>Approach: The QAM will validate that the SI vendor is following its approved Configuration Management Plan, while meeting the requirements of SOS' Configuration Management Plan and policies.</p>
<p>Task 1.12. Unanticipated Tasks – Vendors will include a task for unanticipated needs in quality reviews that is 10% of the total contract hours bid (10% level of effort, LOE).</p>	<p>Responsibility 17. Perform quality related ad hoc analyses as negotiated with the Project Manager and approved by the Project Director.</p>
<p>Deliverable 2.1. Review and refine and maintain the VoteCal Quality Management Plan. Review, refine and revise the VoteCal Quality Management Plan (QMP) to fully define quality processes and performance metrics for all project activities and deliverables named in the plan. Maintain the QMP by providing updates at least at the end of each project phase.</p>	<p>Responsibility 1. Develop the project's quality standards and provide overall direction and focus to the incorporation of these standards into the VoteCal Project. Responsibility 2. Refine and maintain the SOS Quality Management Plan (QMP) and associated task schedule.</p>

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QAM TASKS, ACTIVITIES AND DELIVERABLES	QAM RESPONSIBILITIES
<p>Deliverable 2.2 Provide a Quality Management Status Report monthly. Produce a Monthly Status Report containing:</p> <ul style="list-style-type: none">A. Activities in progress and/or completed during the month.B. Summary of quality evaluation and recommendations related to system testing, acceptance testing, or pilot deployment delivered throughout the month.C. Status of quality management monitoring of project management and systems development processes.	<p>Responsibility 11. Maintain records of quality compliance and provide reports on quality measures at intervals determined by the Project Manager, but not less than monthly.</p>

2.12. VoteCal Acceptance Test Lead

NOTE: SOS is developing an RFO for User Acceptance Testing Contract Services. This information is tentative but provides insight into the roles and responsibilities of the Acceptance Test Lead (ATL) and the contractor's team.

The ATL will be expected to work collaboratively with the QAM, IV&V and SOS' business and technical leads to ensure the VoteCal solution developed by the SI vendor meets SOS' quality, technical and functional expectations. The ATL will also establish effective working relationships with county elections offices involved in UAT and with elections management systems vendors (EMS) to ensure their products conform to VoteCal specifications. The ATL will report daily to the VoteCal Project Manager with the guidance of the QAM and IV&V. Applications testing services may be required for VoteCal through June 2012 with most tasks falling in the 2010-2011 fiscal year. The ATL will manage the VoteCal acceptance tests including developing the acceptance test management plan (ATP), developing test scripts and procedures, estimating the test effort, providing testers, training contract and county testers (if needed), monitoring test execution, accumulating test results, and reporting test status. The ATL will also ensure testing is executed consistent with VoteCal's quality standards. The ATL will provide both time and materials and fixed price services. The ATL will be on-site during project working hours unless otherwise approved by the VoteCal Project Manager.

2.13. Quality Management and Assurance Collaboration

To improve efficiency (reduce duplication of effort) and effectiveness (assure all areas are reviewed), requires collaboration across VoteCal's teams. For example, the QAM and ATL are required by contract to collaborate with IV&V. The table below captures this collaboration.

Pooja – R&Rs overlap. Need to resolve through forthcoming matrix analysis.

Table 2.13, Roles and Responsibilities for Quality Management

WORK PRODUCT	IPOC	IV&V	SOS QAM	SOS ATL	SI VENDORS/ SI VENDOR QA	SI VENDOR TEST LEAD	EMS VENDORS ⁷
Tasks and Reporting per CA State Information Management Manual 2004 ⁸	R&R F&R	R&R F&R	Audits F&R CAP	Implement CAP	Implement CAP	Implement CAP	Implement CAP
Project Management Plans	R&R		R&C				SpC
Quality Management Plan	R&R		√		Support		SpC
Non-technical Deliverables			R&C		√		SpC
Technical Deliverables		R&C		R&C	R&C	√	SpC
UAT Plan		R&C		√	R&C	Support	SpC
SI vendor QA Plan			R&C				SpC
SI vendor Test Plan				R&C	√		SpC
Non-technical Metrics Development	R&R		√		Support		
Technical Metrics Development	R&R			√	Support		
Status and Metrics Reporting	Status Report	Report	Report	Report	Report	Report	SpC
LEGEND:							
	√ accountable		R&R review & report		SpC support per contract		
	F&R findings & recommendations		R&C review & comment		CAP corrective action plan		

⁷ Election Management System (EMS) vendors are governed by their contracts.

⁸ VoteCal started with and will continue using these protocols that have been replaced by CA Office of the Chief Information Officer (OCIO) Project Management Methodology.

3. QUALITY MANAGEMENT APPROACH AND PROCESSES

Quality processes interact with each other and with the other project processes; each can involve effort from one or more persons or groups based on the project requirements; each process occurs at least once in the project and occurs in one or more of the project's phases. Although the processes are presented here as discrete elements with well-defined interfaces, in practice they may overlap and interact in ways not detailed here.

3.1. Approach⁹

The basic approach to quality management described in this section is intended to be compatible with that of the International Organization for Standardization (ISO), particularly ANSI/ISO/ASQ Q10006, Quality management—Guidelines to quality in project management, as well as the quality management processes described in Institute of Electrical and Electronics Engineers (IEEE) Std 730, Standard for Software Quality Assurance Plans. It is compatible with proprietary approaches to quality management such as those recommended by Deming, Juran, Crosby and others; and non-proprietary approaches such as Total Quality Management (TQM), Six Sigma (6 σ), failure mode and effect analysis (FMEA), design reviews, voice of the customer (VOC), cost of quality (COQ), and continuous improvement/process improvement (CI/CPI). Modern quality management complements project management. Both disciplines recognize the importance of:

- **Customer satisfaction** (CS; dissatisfaction DS). Understanding, evaluating, defining, and managing expectations so that customer requirements are met. This requires a combination of conformance to requirements (to ensure the project produces what it was created to produce), and fitness for use (the product or service must satisfy real needs).
- **Prevention over inspection.** One of the fundamental tenets of modern quality management states that quality is planned, designed, and built in (QA)—not inspected in (QC). The cost of preventing (CoP) mistakes is generally much less than the cost of correcting (CoC) them when they are found by inspection.
- **Continuous improvement.** The plan-do-check/study-act (PDCA/PDSA) cycle is the basis for quality improvement as defined by Shewhart and modified by Deming. In addition, quality improvement initiatives undertaken by the project team, such as TQM and 6 σ , should improve the quality of the project's management as well as the quality of the project's product. Process improvement models include Malcolm Baldrige (MBNQA), Organizational Project Management Maturity Model (OPM³©), and Capability Maturity Model Integrated (CMMI©).
- **Management responsibility.** Success requires the participation of all members of the project team, but remains the responsibility of management to provide the resources needed to succeed.

⁹ Project Management Body of Knowledge, Fourth Edition

- **Cost of quality (COQ)** refers to the total cost of all efforts related to quality throughout the product life cycle. Project decisions can impact operational costs of quality as a result of product returns, warranty claims, and recall campaigns (costs of failure, CoF). Therefore, due to the temporary nature of a project, the sponsoring organization may choose to invest in product quality improvement (cost of prevention, CoP), especially defect prevention and appraisal, to reduce the external cost of quality (CoF).
- **Cost of Conformance** (money spent on the project to avoid failures)
 - **Prevention costs** (build a quality product): training, document processes, equipment, time to do it right.
 - **Appraisal costs** (assess the quality, QA): testing, destructive testing loss, inspections
- **Cost of nonconformance** (money spent during and after the project due to failures)
 - **Internal failure costs** (failures found by the project, QC): rework, scrap
 - **External failure costs** (failures found by the customer): liabilities, warranty work, lost business

3.2. Requirements

Both quality assurance and quality control assess processes or products against known requirements. Requirements are captured in a traceability matrix. Project, process and product requirements progressively evolve and are elaborated from the SOC Feasibility Study Report, Special Project Report, Request for Proposal, SI vendor's Proposal, Contract, Quality Management Plan (standards and metrics), Deliverables Expectations Document, Detailed System Design Deliverable 2.3, and other design documents to deliverables; however, a more recent deliverable accepted by SOS may replace, add or delete a previously existing requirement or specification. In addition, changes may be made through the integrated change control process (Change Control Board, CCB). IV&V traces requirements to deliverables. The IV&V consultant maintains VoteCal's traceability matrix and has traced requirements from the FSR, RFP, Proposal, Contract, and SPR to design documents. The QAM and ATL will rely on current DEDs to perform product and process audits or deliverable reviews.

3.3. Standards and Guidelines

Standards and guidelines provide consistency and communicate expectations for the quality of work products and deliverables across VoteCal. They establish criteria against which to measure the application. Standards and guidelines also serve as the input to the creation of checklists, which are used during reviews. The creation and modification of standards and guidelines involve many factors: External standards can be leveraged and tailored to VoteCal Project needs. Section 508 Guidelines for Accessibility are a good example of this use. External standards also include International Organization for Standardization (ISO) standards and Institute of Electrical and Electronics Engineers (IEEE) standards and guidelines.

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- **Standards are prescriptive** and may address code naming standards, the use of the software use case template, or .NET Coding Standards derived from industry best practices.
- **Guidelines** provide preferred but not mandatory approaches such as distributed component design guidelines, writing style guidelines, guidelines for creating a particular type of .NET class.

Table 3.3, Standards and Guidelines

The following documents have been cited in procurement and other project documents or are commonly employed for projects of this type or for tasks within this QMP.

DOCUMENT	STND	GDLN	DEL
CA Department of Finance's (DOF) Project Management Methodology, Section 200, Statewide Information Management Manual (SIMM), March 2006	√		PMP
CA Office of the Chief Information Officer (OCIO) PMM		√	PMP
FSR, RFP, Proposal, SPR, contract amendments, approved changes	√		All
A Guide to the Project Management Body of Knowledge (PMBok), Fourth Edition		√	PMP, 1.2/8
Government Extension to the PMBOK Guide, Third Edition,		√	PMP
Practice Standard for Project Configuration Management (2007)	√		1.4/6/9
Practice Standard for Work Breakdown Structures, Second Edition	√		1.1
Practice Standard for Scheduling (2007)	√		1.1
Practice Standard for Earned Value Management (2005)	√		PMP
Practice Standard for Risk Management (2009)	√		1.5/7
ANSI/ISO/ASQ Q10006, Quality management – Guidelines to quality in project management		√	QMP/1.3
ASQ Body of Knowledge, Certified Quality Manager (QCI Primer)		√	1.3/8/2.10
ASQ Body of Knowledge, Certified Software Quality Engineer (QCI Primer)		√	ALL
ASQ Body of Knowledge, Certified Quality Auditor (QCI Primer)		√	QMP/1.3
ASQ Body of Knowledge, Certified Quality Engineer (QCI Primer)		√	QMP/1.3
Baldrige National Quality Program – Criteria for Performance Excellence		√	QMP
ANSI/IACET 1 Criteria and Guidelines for Quality Continuing Education and Training Programs		√	2.10
ANSI/EIA 649, National Consensus Standard for Configuration Management	√		1.4/6/9
IEEE 730 Standard for Software Quality Assurance Plans/Planning	√		QMP/1.3
IEEE 828, Standard for Software Configuration Management Plans	√		1.4/6/9
MIL-STD-973, Configuration Management			
IEEE 830, Recommended Practice for Software Requirements Specifications		√	2.1/2
IEEE 982.1 Standard Dictionary of Measures to Produce Reliable Software	√		QMP/1.3
IEEE 1008 Standard for Software Unit Testing	√		TEST
IEEE 1012 Standard for Software Verification and Validation	√		ALL
IEEE 1059 Guide for Software Verification and Validation			
IEEE 1016 Recommended Practice for Software Design Descriptions		√	2.3
ANSI/IEEE 1042, Guide to Software Configuration Management		√	1.4/6/9
MIL-HDBK-61A, Configuration Management Guidance			
IEEE 1028 Standard for Software Reviews	√		DEVEL
IEEE 1044 Standard Classification for Software Anomalies	√		TEST
IEEE 1058 Standard for Software Project Management Plans	√		P/QMP
IEEE 1061 Standard for a Software Quality Metrics Methodology	√		QMP/1.3
IEEE 1063 Standard for Software User Documentation	√		ALL
IEEE 1074 Standard for Developing Software Life Cycle Processes	√		ALL
IEEE 1220, Application and Management of the Systems Engineering Process		√	2.3
IEEE 1233 Guide for Developing System Requirements Specifications		√	1.9/2.1/2
IEEE 1362 System Definition Concept of Operations (ConOps)		√	2.3
IEEE 1465, Software Packages – Quality Requirements and Testing			QMP/1.3/TEST
IEEE 1471 Recommended Practice for Architectural Description of Software Intensive Systems		√	2.7
IEEE 1490 Guide to the Adoption of PMI Standard A Guide to the [PMBOK]		√	PMP
IEEE/EIA/ISO/IEC 12207 Standard for Information Technology – Software Life Cycle Processes	√		ALL
Microsoft Development/Microsoft Development Library (MSDN), and Best Practices, SQL server		√	2.4/5/8/9
CMM-I for Development, Version 1.2, CMMI-DEV, V1.2		√	ALL

3.4. Process Descriptions

At a high level, quality management involves quality planning, quality assurance and quality control. Implied within quality management is continuous process improvement (CPI).

3.4.1. Plan Quality

Plan quality is the process of identifying quality requirements and standards for the project and product, and documenting how the project will demonstrate compliance. Inputs include the scope baseline, stakeholder register, cost performance baseline, schedule baseline, risk register, enterprise environmental factors and organizational process assets. Outputs include this QMP with quality metrics, quality checklists, a process improvement plan, and its future (phase) updates. A tool or technique unique to government quality planning is performance-based and gateway budgeting. The QMP is built upon Project and product requirements from the FSR and SPR, RFPs, vendors' proposals, contracts, design phase discovery (joint application design, JAD) sessions and the resulting VoteCal system requirements documentation. Quality planning should be performed in parallel with the other project planning processes. For example, proposed changes in the product to meet identified quality standards may require cost or schedule adjustments and a detailed risk analysis of the impact to plans (change control).

NOTE: To promote **regularly scheduled audits/reviews of key tasks**, quality assurance activities (assessments and audits) will be added to the master project schedule as soon as initial tasks, activities and deliverables have been completed.

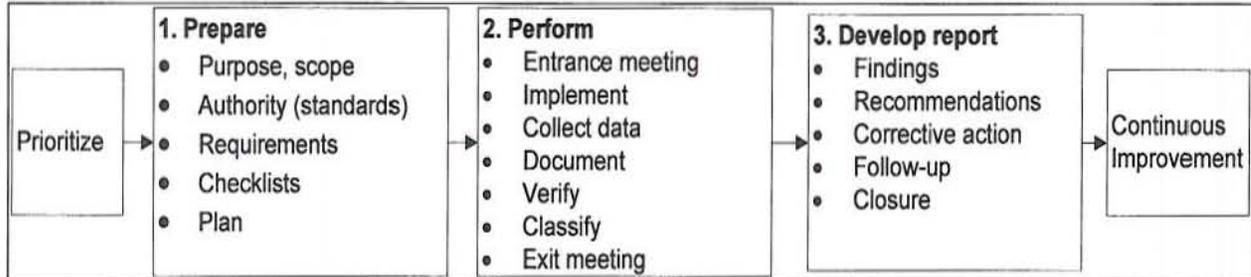
3.4.2. Perform Quality Assurance

Perform quality assurance is the process of auditing the quality requirements and the results from quality control measurements to ensure appropriate quality standards and operational definitions are used. Inputs include the PMP, quality metrics, work performance information, quality control measurements, and regulatory requirements and guidance (unique to government). Outputs include organizational (VoteCal project) process assets updates, change requests, PMP updates, Project document updates and notification of non-compliance (deficiencies, unique to government). QA focuses on preventive action through a documented direction to perform an activity that can reduce the probability of negative consequences associated with project risks. Quality assurance activities will be performed primarily for the purpose of confirming that processes used to develop VoteCal deliverables are satisfactorily leading to the desired outcomes, as specified by the deliverable acceptance criteria. This is primarily an evaluation of overall project performance, as opposed to the assessment of specific work products. Quality assurance will be carried out on an ongoing basis, and reported to the SOS' Steering Committee as part of the monthly status reporting process. QA will include:

- Using information to detect, analyze and establish root causes of potential nonconformities
- Determining the process improvements needed to eliminate these root causes of nonconformities
- Initiating the preventative action and applying controls to ensure that it is effective
- Ensuring that relevant information on actions taken, including changes to processes, is submitted for management review

3.4.2.1. Process and Product Audits

Process or product audits (deliverable reviews) identify process deficiencies and provide process findings and recommendations, or identify product non-conformities. Process findings are project-related topics that may affect scope, schedule, cost, quality, resources or risk. Findings and non-conformities can typically be resolved by taking some form of corrective action.



NOTE: The QAM will collaborate with IV&V consultants to ensure the acceptance test consultant and the SOS Senior Programmer Analyst are versed in quality standards and metrics relevant to their respective positions and tasks.

3.4.2.2. Tasks, Activities, Responsibilities and Deliverables

The SOS contract specifies many quality assurance activities for which the QAM has developed approaches. As required over the phases of the Project, these approaches will be developed into audit or review checklists and will expand the initial set within Appendix B, Quality Checklists.

Task 1. Monitor project processes for compliance with SOS Quality Management Plan. Report findings and recommendations on a flow basis to the VoteCal Project Manager.

Responsibility 4. Provide input to the project team about incorporation of quality standards and practices into daily activities and in-progress deliverables.

Responsibility 6. Monitor designated project processes and deliverables for compliance with quality standards.

Responsibility 8. Undertake quality audits to determine corrective action when observable practices or declining deliverable quality warrants.

QMP approach will use the American Society for Quality (ASQ) Certified Quality Auditor (CQA) body of knowledge (BoK) to develop a program or **regularly scheduled audits/reviews of key tasks** to address system, process, product, and compliance requirements of the Quality Management Plan (QMP).

1. **Prepare** for each audit. Include plan preparation and documentation (purpose, scope, and resources), team (QA, IPOC, IV&V, SI vendor's QA, auditee), source of authority (standards within QMP and applicable national/CA government or industry standards), requirements against which to audit (standards, contract, specifications, policy), documents (source and auditable materials), checklists (specific), data collection methods, and plan(s).
2. **Perform** the audit(s). Include entrance meeting, strategies (trace forward/backward, discovery, examination), implementation (interviews, questionnaires), data collection (detection, analysis and summary, presentation of data), document and record verification (tracing, sampling, physical examination), "calibration" (traceability to software development or project standards), audit analysis (distinguish chronic from sporadic, classification of non-conformances, measures for determining effectiveness of controls), and exit meeting.
3. **Develop audit report** (findings), corrective action (recommendations), and closure. Include report (format and contents; prioritize significant findings, observations and conclusions; potential effects elsewhere in the Project); corrective action and follow-up (auditor recommendations and auditee response, acceptability, timeliness, verification, continuous improvement), and closure (criteria).
4. During these processes, **apply auditing tools and techniques** (T&Ts). As applicable, develop or apply charts and graphs to analyze patterns or trends, determine root causes, and apply descriptive statistics.
5. **Develop a flow of QA activities** that fits with the project plan (quality planning) and provides regularly scheduled feedback throughout the Project (quality assurance) rather than relying upon end-of-phase testing results (quality control).

Task 2. *Collect and analyze performance metrics. Report finding and recommendations on a flow basis to the VoteCal Project Manager.*

Responsibility 3. *Develop performance metrics and targets for QMP-named project management and software development processes and deliverables based on industry best practices.*

Responsibility 7. *Collect and analyze performance data on all work products to measure conformity to adopted standards. Report findings and recommendations to the VoteCal Project Manager.*

QMP approach: Apply PMBoK, ASQ BoKs for Certified Quality Manager (CMoQ/OPE), Engineer (CQE), and Software Quality Engineer (CSQE); and IEEE 1061, Standard for a Software Quality Metrics Methodology, to discern contract, PMP, QMP or to propose metrics.

Collaborate with the PM, IPOC, IV&V, SIPM and SIQA and consider:

1. **Purpose**, value, management endorsement (validity), development process, utility, ease of attaining standardized measurements, and System Integrator (SI) and SoS (Secretary of State) staff and process maturity.
2. **Metrics and measurement theory** germane to software development including knowledge of the software's attributes, measurability, meaningful statements (attributes, entities), and potential for statistical analysis.

3. Entities (objects or events), attributes, measurements, primitives and measures, reliability, validity, errors, representational conditions, and definitions.
4. **Central limit theorem**, measures of central tendency, and measures of dispersion.
5. **Psychology**: potential problems, objectives, non-attribution and human errors.
6. **Process and product measurement**: metrics, software attributes, defect detection effectiveness, program performance and process effectiveness.
7. **Code coverage** including branch-to-branch, condition, domain coverage, cyclomatic complexity, boundary, path, individual predicate, data-flow or other.
8. **Metrics development** including Goal-Question-Metric paradigm; process, product and resource measures (entities and attributes: correctness, efficiency, flexibility, integrity, inter-operability, maintainability, portability, reliability, verifiability, usability, reusability, testability, expandability or extendibility, performance, robustness, traceability); assessment and prediction measures; models to design metrics. Based on this **consensus**, develop direct metrics:
 - Establish software **quality requirements**
 - Identify software **quality metrics** that might include: faults/lines of code compared to requirements, actual/allocated utilization, average labor days to change, faults/line relative to security, effort to couple/develop, labor days to fix, requirements implemented (schedule or contract), user errors/time, value of resources saved, requirements with test criteria, requirements/system or component, available spare capacity, transaction rate, time-to-restart, requirements included in/assigned to/tested in design.
 - **Implement** the metrics
 - **Analyze** the results
 - **Validate** the metrics

***Task 3.** Participate in the review of Deliverable Expectation Documents (DEDs) for SI Vendor Deliverables to ensure incorporation of quality standards and metrics.*

***Responsibility 5.** Provide input on conformance to quality standards at major design reviews.*

QMP approach will emphasize partnership. We look for a “win-win” solution to project challenges through collaboration among stakeholders and SoS project staff; the SI PM, QA, Lead Architect and staff; the Independent Project Oversight Consultant (IPOC) and Independent Verification and Validation (IV&V) consultant. We expect to complement—rather than duplicate—IPOC and IV&V tasks.

1. **Error prevention.** We look for proactive, collaboratively developed and clearly understood processes to software development that will lead to consistent, high quality code and documentation across the team.

2. **Prepare** for each deliverable review. Include plan preparation and documentation (purpose, scope, resources), team (QA, IPOC, IV&V, SIQA, auditees), source of authority (standards within QMP and applicable national/CA government or industry standards), requirements against which to audit (standards, contract, specifications, policy that will **clarify measurable objectives and functional requirements**), documents (source and auditable materials), checklists (specific), data collection methods, and published plan(s).

Task 4. Monitor SI Vendor Quality Standards. Task 4.A. Monitor and report on the incorporation of defined quality standards into designated SI vendor deliverables for phases II through VI.

Task 4.B. Coordinate quality audits of the SI vendor deliverables when product quality warrants, and prepare and deliver Audit Review Reports per IEEE 1028-2008 [Standard for Software Reviews] or equivalent methodology.

Responsibility 9. Participate in systems integration vendor and EMS vendor deliverables evaluation and report deliverable quality status to the Project Manager prior to approval for formal release to the next phase of development or to the production environment.

Responsibility 13. Provide knowledge transfer to the Senior Program Analyst (SPA) regarding quality and performance evaluation techniques for the project deliverables the SPA will be involved in (e.g., code reviews, design reviews, audits etc.).

Responsibility 14. Partner with SOS and vendor staff assigned to deliver state and county training to ensure quality measures are defined for and quality factors are built into project training components.

Responsibility 15. Provide input on critical success factors for state-wide/multi-county roll-outs, including user preparation for installation of new systems.

QMP approach for Task 4-series is the same as the approach for **Task 1** above (product audits).

Task 5. Meet with SI vendor staff as needed to resolve quality management concerns.

Responsibility 16. Liaise as necessary with county, SI and EMS vendor and external interface agency quality management representatives.

QMP approach involves partnership. We look for a “win-win” solution to project challenges through collaboration among stakeholders and SOS project staff; the SIPM, QA, Lead Architect and staff; the Independent Project Oversight Consultant (IPOC) and Independent Verification and Validation (IV&V) consultant. We expect to complement—rather than duplicate—IPOC and IV&V tasks.

1. **Error prevention.** We look for proactive, collaboratively-developed and clearly understood processes to software development that will lead to consistent, high quality code and documentation across the team.
2. Determine **how concern was surfaced**: who, what, when, process, trigger, documentation (schedule, issue or risk logs, test results). Determine if **concern is attributable** to quality planning, quality assurance or quality control.

3. Determine if **concern relates to** a standard, the contract requirements, test or performance metric evidence, or stakeholder expectations. Determine if concern relates to **project management** or **software development process**.
4. **Validate concern** with PM, IPOC, IV&V, SIPM, SIQA, lead architect, lead developer.
5. Apply SOS' **problem solving or continuous improvement model** (PDSA, DMAIC, 8F or other).
6. **Institutionalize** corrective action.

Task 6. *Monitor pilot test results for consistency with quality expectations; collect and report on pilot test metrics and provide a written report on quality measures for the test process and outcomes, including the need for and the approach to error correction.*

Responsibility 12. *Partner with the SOS Acceptance Test Lead consultant and the project's IV&V consultants to ensure project-specific quality processes for testing are applied to produce confirmation of solution readiness for production deployment.*

QMP approach will involve the ATL, IV&V and the subject matter experts (SMEs) on SOS' project team, in addition to **collaboration** with SI vendor's technical and testing staff, and county and election management system (EMS) vendor testers.

1. Determine **types of tests**: functional, performance, regression, environmental load, worst case, perfective (if appropriate), exploratory, random-input, certification, stress, usability and real-time response.
2. Determine **test levels**: unit, component, module, function, integration, system or field (acceptance, qualification, operational, alpha/beta).
3. Determine test **schedules** and coordinate monitoring activities.
4. Become familiar with how tests will be **managed**. Determine how test results will be **measured**.
5. **Obtain test results** and interpretation by SIPM and SIQA.

Task 7. *Support the project's change control processes by providing input on quality metrics for individual corrective actions. At the request of the PM, assist with analysis for proposed changes.*

Responsibility 10. *Conduct analyses as needed to support change requests as these impact quality standards or criteria for specific deliverables.*

QMP approach is to **participate in the CCB**. If the PM requests analysis:

1. Determine actual **measures of performance**.
2. Assist with **quality criteria** for corrective action.
3. Monitor **regression testing**.
4. **Report** non-conforming results.

Task 8. *Collaborate with IV&V consultants to ensure the acceptance test consultant and the SOS Senior Programmer Analyst are versed in quality standards and metrics relevant to their respective positions and tasks.*

QMP approach will be to become familiar with **how user acceptance tests will be conducted.**

1. Become familiar with the UAT consultant's [ATL] **role** (contract).
2. **Collaborate with IV&V** to develop familiarization materials (table for standard, metric, relevant position, relevant task; source materials) for UAT consultant.
3. **Present QA and IV&V materials** without duplication. **Obtain feedback** on UAT consultant's understanding of quality standards, metrics, and their relevance to each UAT position and task.
4. **Assess** UAT consultant's understanding of standards and metrics by position and task. **Review** materials and re-assess as required.
5. **Monitor UAT** to verify standards and metrics are appropriately applied.

Task 9. *Confirm with the SI vendor that each SOS-accepted technical deliverable (including source code, compiled code, documentation, hardware and software configurations) is under configuration management and that all change records for accepted deliverables are complete and up to date. Repeat confirmation as changes are made or at least at the end of each project phase. Report configuration management anomalies to the VoteCal Project Manager.*

QMP approach will be to apply principles of ANSI/IEEE 828 and 1042-series for software configuration management (SCM) as outlined within the CSQE BoK.

1. Become familiar with **SoS' and SI vendor's processes** to define product attributes, document configuration and changes; correlate requirements, design and product information; changes are identified and analyzed for impact; change is managed through a defined process; configuration information is organized for retrieval, and configuration is verified against required attributes throughout the entire life cycle to enable tracing of all software changes.
2. **Preclude simultaneous updates**, double maintenance, fixes and common code functions are shared among engineers, version control precludes conflicts and confusion.
3. Understand the team's software configuration management (**SCM**) **definitions** of baseline, Computer Aided Software Engineering (CASE) tool versions, configuration, configuration control, Configuration/Change Control Board (CCB), configuration identification, configuration item, configuration management process, configuration status accounting, patch identification/management, release notification and distribution, the software engineering environment (versions of software, hardware, firmware), software library, and software lifecycle (waterfall, agile, RAD, other).
4. **Understand the team's library/repository** types, names and processes; defect tracking and library tools; and SCM group (or individual) roles and responsibilities (R&Rs) including CCB, identification, technical documentation, change request, implementation, documentation maintenance, status accounting, formal SCM audits and baseline definition.

5. **Monitor SCM** planning, resources and training, and impact on productivity. To assure SCM contributes to timely, accurate builds, we will conduct SCM audits to determine processes are effective. These might include item identification, version control, reports and queries, security/protection, build support and release management, tool customization and use of graphical user interfaces (GUI, version history display or merge tools).

Task 10. *Unanticipated Tasks (10% level of effort, LOE).*

Responsibility 17. *Perform quality related ad hoc analyses as negotiated with the Project Manager and approved by the Project Director.*

QMP approach will be to **compare the tasking details to our contract's SOW** (Tasks and Responsibilities listed above), **collaborate** with the PM, Project Director and Contracting Officer, and employment of SOS' **Work Authorization process** when applicable.

Deliverable 1. *Review, refine and revise the VoteCal Quality Management Plan (QMP) to fully define quality processes and performance metrics for all project activities and deliverables named in the plan. Maintain the QMP by providing updates at least at the end of each project phase.*

Responsibility 1. *Develop the project's quality standards and provide overall direction and focus to the incorporation of these standards into VoteCal.*

Responsibility 2. *Refine and maintain the SOS Quality Management Plan (QMP) and associated task schedule.*

QMP approach has been to **review the initial QMP** to determine if topics and tasks noted above have been addressed.

1. **Collaborate** with all parties to develop high-level, process audit checklists and then include those within the QMP.
2. **Update the QMP** to incorporate corrective action or new insights that will emphasize QA over QC.

Deliverable 2. *Produce a Monthly Status Report containing:*

- A. *Activities in progress and/or completed during the month.*
- B. *Summary of quality evaluation and recommendations related to system testing, acceptance testing, or pilot deployment delivered throughout the month.*
- C. *Status of quality management monitoring of project management and systems development processes.*

Responsibility 11. *Maintain records of quality compliance and provide reports on quality measures at intervals determined by the Project Manager, but not less than monthly.*

QMP approach will be to **document** monthly status meeting topics related to QA including but not limited to:

1. **Planned activity** completed and delayed or incomplete.
2. Prioritized, overarching **QA issues** and updates.
3. The QMSR will compliment and may reference but will **not duplicate** IPOC, IV&V or PM reports.

3.4.2.3. Quality Assessments

The QAM will assess project performance on a monthly basis to determine whether the project is performing according to plan. This assessment will be primarily based on the performance metrics of personnel hours (cost), schedule, and progress. Earned Value (EV) tracking will be employed to report on the following metrics:

- **Earned Value (EV):** Value of work performed during the reporting period, to be measured in personnel hours or dollars when available.
- **Effort (cost) Variance (CV):** Difference between budgeted personnel hours and actual hours expended to accomplish work.
- **Schedule Variance (SV):** Difference between planned schedule and actual schedule
- **Cost Performance Index (CPI):** Ratio of Earned Value to Actual Cost of Work Performed. A ratio of greater than 1 indicates the project is costing less than budgeted, and a ratio less than 1 indicates the project is costing more than budgeted. Cost will be measured in personnel hours, or dollars when available.
- **Schedule Performance Index (SPI):** Ratio of Earned Value to the Cost of Work Scheduled to occur during the reporting period. Similarly, a ratio of greater than 1 indicates the project has accomplished value in less time than budgeted, and a ratio less than 1 indicates the project has accomplished value in more time than budgeted.

Table 3.4.2.3, Quality Assessments

ASSESSMENT	CONDUCTED BY	REPORTED TO
IPOC	IPOC	Project Director, Project Sponsor CA Department Of Finance CA Office Of The Chief Information Officer
Project Implementation Evaluation Report	IPOC	SAME
IV&V	IV&V	Project Director
Requirements Traceability Verification And Validation	IV&V	Project Director
Process Audit	QAM	Project Manager
Product Audit	QAM	Project Manager
Deliverable Walkthrough	SI vendor	SOS Team
DRAFT Review	SOS Project Team	Project Manager
Final Review, Sign-Off And Acceptance	Core Team	Project Director
Software Development Quality Control	SEE ACCEPTANCE TEST PLAN	

3.4.2.4. Corrective Action Plan (CAP)

Process and product audit (reviews) frequently produce findings and recommendations that will be tracked to closure in the CAP. In addition, negative variances in project management areas or deliverables of ten percent (10%) or more will trigger corrective action. The plan will specify recommendations or activities required to correct the variance and associated due dates.

Correction owners will report progress relative to corrective action at status meetings. The CAP provides on-line, accessible documentation—like the Risk and Issue logs—and will include: finding or non-conformity source, date and reference number; priority and description; recommendations or tasks (if provided with the finding).; status, owner and due date; and comments. General steps include:

1. **Initiate:** Any Project participant can identify a deficiency or non-conformity; however, the IPOC, IV&V consultant, QAM and the SI vendor QA/QC are specifically charged with this responsibility. The originator should provide sufficient detail to facilitate resolution. The status of CAP at this time is "OPEN."
2. **Qualify:** Once a finding or non-conformity is surfaced, the QAM reviews it to determine whether or not it is a valid (references a deliverable requirement, metric or standard) and original (i.e., not a duplicate). If not qualified, the QAM will close the item, document the reason for closure, and send notification via e-mail to the originator of the issue and the SOS PM. If it is valid and not a duplicate, the QAM will assign a priority, an owner, due date, and recommended action item(s) as appropriate. The status of the CAP at this time is either "closed" or "OPEN."
3. **Escalate:** The QAM may recommend that the PM escalate the CAP to the Project Director or ESC, according to the escalation process discussed in other project documents.
4. **Update:** In addition to resolving the finding or non-conformity, the owner is also responsible for updating the status within the CAP monthly or more frequently if tasked. The owner will brief QAM and PM regarding progress and expected closure date.
5. **Close:** The owner notifies the QAM when action has been completed and the finding or non-conformity has been resolved. If resolved, the QAM will change the status within the CAP to "closed."
6. **Review:** The QAM will periodically¹⁰ review or audit closed findings (and non-conformities if appropriate) to assure root causes have been addressed and the issue has not recurred.

3.4.3. Perform Quality Control

Perform QC is the process of monitoring and recording results of executing the quality activities to assess performance and recommend necessary changes. Inputs include the PMP, quality metrics and checklists, work performance measurements, approved changes requests, deliverables and Project process assets. Outputs include quality control measurements, validated changes, validated deliverables, Project process updates, and Project document updates. QC focuses on corrective action through a documented direction (Corrective Action Plan, CAP) for executing VoteCal work to bring expected future performance of the Project work in line with the PMP. Scope verification differs from quality control in that scope verification is primarily concerned with acceptance of the deliverables, while quality control is primarily concerned with correctness of the deliverables and meeting the quality requirements specified for the deliverables. Quality control is the process of assessing project work results and determining whether they are in compliance with the defined criteria. Criteria are usually specified in Deliverable Expectations Documents (DEDs), standards or metrics. Quality control will be performed in a number of areas, as described below.

3.4.3.1. Deliverable Reviews/Approvals

Each deliverable will be reviewed for compliance with the defined acceptance criteria. Acceptance criteria for each of the deliverables are specified in DEDs developed during each phase. The Exit Criteria sections under each deliverable provide these criteria. The process for

¹⁰ Schedule follow-up relevant to Project phases, tasks or deliverables dates

quality review and acceptance of deliverables is described in Appendix B, Checklists. This process also addresses the resolution of material defects that are identified within deliverables. All non-technical deliverables will be reviewed by the QAM; technical deliverables will be reviewed by IV&V. Material deficiencies found during this review will be identified, and in most cases, corrected, before the deliverable is submitted to SOS. The SI vendor will include a list of identified deficiencies in cases where deficiencies are not corrected before submittal to SOS (as sometimes is the case for draft documents).

3.5. Document Management

Quality assurance and acceptance test work-in-progress (work papers) will be maintained by the QAM and ATL. The QAM and ATL will maintain electronic versions of documentation supporting the processes described within this Quality Management Plan. Key records include audit records, deficiencies identified, corrective actions, testing results, etc. Baseline versions and completed documents and quality checklists will be uploaded and stored on VoteCal's shared network drive at \\sosfps4\SOS_SHARE\Projects\HAVA\SWDb\VoteCal\Project Management\Quality Management. Related folders include:

- Independent Project Oversight (IPOC) series
- Independent Verification and Validation (IV&V) series
- Quality Management Plan*
 - Audit plans, reports and completed checklists
 - Corrective Action Plan and Follow-up Audits
 - QA Monthly Status Reports
 - Metrics
- Acceptance Test Plan*
 - Test scripts and results

* Baseline deliverable documents under change control

3.5.1. Plan Reviews

Because the QAM was added to the Project after plans were developed during Phase I, plans will only be reviewed during periodic updates currently scheduled for the end of each phase. The QAM will provide comments on material that is missing, incorrect, ambiguous, or unclear based on project standards and Deliverable Expectations Documents (DED).

- To the extent practical, the QAM will review for and contribute to **measurable objectives and functional requirements** within plans, DEDs and deliverables.

3.5.2. Change, Risk and Issue Management

To preclude redundancy, corrective action plans that introduce changes, risks or issues will use those existing management processes (change control board, risk and issue logs). Corrective action plans will only track findings and recommendations that have no other suitable vehicle.

3.6. Metrics

A quality metric is an operational definition that describes, in very specific terms, a project or product attribute and how the quality control process will measure it. A measurement is an actual value. The tolerance defines the allowable variations on the metrics. For example, a metric related to the quality objective of staying within the approved budget by $\pm 10\%$ could be to measure the cost of every deliverable and determine the percent variance from the approved budget for that deliverable. Quality metrics are used in the quality assurance and quality control processes. Some examples of quality metrics include on-time performance, budget control, defect frequency, failure rate, availability, reliability, and test coverage.

Government Extension, PMBoK, Performance-Based and Gateway budgeting:

“Performance-based budgeting can be of great benefit to the voters and taxpayers. However, there are pitfalls:

- Performance measures must be carefully designed to encourage desirable behavior.
- Poorly defined measures can require managers to make wrong decisions in order to meet their performance targets.
- The design of the measures requires a thorough understanding of the program.

Software metrics. CSQE BoK, Metrics and Measurement:

“... The application of software metrics in industry has been relatively slow.... Large disagreement exists about the value of measures.... validation is difficult to explain to management.... software development and quality systems are primitive. The quality systems that do exist tend to be code oriented.... lack of accessible materials on software measures and metrics....”

Metrics are useful quantitative indicators that provide measurable feedback. Across the VoteCal Project phases, the QA Manager in conjunction with IV&V and selected SOS staff will identify, measure, and evaluate several different metrics. These include metrics for Project Management, Requirements Analysis, Software Development, Implementation, and other designated QA activities. Both product and process metrics will be used as part of the quality assurance and control processes. Project metrics are contained at Appendix A.

3.6.1. Tools

The following tools—the seven tools of quality and seven new tools of quality—are typically used by process improvement teams. The QAM will train SOS or SI vendor staff or facilitate CPI that requires the Team to use quality tools for analysis. Among these are:

- Cause-and-effect (Ishikawa, fishbone) diagrams
- Flow charts
- Checksheets
- Histograms
- Control charts
- Pareto charts
- Scatter diagrams
- Affinity diagram (KJ method™)
- Tree or systematic diagram
- Process decision program chart (PDPC)
- Matrix diagram
- Interrelationship digraph (I.D.) or relationship diagram
- Prioritization matrices or matrix diagrams
- Activity network diagram or arrow diagram

Additional approaches and tools available from the QAM include

- Brainstorming
- Force field analysis
- Nominal group techniques (limited application to VoteCal)
- Six sigma and lean 6 σ , Quality Function Deployment (limited application)
- CMMI
- Process flowcharts
- Statistical sampling, statistical process control (SPC)
- Design of Experiments (DOE)
- Benchmarking
- Cost-benefit analysis (CBA)
- Run charts

3.7. Checklists

A checklist is a structured tool, usually component-specific, used to verify that a set of required steps has been performed. Checklists range from simple to complex based on project requirements and practices. Many organizations have standardized checklists available to ensure consistency in frequently-performed tasks. In some application areas, checklists are also available from professional associations or commercial service providers. Quality checklists are used in the quality control process. Checklists are lists of items or actions that should be addressed by a given work product. Based on standards and guidelines, they contain expectations for work products in the form of a specific but concise list. For details and examples regarding the criteria in a checklist, the reader may refer back to the standards and guidelines used to develop the checklist. The QAM will develop checklists during audit preparation.

4. SOFTWARE QUALITY ASSURANCE

Note: This section will be developed during the next End of Phase update, and may include the following topics:

- Purpose
- Reference documents
- Management
- Documentation
- Standards, practices, conventions and metrics
- Reviews and audits
- Test
- Problem reporting and corrective action
- Tools, techniques and methodologies
- Code control
- Media control
- Supplier control
- Record collection, maintenance and retention
- Training
- Risk management

APPENDIX A – METRICS

NOTES for Appendix A-series

1. VoteCal teams suggested and reviewed most of these metrics. As they are developed for use in determining Project quality, the QAM will revisit teams to clarify the measures, measurement processes, and accountabilities. The Project will not use all measures at first and some may be dropped if they don't provide sufficient value—actionable insight—to justify the level of effort needed to track them.
2. To assure these metrics add value that exceeds the effort to develop them, they will be progressively developed over time. The QAM will start the initial process to develop each measure. A team member—by position—has been suggested as the responsible person for each metric and will continue updates after the metric has been developed and accepted. In addition, the QAM will narrow down near-duplicates after the teams have an opportunity to compare draft versions with real project data.
3. The following metrics were collaboratively developed by the VoteCal team to:
 - provide value and lead to action
 - be easy to collect
 - clearly explain what is being measured using Project terms
 - be reviewed weekly and reported monthly

This Appendix A-series, Metrics, applies the American Society for Quality (ASQ) bodies of knowledge (BOK) for Certified Manager of Quality/Organizational Performance Excellence (CMQ/OPE, CQM) and the Project Management Institute Standard for Earned Value Management. A future Appendix A4, Software Metrics, will conform to IEEE 1061, Standard for a Software Quality Metrics Methodology and the ASQ Certified Software Quality Engineer (CSQE) approach to metrics development.

The Quality Assurance Manager (QAM) consulted the following to develop these metrics:

- CA Office of the Chief Information Officer (OCIO) and Department of Finance (DOF) guidance for project management and reporting;
- VoteCal's procurement documents and respondents' proposals;
- VoteCal's Project Management Plan (PMP) and Quality Management Plan (QMP) v0.7;
- Catalyst's project management plans;
- Reporting and recommendations of the Independent Project Oversight Consultant (IPOC) and Independent Verification and Validation (IV&V) consultant.

The QAM collaborated with the VoteCal Project Director and Project Manager (PM), IPOC and IV&V consultants, Catalyst's PM and QAM, and the VoteCal Core Team and considered:

- the purpose, value, management endorsement (validity), development process, utility, ease of attaining standardized measurements, and Catalyst's and SOS' staff and process maturity relevant to metrics;
- central limit theorem, measures of central tendency, and measures of dispersion; and
- psychology of metrics including potential problems, objectives, non-attribution and human errors.

Appendix A1 – Dashboard Indicators

Project Status

Team members will update metrics for each informal weekly status report and for the Executive Steering Committee's (ESC) formal, monthly performance review. These indicators present the Project's status.

VoteCal Project Dashboard¹¹ as of Mmmm, DD, YYYY

METRIC	≤5%	≤10%	>10%	Comments
VoteCal Project ¹² (IPOC)				Rating based on OCIO or DOF guidelines
• Scope risk	Absorbable; no impact on users	Material change that affects users	Change order required	Related to Schedule risk (above)
• Schedule risk	No milestone slips – workarounds possible and additional resources may be required <u>or</u> minimal impact, possible slip of non-critical activities	Major slip in key milestone or an impact on critical path <u>or</u> minor slip in key milestone. NOTE: slippages of 5% behind schedule are reported in the IPOR.	Unacceptable slip of a key milestone.	
• Budget risk	2-4.9% <u>or</u> minimal impact (< 2%)	7-9% <u>or</u> 5-6.9%	Unacceptable - 10% or greater	
• Technical performance and Quality	Acceptable with some reduction in performance margin <u>or</u> Possible reduction in performance margin	Serious performance degradation that affects users <u>or</u> minor performance degradation – no margin remaining	Unacceptable performance degradation	
CATALYST'S PROJECT STATUS RATING (Catalyst's PM)	<5% of the tasks on the critical path in the baseline schedule are overdue <u>and</u> on- track	5 ≤ 10% of the tasks in the baseline schedule are overdue <u>or</u> one or more problem areas.	>10% of the tasks in the baseline schedule are overdue <u>or</u> significant issues	Monthly Status Report ratings for Schedule, Deliverables, Risk/Issues, Action Items and Organizational Readiness

¹¹ Standard CA OCIO or DOF project status reporting system. This system emphasizes quantitative variance from plan (baseline). Generally, projects do not require permission from or coordination with outside stakeholders for variance less than or equal to 10%.

¹² Special Project Report, VoteCal, June 23, 2009, Section 5.0, Risk Management Plan, para 5.1, Risk Management Log, sub-para 5.1.1, Risk Assessment , Exhibit 5-2, Risk Impact Assessment Criteria

VoteCal Quality Management Plan

METRIC	≤5%	≤10%	>10%	Comments
SCOPE (QAM)	≤5% non-conforming and no critical elements; draft returned with no substantive changes	≤10% and no critical elements; or 2 nd draft requested	>10% or any critical requirement or deliverable declined for rework	# incorrect, ambiguous, incomplete, inconsistent, misunderstood by SOS, added, not concise, disorganized requirements + all requirements in traceability matrix = percent non-conforming
SCHEDULE (Scheduler)	≤5% late, none on critical path	≤10% or any critical path task (1 st report only)	>10% or critical path task (2 nd and subsequent reports) or deliverable	How are we doing time wise? # late tasks + all tasks on schedule = percent late tasks
• Schedule Variance (SV)	≥\$[-909K]	≥\$[-1818K]	<\$[-1818K]	Are we ahead or behind schedule? SV = Earned Value (EV) – Planned Value (PV)
• Schedule Performance Index (SPI ¹³)	≥.95	≥.90	<.9	How efficiently are we using time? SPI = EV÷PV
• Time Estimate at Completion (EAC _t)	≤31.5months	≤33	>33	When are we likely to finish work? EAC _t = (BAC+SPI)÷(BAC+months)
COST (Scheduler and Contracting)	≤105%	≤110%	>110% or SPR required	How are we doing cost wise? Actual Cost (AC) of work performed (ACWP, spent+paid to-date)
• Planned Value (PV)	See budget for deliverables for this date			Performance Measurement Baseline (PMB), budgeted cost of work scheduled (BCWS)
• Earned Value (EV)	See spending/payments for deliverables up to this date			Budgeted cost of work performed (BCWP)
• Cost Variance (CV)	≥-.05	≥-.1	<-.1	How much are we over or under budget? CV = EV-AC
• CV percent	≥-5%	≥-.10%	<-.10%	What percent are we over or under budget? CV% = CV÷AC
• Cost Performance Index (CPI)	≥.95	≥.9	<.9	How efficiently are we using our resources? CPI = EV÷AC
• To-Complete Performance Index (TCPI)	≤1.05	≤1.1	>1.1	How efficiently must we use our remaining resources? TCPI = (BAC-EV)÷(BAC-AC)

¹³ PMI Practice Standard for Scheduling

VoteCal Quality Management Plan

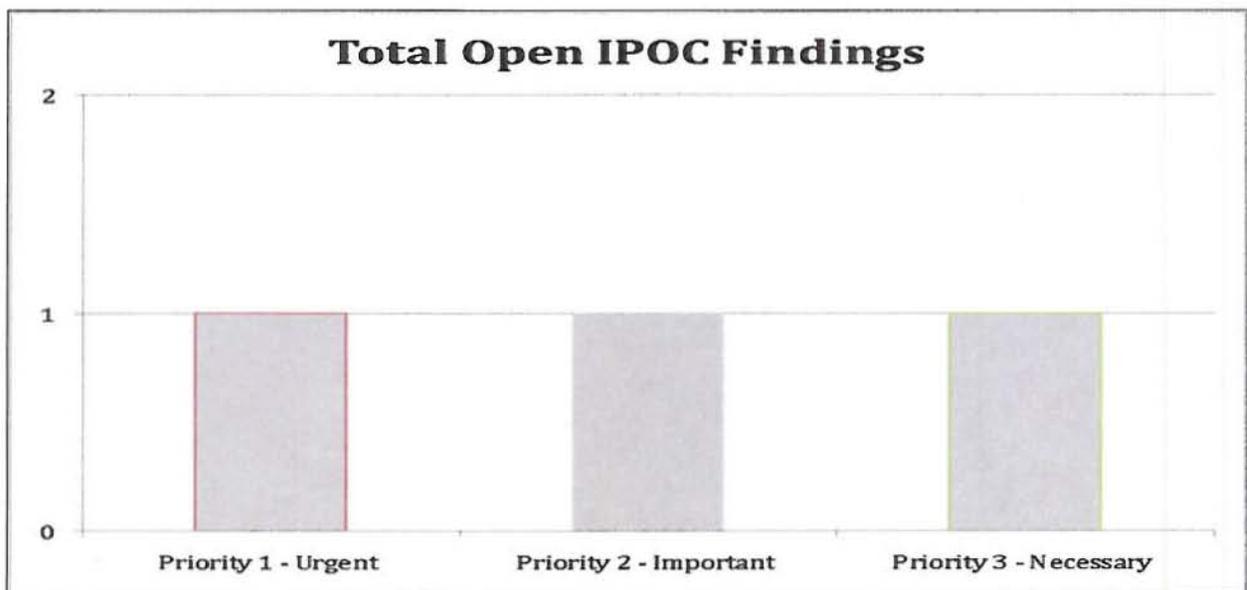
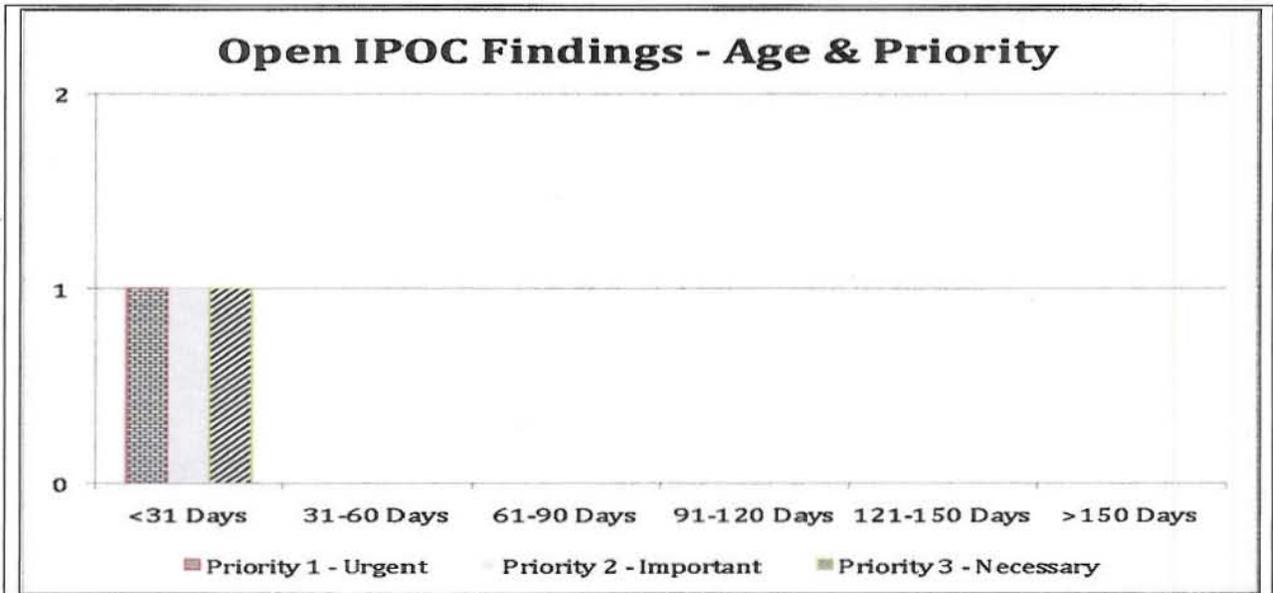
METRIC	≤5%	≤10%	>10%	Comments
<ul style="list-style-type: none"> Estimate At Completion 	≤\$19,086K	≤\$19,995K	>\$19,995K	What is the project likely to cost? EAC = BAC+CPI
<ul style="list-style-type: none"> Weighted EAC for .8SPI and .2CPI (EAC@.8SPI&.2CPI) 	≤\$19,086K	≤\$19,995K	>\$19,995K	What is the project likely to cost considering schedule to date more than cost to date? for [SPI=.8 and CPI=.2] = AC+[(BAC-EV)+(.8SPIx.2CPI)]
<ul style="list-style-type: none"> Variance at Completion (VAC) 	≥\$[-909K]	≥\$[-1818K]	<\$[-1818K]	Will we be over or under budget? VAC = BAC - EAC
<ul style="list-style-type: none"> Estimate to Complete (ETC) 	≤Balance+\$909K	≤Bal+\$1818K	>Bal+\$1818K	What will the remaining work cost? ETC = (BAC - EV)+CPI
QUALITY (QAM)	Late Priority 3 Corrective Action Plan (CAP) + all findings	Any Priority 2	Any Priority 1	Focus on improvement
HUMAN RESOURCES (SOS' PM) <ul style="list-style-type: none"> Core Team Non-core or contractors Catalyst resources County 	Entire Team	-1	-2 or more	Focus on people
	SAME	-1	-2 or more	
	SAME	-1 non-specified	1 specified <u>or</u> -2 non-specified	
	SAME	-CIO <u>or</u> IT	-2 or more	Focus on OCM
PROCUREMENT (Contracting) <ul style="list-style-type: none"> Contract compliance 	Sum of Contract Metrics			
	Compliant	Substantially compliant <u>or</u> non-critical errors or omissions	In-breach	
CUSTOMER SATISFACTION (QAM or Catalyst's OCM Manager) <ul style="list-style-type: none"> Stakeholder satisfaction index Stakeholder dissatisfaction 	≥B+/3.5	≥C/3	<C/3	Average rating wherein A=4.0, F=0
	≥.5	≥0	<0	Average rating wherein A=1, B=.5, C=0, D=-1, F=-2
	Decreasing Pareto by category	Stable Pareto	Increasing Pareto	Average of the categories = # decreasing ÷ # categories

Appendix A2 - Independent Project Oversight Consultant Metrics

The following charts show:

- Progress toward addressing prior findings and their priority
- Current number of open findings by priority
 - Priority 1 (Urgent – immediate action recommended)
 - Priority 2 (Important – address within 1-3 months)
 - Priority 3 (Necessary – address within 1-6 months)

IPOC Metrics



Appendix A3 - Contract Metrics

The Contract Management Plan (CMP) outlines the metrics that the project will use to determine

- the vendors' success in meeting contract requirements
- SOS' ability to accurately estimate schedule, scope of work, and budget targets.

The Contract Manager is responsible for analyzing data related to the approved contract performance metrics and reporting results monthly to the Project Manager and Project Director.

The Project Manager (or designee) is the primary source of schedule and quality related data.

The Contract Manager, in collaboration with the HAVA fiscal analyst and SOS Accounting, is responsible for budget related data. The Contract Manager is responsible for contract initiation

and execution related data. The Contract Manager is responsible for producing the monthly Contract Management Performance Report by the 10th working day of each month. Three metrics will be used to evaluate each of the deliverables-based contracts SOS enters into for the VoteCal Project: quality, budget and schedule. Those contracts include SI vendor, IV&V, IPOC and the deliverables portions (if any) of time and materials contracts for the Technical Architect, Quality Assurance Manager, and Acceptance Test Lead.

Measuring Quality

The CMP states that for contract performance purposes quality will be measured as “the variance between established quality expectations and the product delivered.”

Baseline: Quality expectations established and agreed to either through the procurement vehicle (for example, the statement of work), DED process, named industry standards, or through verbal or written negotiation with the Project Manager and/or Project Director.

For each contract, the Project Manager (or Project Director in the case of PM services) will report to the Contract Manager not later than 5 working days from the last working day of the month:

- A summary of subjective judgments related to the quality of contractor performance

Measuring Budget/Cost Management

The CMP states that for contract performance purposes cost management will be measured by comparing actual contract expenditures to the original contract budget to identify percent change. Similar measures can be made for the project overall.

Baseline: Original Contract Values

- Total Dollars
- Total Hours (in dollars)
- Individual Deliverable Costs (in dollars)
- Original SPR EAW line item totals

For each contract, the Contract Manager will maintain an accounting of the contract baseline costs and actual expenditures. The Contract Manager will provide monthly reports to the Project within 10 calendar days of month end.

- actual versus budgeted costs by fiscal year for each contract
- total hours expended to date for time and materials contracts

Measuring Schedule Management

The CMP states that for contract performance purposes the Contract Manager will monitor the relationship between deliverable acceptance and scheduled due dates.

Baseline: Deliverables list defined in each contract

- Last approved project schedule

For each contract, the Project Manager (or Project Director in the case of PM services) will report to the Contract Manager on a flow basis but not later than 3 working days from the last working day of the month:

- any changes to deliverable review cycles
- any changes to deliverable due dates
- the actual dates deliverables were received
- the actual dates deliverables were approved

The Contract Manager will report monthly to the Project Manager and Project Director by contract and by deliverable:

- the scheduled versus actual delivery dates of all deliverables
- the number of days variance from the baseline schedule (calculated by identifying the number of days between actual delivery data versus the scheduled delivery date as posted in the project schedule)
- the percent of deliverables that were on schedule (calculated by difference of number of deliverables delivered on schedule versus total number of deliverables)

Caveats

NOTE: The duration estimate is progressively elaborated, and the process considers the quality and availability of the input data. For example, as the project engineering and design work evolves, more detailed and precise data is available, and the accuracy of the duration estimates improves. Thus, the duration estimate can be assumed to be progressively more accurate and of better quality.¹⁴

The project schedule is central to many contract performance metrics. For reporting purposes, the Contract Manager will rely on the last approved project schedule as the baseline for the project. It is the Project Manager's responsibility to maintain the schedule by reflecting in the schedule all task and deliverable assignments and all changes to initiation and due dates, review cycles, deliverable due date extensions, dates deliverables received and dates deliverables are approved. In order to allow sufficient time at month end to fully capture all schedule changes, the Project Manager may provide notices via email of schedule changes. If these changes affect other timelines for that deliverable or for other deliverables, it is the responsibility of the Project Manager to provide that information to the Contract Manager for it to be considered in the monthly performance report. Use of such informal data in project metrics will be noted in the monthly report. For time and materials contracts, hours are expended on a daily basis and may not be the same each day. In order to avoid duplicate effort, the Contract Manager will rely on the HAVA timesheets for reports of hours expended by task. Generally, these are received by the Contract Manager within a few days of month end. If timesheets are not submitted timely, recent month expenditures may not be included in the monthly report.

¹⁴ PMBoK, para 6.4, Estimate Activity Durations

Contract Metrics

TARGET	METRIC	PURPOSE	MEASUREMENT	DATA SOURCE	DATA PROVIDER	WHEN IS DATA DUE
Catalyst	Rework Cycles as a percentage of total deliverables (# of requests for rework divided by the total number of vendor deliverables described in the contract. * only applies to contract deliverables, not interim products	Monitor contractor's ability to deliver quality the first time	<ul style="list-style-type: none"> total time allocated; # review cycles planned; # days allocated per review for each participant; # days elapsed per participant; # requests for rework # actual review cycles total actual days elapsed from initiation until approval 	SI Contract: Designated deliverables Schedule: <ul style="list-style-type: none"> Task initiation date Scheduled due date Planned review cycles and associated entry and exit dates Days associated with approved extensions/additional review cycles Other: <ul style="list-style-type: none"> # requests for rework (if not posted into schedule) Copies of signed acceptance documents 	Pat, Fred/project scheduler	Within 3 days of the end of the month
SOS	Percent variance from baseline budget	Monitor project's ability to keep expenditures within budget allocated	<ul style="list-style-type: none"> \$ difference between baseline and actual invoice % variance by contract % variance by overall project 	<ul style="list-style-type: none"> Project Budget (approved EAWs and FY allocations) Deliverable Invoices Approved Change Requests 	Rox, Kaye	Within 5 days of the end of the month* ¹⁵
Deliverables-based contractors	Number of days variance from deliverable due date *will only apply to schedule-tracked deliverables	Monitor project's ability to stay on planned schedule	<ul style="list-style-type: none"> difference in days between due date and receipt date 	Contracts: Named deliverables Schedule: <ul style="list-style-type: none"> deliverable due date deliverable receipt date 	Pat, Fred	Within 3 days of the end of the month

¹⁵ Dependent on timely receipt of vendor HAVA timesheet. If vendor billing is not received by the data cut-off date the performance report will indicate up to date is not yet available.

VoteCal Quality Management Plan

TARGET	METRIC	PURPOSE	MEASUREMENT	DATA SOURCE	DATA PROVIDER	WHEN IS DATA DUE
Technical Architect, Security Auditor, Quality Assurance Manager, Acceptance Test Lead.	Percent of deliverables that were behind schedule * will only apply to schedule-tracked deliverables	Monitor contractor's ability to meet agreed due dates	<ul style="list-style-type: none"> difference in days between due date and receipt date expressed as a % of total deliverables 	Contracts: Named deliverables Schedule: <ul style="list-style-type: none"> deliverable due dates deliverable receipt dates 	Pat, Fred	Within 3 days of the end of the month
Consultants	Satisfaction with consultant's willingness to engage the project and provide their expert observations and recommendations. Usefulness of recommendations to project management, issue/risk management and quality assurance.	Satisfaction with consulting services provided	Monitoring contractor productivity and document any concerns about performance	Project Director, in consultation with the Project Manager (except when evaluating the Project Manager's services)	Mary; Fred	Within 5 days of the end of the month

Additional Periodic Metrics (Contracting, on request)

TARGET	METRIC	PURPOSE	MEASUREMENT	DATA SOURCE	DATA PROVIDER	WHEN IS DATA DUE
Vendors	Percent scope variance from contract SOW	Accuracy in estimating scope of work	As appropriate: <ul style="list-style-type: none"> Total # (amended) deliverables divided by original # of deliverables expressed as a % of total deliverables Total # (amended) hours divided by the original # hours expressed as a % of total hours 	<ul style="list-style-type: none"> Contract SOW Contract amendments 	Rox	Include in report as appropriate

VoteCal Quality Management Plan

TARGET	METRIC	PURPOSE	MEASUREMENT	DATA SOURCE	DATA PROVIDER	WHEN IS DATA DUE
SOS	Percent variance from estimated time to execution	Monitor contracting process throughput	Projected vs. elapsed time for <ul style="list-style-type: none"> • SOW or amendment development • Internal approval • Vendor or county approval • DGS action • Contract execution (after receipt from vendor, county, or DGS) 	<ul style="list-style-type: none"> • ASTROS • Email communications 	ASTROS BOAS	Within 5 days of the end of the month
Discovery	2/8/10: Complete - SOS and Catalyst completed the final metrics for Discovery to be used at the sessions.	REF: VoteCal To-Do List.xls-Completed. What are the performance metrics and targets for Discovery Sessions?	As appropriate: <ul style="list-style-type: none"> • Total # (amended) deliverables divided by original # of deliverables expressed as a % of total deliverables • Total # (amended) hours divided by the original # hours expressed as a % of total hours 	<ul style="list-style-type: none"> • Contract SOW • Contract amendments 	Rox	Include in report as appropriate

Appendix A4 – Quality Performance Metrics

NOTE: To assure these metrics add value that exceeds the effort to develop them, they will be progressively developed over time and in response to specific problem areas.

A quality metric is an operational definition that describes, in very specific terms, a project or product attribute and how the quality control process will measure it. A measurement is an actual value. The tolerance defines the allowable variations on the metrics. For example, a metric related to the quality objective of staying within the approved budget by $\pm 10\%$ could be to measure the cost of every deliverable and determine the percent variance from the approved budget for that deliverable. Quality metrics are used in the quality assurance and quality control processes. Some examples of quality metrics include on-time performance, budget control, defect frequency, failure rate, availability, reliability and test coverage.

PMBok, para 8.1.3, Plan Quality: Outputs, sub-para .2, Quality Metrics: "A quality metric is an operational definition that describes, in very specific terms, a project or product attribute and how the quality control process will measure it. A measurement is an actual value. The tolerance defines the allowable variations on the metrics. For example, a metrics related to the quality objective of staying within the approved budget by $\pm 10\%$ could be to measure the cost of every deliverable and determine the percent variance for that deliverable from the approved budget for that deliverable. Quality metrics are used in the quality assurance and quality control processes. Some examples of quality metrics include on-time performance, budget control, defect frequency, failure rate, availability, reliability, and test coverage."

Sub-para .4, Process Improvement Plan: "... Areas to consider include:

- Process metrics. Along with control limits, allows analysis of process efficiency."

PMBok, para 8.3.1, Perform Quality Control: Inputs, sub-para .4 [also 10.5.1, Performance Reporting, sub-para .3], Work Performance Measurements: "Work performance information is used to generate project activity metrics to evaluate actual progress compared to planned progress. These metrics include, but are not limited to:

- Planned versus actual schedule performance,
- Planned versus actual cost performance, and
- Planned versus actual technical performance.

PMBok, para 12.1.3, Plan Procurements: Outputs, sub-para .1, Procurement Management Plan:

- "Procurement metrics to be used to manage contracts and evaluate sellers."

Government Extension, PMBoK, Performance-Based and Gateway budgeting:

"Performance-based budgeting can be of great benefit to the voters and taxpayers. However, three are pitfalls:

- Performance measures must be carefully designed to encourage desirable behavior.
- Poorly defined measures can require manager to make the wrong decisions in order to meet their performance target.
- The design of the measures requires a thorough understanding of the program.

Quality Performance Metrics

TARGET	METRIC	PURPOSE	MEASUREMENT	DATA SOURCE	DATA PROVIDER	WHEN IS DATA DUE
SOS	SOS' project management for Phase I, SOS' ongoing process tasks	Product Quality The monitoring of specific project results to determine whether the team is performing to relevant quality standards and the identification of actions required to correct unsatisfactory performance. Process Quality. The application of planned, systematic quality activities to provide confidence that the team is following the defined processes to needed to meet the requirements of the project.	A. Number of findings or exceptions per review B. Number of repeated reviews based on deficiency C. Reason for repeat review [Pareto]	IPOC, IV&V, QAM Findings and Recommendations Corrective Action Plan	SOS QAM	Monthly Performance Review
Catalyst	Catalyst's project management, Phase I, Initiation and planning	Product Quality The monitoring of specific project results to determine whether the team is performing to relevant quality standards and the identification of actions required to correct unsatisfactory performance. Process. The application of planned, systematic quality activities to provide confidence that the team is following the defined processes to needed to meet the requirements of the project.	A. Number of findings or exceptions per review B. Number of repeated reviews based on deficiency C. Reason for repeat review [Pareto]	IPOC, IV&V, QAM Findings and Recommendations Corrective Action Plan	Catalyst QAM	Monthly Performance Review

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TARGET	METRIC	PURPOSE	MEASUREMENT	DATA SOURCE	DATA PROVIDER	WHEN IS DATA DUE
SOS	SOS' project management for Phase II, Design, SOS' ongoing process tasks	Product Quality The monitoring of specific project results to determine whether the team is performing to relevant quality standards and the identification of actions required to correct unsatisfactory performance. Process. The application of planned, systematic quality activities to provide confidence that the team is following the defined processes to needed to meet the requirements of the project.	A. Number of findings or exceptions per review B. Number of repeated reviews based on deficiency C. Reason for repeat review [Pareto]	IPOC, IV&V, QAM Findings and Recommendations Corrective Action Plan	SOS QAM	Monthly Performance Review
Catalyst	Catalyst's project management, Phase II, Design	Product Quality The monitoring of specific project results to determine whether the team is performing to relevant quality standards and the identification of actions required to correct unsatisfactory performance. Process. The application of planned, systematic quality activities to provide confidence that the team is following the defined processes to needed to meet the requirements of the project.	A. Number of findings or exceptions per review B. Number of repeated reviews based on deficiency C. Reason for repeat review [Pareto]	IPOC, IV&V, QAM Findings and Recommendations Corrective Action Plan	Catalyst QAM	Monthly Performance Review

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TARGET	METRIC	PURPOSE	MEASUREMENT	DATA SOURCE	DATA PROVIDER	WHEN IS DATA DUE
SOS	Project Integration Management	Change cycle time. Evaluate the time required to create, discuss and implement a change request versus the estimated time for the process (trend line per change). Include the details of sub-processes- i.e. time to create, time to discuss and approve, time to implement [Pareto by change]	A. Time from Change request submission to closure B. Time to complete change request including analysis C. Time from completion to approval D. Time from approval to closure	Schedule, actual duration (business days)	CCB Chair	End of phase
SOS	Project Scope Management	Deliverable review cycle time. Evaluate the time required to review drafts and accept final deliverables. Include details of review: first draft, revisions, second and subsequent drafts and revisions if required, final	A. Time from first draft delivery to acceptance. B. Draft review time(s) C. Draft revision time(s) D. Final signature time	Schedule, actual duration (business days)	SOS Scheduler	End of phase
Catalyst	Project Schedule Management	Estimated vs. Actual Work. Percent of actual work compared to hours planned.	Work (estimate)/Actual Work (use Duration if Work/hours aren't available)	Schedule, Work (Hours, planned) and Actual Work	Catalyst Scheduler	End of phase
SOS	Project Quality Management	Project report card. Average of PMBoK area report cards (trend). Include details to differentiate SOS' and Catalyst's ratings (Pareto by area and team).	A through F, 4.0 through 0	Survey Monkey or other	QAM	End of phase

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TARGET	METRIC	PURPOSE	MEASUREMENT	DATA SOURCE	DATA PROVIDER	WHEN IS DATA DUE
SOS	Project Quality Management	Responsiveness and agility. Average number of open action items (trend). Details by sub-team (CCB, OCM, etc.) and turnover rate.	Action items, findings and recommendations open (monthly). Open – Closed + total.	IPOC, IV&V and QAM audits	QAM	End of phase
SOS	Project Communications Management	Meeting effectiveness. Conduct effective meetings (IV&V noted that many tasks are engaged through meetings). Rate meeting effectiveness (trend by meeting). Include details on duration, utility and dissatisfaction	A through F, 4.0 through 0	Survey Monkey or other	Meeting facilitator/Team leaders to QAM	End of phase
SOS	Project Procurement Management	Partnership. Poll Catalyst and SOS teams on satisfaction with professional relationships. Include details of dissatisfaction	A through F, 4.0 through 0	Survey Monkey or other	QAM	End of phase
Catalyst	Organizational Change Management	Communications with counties. Poll county reps on satisfaction with VoteCal information sharing. Include details on whether they feel well informed and do they have a positive attitude toward VoteCal? Include details of dissatisfaction.	A through F, 4.0 through 0	Survey Monkey or other	OCM	End of phase

DRAFT Appendix A5 – Software Metrics

NOTE: This appendix has been started; however, these metrics may not be completed until the forthcoming Acceptance Test Lead is in place or prior to VoteCal's Development Phase. Software metrics will conform to IEEE 1061, Standard for a Software Quality Metrics Methodology, and consider best practices from the ASQ CSQE BoK.

Software metrics. CSQE BoK, Metrics and Measurement:

"... The application of software metrics in industry has been relatively slow.... Large disagreement exists about the value of measures.... validation is difficult to explain to management.... software development and quality systems re primitive. The quality systems that do exist tend to be code oriented.... lack of accessible materials on software measures and metrics...."

Considerations for the forthcoming Appendix A5, Software Quality Metrics, include:

- metrics and measurement theory germane to software development including knowledge of the software's attributes, measurability, meaningful statements (attributes, entities), and potential for statistical analysis;
- entities (objects or events), attributes, measurements, primitives and measures, reliability, validity, errors, representational conditions, and definitions;
- process and product measurement: metrics, software attributes, defect detection effectiveness, program performance and process effectiveness;
- code coverage including branch-to-branch, condition, domain coverage, cyclomatic complexity, boundary, path, individual predicate, data-flow or other;
- metrics development including Goal-Question-Metric paradigm; process, product and resource measures (entities and attributes: correctness, efficiency, flexibility, integrity, interoperability, maintainability, portability, reliability, verifiability, usability, reusability, testability, expandability or extendibility, performance, robustness, traceability); assessment and prediction measures; models to design metrics; and
- the ready availability of metrics through Catalyst's development tools such as Microsoft Visual Studio/Team Foundation Server.

DRAFT Software Metrics

REVIEW ITEM	OPERATIONAL DEFINITION
Software quality	<p>Defects</p> <p>A. Defect Density, The ratio of the number of defects to program length. Normalizing by size allows groupings (module or release) of varying size to be compared. Density = Total Number of Defects per Thousand Lines of Code (KLOC) Grouped by Module or Release [Pareto], (Total Defects / KLOC) by Group</p> <p>B. Note: Microsoft Visual Studio incorporates lines of code metric feature (code coverage tool).</p> <p>C. Defect Leakage, Defects that should have been identified in a preceding SDLC phase. Identifies inefficiencies in the software engineering process as a whole. Leakage = Total Number of Leaked Defects (by Phase) [Pareto]</p> <p>D. Causal Analysis, The purpose of Causal Analysis is to identify common causes of defects and other problems and take action to prevent them from occurring in the future. Count of Defects Grouped by Cause [Pareto]</p>
<p>Development phase (code review)</p> <p>REF: http://msdn.microsoft.com/en-us/library/ee658094.aspx#Overview</p>	<ol style="list-style-type: none"> 1. Number of defects per LOC (defect density). 2. Number of distinct function points to LOC. 3. Percentage of LOC of function points (code coverage). NOTE: Define 4. Risk density per LOC (number of high, medium or low risks per LOC). NOTE: Define H/M/L risk 5. Number of defects per LOC in re-inspection. 6. Exception handling factor (number of exception classes/total number of possible exception classes) 7. Number of defects per unit of time spent on review (Defect detection rate) 8. Re-inspection defect rate (number of defects during re-inspection) See above 9. Data type, format, length and range checks enforced for all data. Documentation? 10. Number of security decisions based on parameters (e.g. URL parameters) 11. Number of unhandled exceptions. 12. Number of unscrambled error messages (Error messages should be scrubbed to avoid any sensitive information being revealed) 13. Number of functions requiring user re-authentication. 14. Access control (ACL's) applied on log files (to prevent un-authorized access) 15. Number of tiers having auditing and logging enabled across multiple servers. 16. Number of injection flaws (e.g. SQL injections to bypass authentication, log injections) 17. Number of components sliced for Horizontal and vertical authorization (Horizontal – users should not see data other than their own, Vertical – distinction between access to "Super-user" and "Normal user").
Testing phase	<ol style="list-style-type: none"> 1. Number of test cases used per the number of requirements 2. Number of failures for each test. 3. Number of failures per test cycle 4. Number of modules passed/failed during each test cycle. F/Total? 5. Number of test records evaluated per test cycle. Number of modules that failed in integration testing 6. Number of defects in interfaces with counties. 7. Number of defects due to remediated data from counties. 8. Number [by] type of defects per total number of defects by type [Pareto] 9. Number of test cases reworked (based on clarification of requirements and based on defects reported in the test cases themselves).

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REVIEW ITEM	OPERATIONAL DEFINITION
<p>Deployment phases</p> <ol style="list-style-type: none"> 1. Pilot deployment 2. Deployment and cutover 	<ol style="list-style-type: none"> 1. Deploy and test Routers for local county connectivity (Desired Outcome: physically deploy routers and ensure ability to successfully transmit and receive data though local network and firewalls) <ol style="list-style-type: none"> A. Deploy Routers. Whether SOS is deploying routers in an expeditious manner, #counties deployed / # counties, Weekly, Target: Should see steady improvement B. Test County connectivity. SOS, Whether Counties connectivity to VoteCal is being successfully tested, #counties successfully tested / # counties in which routers deployed, Weekly, Target: Should see steady improvement. C. #counties failed on 1st try/ total counties tested. 2. Reliability <ol style="list-style-type: none"> A. Availability (percentage of time a system is available, versus the time the system is needed to be available) B. Mean time between failure (MTBF) C. Mean time to repair (MTTR) D. Reliability ratio (MTBF / MTTR) E. Number of product recalls or fix releases. F. Number of production re-runs as a ratio of production runs. 3. Help Desk. <ol style="list-style-type: none"> A. Develop standards for help desk response times; e.g. time to develop trouble ticket, time to route request to appropriate party and time to respond to user needs. Evaluate the actual times against the standards. [Pareto/trend] B. Number of first contact resolutions. C. Number of resolutions utilizing the knowledge base. D. Number of calls abandoned and call abandon rate per total help desk calls.

DRAFT Appendix A6 – Future Phase Metrics

The metrics will not be developed until future phases of the Project.

Future Phase Metrics

REVIEW ITEM	OPERATIONAL DEFINITION
Project management for each phase: III. Development IV. Testing V. Pilot deployment VI. Deployment and cutover	Product. The monitoring of specific project results to determine whether the team is performing to relevant quality standards and the identification of actions required to correct unsatisfactory performance. Process. The application of planned, systematic quality activities to provide confidence that the team is following the defined processes to needed to meet the requirements of the project. Number of findings or exceptions per review Number of repeated reviews based on deficiency Reason for repeat review [Pareto]
Cost of Quality (C0Q) (Prevention, CoP)	Costs of quality activities (in hours) A. reviews B. inspections C. preventive measures D. test planning E. test preparation F. test execution G. version and change control
CoQ (Cost of Internal Failure, CoFi)	Cost of quality activities (in hours) A. defect tracking (update time) B. debugging C. regression testing
CoQ (Cost of External Failure, CoFe)	Cost of quality activities (in hours) – User Acceptance Testing and Pilot A. defect tracking (update time) B. debugging C. regression testing
Project closeout	1. Cost-benefit 2. Net present value 3. Statistical measures of project performance
SOS Information Technology Division's Metrics	None used (currently developing standards)

APPENDIX B – VOTECAL QUALITY CHECKLISTS

A checklist is a structured tool, usually component-specific, used to verify that a set of required steps has been performed. Checklists range from simple to complex based on project requirements and practices. Many organizations have standardized checklists available to ensure consistency in frequently-performed tasks. In some application areas, checklists are also available from professional associations or commercial service providers. Quality checklists are used in the quality control process.

Applicable Industry Standards

Verification is an iterative process aimed at determining whether the product of each step in the system development life cycle

- (a) fulfills all the requirements levied on it by the previous step, and
- (b) is internally complete, consistent, and correct enough to support the next phase of the project.

Validation is the process of executing software and exercising the hardware, and comparing the test results against the required performance.

All tasks and activities will be performed in accordance with the applicable Institute of Electrical and Electronics Engineers (IEEE) standard(s) (or equivalent standard that is substantially similar). At a minimum, IEEE standards 1012-1998 (Software Verification and Validation) and 12207-1995 (Software Life Cycle Processes) should be applied.

SAMPLE Contract Management Checklist [extract]

ITEM	YES	NO
1. Are efforts in place to ensure that the RFP and vendor selections are undergoing sufficient independent peer reviews and audits?		
2. Is the RFP quality review process defined and described (this would be the process for the review of the RFP and for the evaluation of responses): who reviews, who signs off, who is copied?		
3. Is the process described for any RFP or subsequent contract amendments: who signs off, how they are communicated		
4. Is the process described for how responses are to be treated and logged: checked in and out, how identified, how accessed, are they controlled documents, who has authority to use them, what is the security policy for SOS response to vendor questions?		
5. How will the capability of the contractors who respond be evaluated?		
6. Is there an evaluation plan and criteria for the responses?		
7. Is there a list of formal documentation to be given to each vendor?		
8. Is there a requirements traceability process in place?		
9. How will the Quality Records be controlled? (Quality records will be the testing records, audits, deficiencies, corrective actions, etc. that are kept once implementation begins, but a process to control them can and should be defined at any time prior to implementation).		
RFP and vendor selections independent peer reviews and audits		
10. Does the RFP document quality expectations for the vendors such as?		
A. What audits and reviews will be conducted?		
B. What management stage-gate reviews are expected?		
C. What oversight and rework is expected?		
11. Have oversight functions been described in procurement documents		
Once the Software Application Integration vendor is chosen, the following additional criteria will apply:		
12. Are system designs undergoing independent and peer reviews?		
13. Is there a process for auditing and approving all test results?		
14. Are requirements being traced through the testing and results?		
15. What quality metrics will be used to evaluate test results?		
16. What quality tools and techniques will be used during testing, such as benchmarking?		

SAMPLE Project Startup Checklist – SOS VoteCal Project

Form: PM 06 Sample Project Start Up Check List

Item	Status	Comments/Plan to Resolve
1. Planning		
1.1. Is the project statement -- scope, definition and objectives -- the same as agreed to in the project initiation process and/or in the vendor contract?		
1.2. Has the project statement been reviewed as part of the baseline process?		
1.3. Is there a baseline plan against which to measure progress?		
1.4. Does the baseline plan address the following areas:		
1.5. Project Scope, Deliverables, and Milestones		
1.6. Work Breakdown Structure		
1.7. Task plans, estimates, resource assignments		
1.8. Task dependencies		
1.9. Project Schedule		
1.10. Milestone Schedule		
1.11. Project progress tracking		
1.12. Issue Resolution and Change Management		
1.13. Quality Plan		
1.14. Risk Management Plan		
1.15. Project Organization		
1.16. Other Plans as needed:		
1.17. Facilities Plan		
1.18. Documentation Plan		
1.19. Materials Plan		
1.20. Training Plan		
1.21. Back-up and Recovery Plan		
1.22. Contingency Plan		
1.23. Cut Over Plan		
1.24. Warranty Plan		
1.25. Transition Plan		
1.26. Others:		
1.27. Is the plan for project resources adequate?		
1.28. Are the original project schedule and budget realistic?		
1.29. Is the plan for the organization of the project resources adequate?		
1.30. Are there adequate project control systems?		
1.31. Is there an information system for the project?		
1.32. Were key project stakeholders brought into project plan?		
1.33. Were potential users involved early in the planning process?		
1.34. Was planning completed before the project was initiated?		
1.35. Is the plan under configuration management?		
1.36. If there are vendors, have they signed off on the project plan?		
1.37. If there is an independent oversight contractor, have they signed off on the project plan?		
2. Organization		
2.1. Is the project organization documented and on file?		
2.2. Is the Project Manager qualified and experienced in Project Management?		
2.3. Have roles and responsibilities of the team been documented and clearly communicated to the team, customer, and stakeholders?		
2.4. Is the organization structure appropriate for the project's size and complexity?		
2.5. Is there an identified role of a technical leader (i.e., Project Lead, Team Lead, Solution Architect)?		
2.6. Is the quality function identified and assigned?		
2.7. Is there a Project Administrator function identified and defined?		
2.8. Is there a Change Management Board?		
2.9. Have the configuration management functions been assigned?		
2.10. Are there backup strategies for key members of the project?		
2.11. Other Organization items:		

SAMPLE Project Oversight Review Checklist: High Criticality Project

PRACTICES AND PRODUCTS	ADEQUATE	DEFICIENT	NOTES: ITEMS REVIEWED; INTERVIEWS CONDUCTED; DEMONSTRATION
Planning and Tracking			
1. Have the business case, project goals, objectives, expected outcomes, key stakeholders, and sponsor(s) identified and documented?	X		
2. Has a detailed project plan with all activities (tasks), milestones, dates, and estimated hours by task loaded into project management (PM) software? Are the lowest level tasks of a short duration with measurable outcomes?		X	The SI vendor has produced and SOS has accepted a plan and schedule for the vendor tasks. It is not resource loaded. SOS is completing their schedule with resource loading and should be ready for review sometime in Feb. 2010. It is unknown at this time if there are measurable outcomes for the lowest level tasks.
3. Is completion of planned tasks recorded within the PM software?	X		Done in MS Project
4. Are actual hours expended by task recorded at least monthly within PM software?	X		Actual duration in days is recorded in MS Project
5. Are estimated hours to complete by task recorded at least monthly within PM software?		X	No evidence in MS Project
6. Is there a formal staffing plan, including a current organization chart, written roles and responsibilities, plans for staff acquisition, schedule for arrival and departure of specific staff, and staff training plans			A formal staffing plan is in progress. There is an organization chart in the Project Charter and Communications Plan.
7. Have project cost estimates, with supporting data for each cost category, been maintained?	X		Costs are tracked at a high level. Vendor contract is fixed price and deliverables based.
8. Are software size estimates developed and tracked?			Not applicable for this phase of the project.
9. Are two or more estimation approaches used to refine estimates?			Not applicable for this phase of the project.
10. Are independent reviews of estimates conducted?			Not applicable for this phase of the project.
11. Are actual costs recorded and regularly compared to budgeted costs?	X		Previous IPOC reported that actual costs are recorded from CalSTARS reports and compared to FSR budget amounts. Current IPOC has not reviewed budgets at this time.
12. Is supporting data maintained for actual costs?	X		Invoices and CalSTARS
13. Is completion status of work plan activities, deliverables, and milestones recorded, compared to schedule and included in a written status reporting process?			New IPOC has not assessed yet.
14. Are key specification documents (e.g. contracts, requirement specifications and/or contract deliverables) and software products under formal configuration control, with items to be controlled and specific staff roles and responsibilities for configuration management identified in a configuration management plan?	X		Configuration Management Plan Oct 19, 2009
15. Are issues/problems and their resolution (including assignment of specific staff responsibility for issue resolution and specific deadlines for completion of resolution activities), formally tracked?	X		Issue Management Plan August 3, 2009
16. Is user satisfaction assessed at key project milestones?	X		The Counties are actively involved and will participate in Discovery sessions held in Feb. 2010.
17. Is planning in compliance with formal standards or a system development life-cycle (SDLC) methodology?			New IPOC has not assessed at the point.
18. Is a formal enterprise architecture in place?			New IPOC has not assessed at the point.

Vendor Walkthroughs

To the extent practical, vendors should provide appropriate SOS staff a walk through of deliverables before drafts are finalized. This will preclude rework due to incorrect, missing, incomplete or ambiguous material that SOS staff subject matter experts can provide insight that is not readily available to vendors. During the walkthrough, the vendor should highlight alignment of the deliverable to DEDs, standards and metrics, and other authoritative requirements.

SAMPLE Deliverables Acceptance (SOS' sign off) Process¹⁶

SI vendor and SOS have agreed on a deliverable review and approval guideline process containing the following steps:	YES	NO
1. SI vendor will create the draft deliverable and submit it to SOS for review (e.g., version 1.0).		
2. The SOS Core Team will conduct a high-level review of the deliverable over a one- to two-day period.		
3. SI vendor will conduct a briefing for the Core Team on the deliverable highlighting the significant aspects of the deliverable.		
4. The Core Team will conduct an in-depth review of the deliverable and will provide comments to the SOS Project Manager in a single document. Note that the Core Team may solicit other SOS and State subject matter experts in conducting the review.		
5. The SOS Project Manager will provide a consolidated version of the Core Team comments to SI vendor.		
6. SI vendor may request a meeting with the Core Team to clarify any aspect of the Core Teams comments. If SI vendor does not request such a meeting, SOS will assume that the Core Team comments will be addressed.		
7. SI vendor will make the appropriate revisions to the deliverable and will submit it as an updated draft (e.g., 1x), identifying the change made.		
8. SI vendor will meet with the Core Team to conduct a walk-through of the changes contained in the updated draft. If further changes are needed to the deliverable, SI vendor and the Core Team will agree upon those changes during this walk-through session.		
9. SI vendor will submit the final version of the deliverable (e.g., 2.0).		
10. SOS will review and approve the final version of the deliverable.		
SOS reserves the right to review and approve all deliverables as outlined I the VoteCal RFP.		

SAMPLE Design Review Checklist

ITEM	Y/N/NA	Finding/ Observation	Comments
Review preparation			
1. Have standards been identified to clearly define the review process?			
2. Were guidelines used to prepare for the review?			
3. Has the project submitted any request for deviations or waivers to the defined process?			
Requirements			
4. Do the requirements flow down and are they traceable?			
5. Have remaining "To Be Determined" (TBD) requirements been resolved? (If any).			

SAMPLE Operational Readiness Review Checklist

ITEM	Y/N/NA	Finding/ Observation	Comments
1. Were the goals of the review and any review prerequisites provided?			
2. Was status given on action items from the Acceptance Review?			
3. Was the relationship of requirements to support provided (i.e., typical, critical, special or contingency)?			

¹⁶ This process is documented at \\sosfps4\SOS_SHARE\Projects\HAVA\SWDb\VoteCal\Project Management\Decisions\Deliverable Review and Approval Process 102209.doc and is under review as of April 2010

SAMPLE Project Management Plan Artifact Assessment Checklist

Appendix Q-3A, Project Charter and Project Management Plan Checklist

NOTE: this checklist was completed March 8, 2010; however, dated signatures of sponsor, PM and SI vendor PM (ceremonial signatures) may be delayed until project initiation team meeting/celebration.

- √ Employs SOS standard formatting; is unambiguous to VoteCal Project sponsor, project manager and team members; quantifies elements whenever practical; and considered: reference planning inputs including the Phase 1 charter and procurement documents, organizational policies (available on the SOS intranet), updated constraints and assumptions; applied project planning methodology (herein and in Phase 1 Deliverable 5), stakeholder skills and knowledge provided by SI vendor PM, supplemented by VoteCal PM, PM information system (PMIS, G-drive), earned value management (EVM, provided by SI vendor PM), supporting detail provided by SI vendor and these checklists germane to plans (previously reviewed in Phase 1).
- √ Scope planning includes the following inputs (may be appendices): original (Phase 1) product description, strategic plan (extracts), selection criteria and historical information (selected), business need (described in Phase 1), goals and objectives (described in Phase 1), in scope and out of scope and high-level deliverables (included in deliverable entrance and exit criteria), high-level resource requirements including team members and time commitments, high-level time and cost estimates (detailed in Phase 1 Deliverable 5), differentiated responsibilities of VoteCal and SI vendor project managers, project managers, constraints and assumptions (updated from Phase 1), product analysis, expert judgment, scope statement from Deliverable 5 and the Phase 2 Contract, supporting detail to the extent that SOS team members can understand their roles and responsibilities, scope definition (deliverable entrance and exit criteria), other planning outputs related to scope as required.
- √ Work Breakdown Structure includes: activity list including line items from Phase 1, Deliverable 5, supporting detail to the extent that SOS team members can understand their roles and responsibilities.

NOTE: WBS updates providing additional details as the project phases progress do not require CCB action.

- √ Activity Sequencing includes: Activity list, Product description, Mandatory dependencies, Discretionary dependencies, External dependencies, Milestones; application of precedence diagramming method (PDM), arrow diagramming method (ADM), conditional diagramming methods and network template (considered, not required); network diagrams including critical path (available through MS-Project plan on G-drive).

NOTE: Activity updates providing additional details as the project phases progress do not require CCB action.

- √ Activity Duration Estimating includes: activity list, updated constraints and assumptions; resource requirements and capabilities, staff availability, historical information and risk management experience from Phase 1; applied expert judgment, analogous estimating, quantitatively based durations, reserve time (contingency funds are available); provided activity duration estimates (guidelines: SI vendor 8-80 hours (2 weeks), SOS 4-20 hours (1 week); and basis for estimates (documented in Phase 1 Deliverable 5).

NOTE: Activity updates providing additional details as the project phases progress do not require CCB action.

- √ Schedule includes: project network diagrams (not essential), activity duration estimates, resource requirements and resource pool description (detail as required; ISD resources will provide IS development and network operations expertise), calendars for SOS VoteCal team members (to be created and distributed by SI vendor as activities such as test or training are planned in detail), constraints and assumptions (updated from Phase 1), leads and lags from SI vendor master MS-Project/Gantt charts (G-drive, to be detailed as required), risk management plan experience, activity attributes including expertise/members by name (detailed when required); applied mathematical analysis to estimate level of effort for testing (simulation was considered but is not anticipated nor is resource leveling heuristics), project management software (includes MS-Project within G:\SOS\PROJECTS\ATS Phase 2), the coding structure (WBS numbering/MS-Project ID; and produced the project schedule in MS-Project, supporting detail in MS-Project/Calendar displays for SOS VoteCal Project team members (detailed when required - schedule management plan should include weekly forecasts and coordination not later than noon the preceding Friday).

NOTES:

1. Duration compression/fast-tracking/parallel activity should be used and coordinated by the SI vendor PM with the VoteCal PM/team members
2. Resource requirement updates should be provided by SI vendor PM to VoteCal PM anytime project schedule is projected to exceed 10% FOR ANY ACTIVITY.

- √ Communications (Documentation) Plan includes: information distribution, information retrieval systems (G-drive), information distribution methods (communications matrix), project records, reports and project presentations; performance reporting and reviews (includes CCB/SCCB), variance, trend and earned value analysis requirements; applied tools & techniques related to performance reports and change requests; and also addresses SOS administrative closure, performance measurement documentation, product documentation (G-drive\SOS\DELIVERABLES RECEIVED...), other project records and archives, project closure and lessons learned.

- √ Change Management Plan includes: project plan execution, preventive action, corrective action, work authorization system, project management information system, issues tracking and management (aligned with Communications Plan), work results analysis, Change Control Board/Software Change Control Board, change requests, integrated change control, change control system

TBD in Software Coding Standards: Configuration Management/version control

- √ Human Resources (organizational) Plan includes: organization planning processes, staffing requirements, human resource practices, stakeholder analysis (see also Communications Plan), role & responsibility assignments, staffing management plan for SOS, organization chart, staff acquisition, staffing pool, negotiations, reassignment, project staff and team directory, team development/building activities, reward & recognition systems, co-location, training (see also Training Plan), performance improvements and input to performance appraisals

SAMPLE Process Audit Report

DRAFT (redacted)

Date: April 13, 2010

Subject: SI vendor's FUNCTION (F) Plan and Process

1. Introduction

The purpose of this audit was to review SI vendor's Deliverable #.#, FUNCTION (F) Plan and the attendant F process. The scope included interviews with SI vendor's F Manager, First Last; review of the associated Deliverable Expectations Document (DED) and the Plan; and observation of bi-weekly FM meetings and process documentation. The VoteCal Quality Assurance Manager (QAM,) conducted the audit at the request of the VoteCal Project Manager (PM). The QAM, Chris Moore, is an American Society for Quality (ASQ) Certified Quality Auditor (CQA). The audit was conducted between March 25 and April 13, 2010, at the CA Secretary of State's (SoS) VoteCal Project work site using audit protocols from the ASQ CQA body of knowledge. No confidential topics or materials were involved. This was the first VoteCal QA product and process audit.

1.1. Standards:

1. VoteCal Statewide Voter Registration System, ATTACHMENT 1 – Statement of Work [SOW], Exhibit 2: VoteCal System Tasks and Deliverables, RFP SOS 0890 – 46, Deliverable I.8 – VoteCal System FUNCTION [F] Plan
2. VoteCal Deliverable Expectations Document #.#, FUNCTION Plan v2.1, November 10, 2009
3. VoteCal Deliverable #.#, FUNCTION Plan v2.0, December 10, 2009

1.2. Distribution: VoteCal PM; SI vendor's PM and F Manager

2. Compliance.

Observation. The F Plan fully-addresses all contract requirements as refined into the DED. The F process and supporting documentation is robust and employs a proactive approach to identify and address people-related issues. Returned county surveys showed better than anticipated F results and early progress through phases illustrated in F Plan Appendix D – Anticipated Results.

Finding 1, PLAN ACTIVITY (Priority 1 due to in-progress procurement activity). The F Team rated "PLAN ACTIVITY" as Yellow. The STAKEHOLDER (S) contract(s) are not yet complete and those stakeholders are reluctant to ACTIVITY needed for system and interface specifications. In addition, county elections officials seem unsure of the protocols for user acceptance testing by SOS staff on county elections officials' systems or by county staff on SOS' systems. (Table 3-1, item 1)

Recommendation 1A. The F Manager, S representative and SoS' Contract Manager should include language that addresses how the VoteCal Team will handle stakeholder's ACTIVITY to assure confidentiality and non-disclosure across stakeholders; then obtain S' buy-in prior to finalizing the contracts.

Recommendation 1B. Involve county elections officials in User Acceptance Test (UAT) planning, then clarify and document when county participants will use SOS' systems and when SOS staff may use county systems during S ACTIVITY and UAT.

3. Corrective Action

Pending publication of SOS' Quality Management Plan and corrective action process, the F should use their current action item process to consider these recommendations and resolve these findings.

Chris Moore, April 13, 2010

CHRIS MOORE, PMP & CSQE
VoteCal Quality Assurance Manager

1 Atch: Audit Checklist

VoteCal Quality Management Plan

SAMPLE Process Audit Checklist

REVIEW ITEMS:	COMMENTS, FINDINGS (F) and OBSERVATIONS (O)
1 Contractor shall develop a VoteCal System FUNCTION Plan (FP),	Reviewed SI vendor Deliverable 1.8, VoteCal FUNCTION Plan, V2.0, December 10, 2009
1.1 in accordance with the approved DED for this deliverable.	Reviewed SI vendor Deliverable Expectations Document (DED) 1.8, VoteCal System FUNCTION Plan, November 10, 2009
2 The FP will address the anticipated business process changes that will be required with the implementation of the VoteCal system, both for the SOS	Reviewed Tables 4-1 (process changes) and 5-3 (management to minimize).
2.1 and for county users	
2.2 and how they will be managed to maximize buy-in,	
2.3 minimize disruption in business processes	
2.4 and ensure project success.	
3 This plan must include a discussion of the change management strategy	Reviewed Table5-3/Appendix A, F Planning Matrix.
3.1 and address an assessment of workplace readiness for implementation of the solution.	Reviewed design phase assessment. Activity deferred until Development Phase (June'10)
A. Is there an example of a completed assessment survey from Appendix B, Change Readiness or Communications?	Reviewed completed and analyzed assessments (MS-Word document, design phase F assessment_031210). SI vendor visited Sacramento and El Dorado (Nov'09), LA (Dec), and Orange and Riverside (Jan'10)
B. Has SI vendor or SOS completed formal assessment/planning during the Design phase? (plan para 3.1, pg 10)	
C. Have county visits (Orange, Fresno, San Diego) been completed as planned during Jan'10?	
D. What "... people-related transition risks and needs ..." were identified? (Table 3-1, item 1)	
E. What responses have been planned? (same)	Reviewed Table 4-1 that was developed based on first visits (two counties), SI vendor's corporate knowledge and Core Team inputs. This table will be revisited in July'10
F. What activities have been completed germane to "... creating a shared vision, building team rapport and dynamics, supporting team learning and process improvement, and information sharing."	Responses are listed in Appendix A, F Planning Matrix (table)
G. Which internal and external stakeholders have been identified?	The core team has held some team building activities and deferred some. Reviewed presentations (PowerPoint). Finding: Information sharing is rated Yellow. The EMS' contracts are not yet complete and those vendors are reluctant to share some proprietary information (data dictionaries) needed for interface specifications.
H. What timely, relevant information has been shared?	Reviewed App D and F meeting notes. Stakeholders are refined for each activity.
	Reviewed MS PowerPoint, VoteCal Disc Sess_presentation1 and VoteCal Disc Sess_presentation2. Initially, SI vendor conducted in-person presentations; however, due to travel costs for counties and SoS, in-person meetings have been changed to webinars at counties' request.

APPENDIX C – CORRECTIVE ACTION PLAN (CAP)

SAMPLE CAP

SOURCE FINDING	PRIORITY & RECOMMENDATION	POC CAP DUE COMPLETE REVIEW	STATUS QAM COMMENTS
IPOC VOTECAL QUALITY MANAGEMENT ASSESSMENT REPORT AUGUST 2007 1: Quality processes during the requirements, procurement, and vendor selection phases are not described in the plan.	P1 (as this impacts the RFP) Include quality processes for the RFP and vendor selection phases in the plan using the criteria in this assessment as a checklist. Include the quality review and audit processes within the RFP so that the bidder will allow sufficient dollars to participate.	Feb'10	CLOSED February 2010 – IPOC has reviewed Change Control Plan V2.1 and believes that it is sufficient for the project at this time. This finding is now closed. IPOC will monitor the change management process to assure that it serves the project. January 2010 – Carried forward from prior IPOC. IPOC to review current status reports to Sponsor and Exec Steering Committee and VoteCal Change Management Process in February and clarify or close finding.
Department of Finance (DOF), Information Technology Project Oversight Framework, IPOR February 2010 \\sosfps4\SOS_SHARE\Projects\HAVA\SWDb\VoteCal\Contract_Management\IPOC\IPORs\2010\SOS VoteCal Project Oversight Report February 2010.doc 20100206.01 Change Management Reporting Standards require clarification (propagated from prior IPOC findings)	P3 Project reporting to steering committee and sponsor should include information about changes being considered, including aging information (how long a change has been in progress		February 2010 – IPOC has reviewed Change Control Plan V2.1 and believes that it is sufficient for the project at this time. This finding is now closed. IPOC will monitor the change management process to assure that it serves the project. January 2010 – Carried forward from prior IPOC. IPOC to review current status reports to Sponsor and Exec Steering Committee and VoteCal Change Management Process in February and clarify or close finding.
IV&V VoteCal: Requirements Analysis FSR to RFP Traceability Findings, July 30, 2009. Purpose. The purpose of this report is to conduct traceability from the original VoteCal Feasibility Study Report (FSR) to the final RFP sent to the bidders and ensure SOS that no requirements were missing from the RFP.	NA	NA	The results of the trace demonstrated that no requirements were lost in translation between FSR completion and the final RFP publication. In general, SOS refined and clarified the requirements during the two year period and validated that both organizational and HAVA requirements were met.
VoteCal IV&V Schedule Review January 15, 2010 O1. Schedule needs major rework- re-establish date sequencing O2. Hard decisions relative to schedule may regain time, but will increase risk	R1. First, change dependencies back to Submission of Final – Simultaneously, SI vendor needs to validate increases in duration for certain tasks, e.g. Design DED Sequencing, Pilot Training, Pilot Execution, Deployment Cutover etc. R2. Second, consider changing dependencies to SOS submission of comments on draft to SI vendor, because it is more reflective of reality. Third, if the schedule change is insufficient to conduct pilot test for June 2011 election, consider changing to a virtual pilot.		

APPENDIX D – CONTINUOUS IMPROVEMENT

Continuous improvement is a key element of quality management. This appendix details the steps for analyzing processes to identify activities which enhance their value. Areas to consider include:

- **Process boundaries.** Describes the purpose of processes, their start and end, their inputs/outputs, the data required, the owner, and the stakeholders.
- **Process configuration.** A graphic depiction of processes, with interfaces identified, used to facilitate analysis.
- **Process metrics.** Along with control limits, allows analysis of efficiency.
- **Targets for improved performance.** Guides the process improvement activities.

Continuous Improvement Process

The continuous improvement process (CIP) is a systematic approach to planning, sequencing and implementing improvement efforts. It is not the only process improvement model or method, but it is a very comprehensive improvement process based on the Shewhart cycle.

Additionally, CIP provides a common language and methodology for all VoteCal Project team members to better understand the improvement effort.

Step 1. Identify Improvement Opportunity. Select the appropriate process for improvement that impacts the organization's mission and is linked to its key processes. This helps ensure the most return on investment (ROI) for the team's efforts. Establish a logical pattern or framework to lead the team through the improvement process. Develop indicators, such as graphs or control charts, to accurately display and help visualize the need for improvement. Remember to narrow the focus to a specific process; keep the improvement efforts within the team's span of control.

Checkpoints:

- √ Identify the project's key processes
- √ Ensure everyone understands why the process was selected for improvement and its relationship to the project
- √ Identify customer-defined critical success factors
- √ Develop a macro-process flowchart
- √ Prioritize candidate processes
- √ Identify the process to improve
- √ Identify process owner, customers, suppliers and stakeholders
- √ Identify customer requirements
- √ Establish indicators that will measure process performance
- √ Develop schedule for completing CIP and leadership reviews

Step 2. Evaluate the Process. Select an improvement opportunity and focus on the problems in close detail. Collect and interpret data relating to the process and identify a specific issue to tackle. Remember, the word 'problem' describes any discrepancy between the current and desired state of a process.

Checkpoints:

- √ Develop "as is" flowchart to task level
- √ Identify process measurement relevant to customers then collect the data
- √ Stratify the problem to a specific level for analysis
- √ Identify the most significant part of the problem
- √ Validate customer requirements against process capabilities
- √ Ensure the problem statement addresses the gap between the desired state and the actual state of the process
- √ Establish the target for improvement (use data)

Step 3. Analyze. To identify and verify the root causes of the problem use analytical tools to explore the data. Do not focus on symptoms! Analysis can help avoid discussing symptoms while identifying areas that need more information. Whether focusing on a single stage or an entire process, a careful analysis can help you succeed.

Checkpoints:

- √ Perform cause-and-effect analysis of the problem
- √ Analyze potential root causes
- √ Select the root cause that has the greatest probable impact
- √ Verify the root causes (use data)

Step 4. Take Action. Plan and implement actions that correct root causes. The team can propose improvements by using an action plan matrix to identify specific methods to use in attacking root causes. The action plan should address what, who, how and when plus identify the resources needed. The methods should be feasible, effective and cost beneficial.

Checkpoints:

- √ Develop and evaluate possible actions
- √ Ensure the actions are cost-beneficial
- √ Develop an action plan
- √ Test actions (if possible) before fully implementing them
- √ Get the cooperation and approval needed
- √ Implement the action plan

Step 5. Study Results. Confirm that the actions taken achieved their target results. It's important to understand why the target was or wasn't met. If the actions were not effective, additional actions may have to be implemented.

- √ Checkpoints:
- √ Confirm the indicator was the same one used to identify the process
- √ Determine if the action results met or exceeded the target
- √ Discuss why the target was or wasn't met
- √ If the target wasn't met, confirm additional actions

Step 6. Standardize Solution. Maintain the improved level of performance. Integrate the team's improvement efforts into the project; make improvements a regular part of daily operations. A control system can help by outlining the process, tasks involved, improvement efforts and targets.

Checkpoints:

- √ Publish revised methods and procedures
- √ Conduct training on new processes
- √ Create periodic process review points
- √ Consider areas for replication

Step 7. Plan for Future. Plan what to do with remaining problems and evaluate the team's effectiveness. The improvement process allows the team the opportunity to review the work accomplished, address remaining issues, and evaluate effectiveness. Additionally, the team can review lessons learned in problem-solving, interpersonal communications, and group dynamics.

Checkpoints:

- √ Analyze and evaluate any remaining issues
- √ Plan any future actions necessary
- √ Evaluate the team's problem-solving skills and their effectiveness

APPENDIX E – PROJECT DOCUMENT UPDATES

SAMPLE Checklist

DOCUMENT	UPDATE
Stakeholder register	
Responsibility assignment matrix	
Quality control measurements, quality checklists, quality metrics, team performance assessments, work performance information, work performance measurements	
Activity attributes, activity cost estimates, activity list, basis of estimates, duration estimates, resource requirements, stakeholder requirements,	
Charter, contracts, project funding requirements, proposals, procurement documents, sellers list, source selection criteria, statement of work,	
Assumption log, change log, forecasts, issue log, milestone list, performance reports, project organizational structure, resource breakdown structure, risk register, roles and responsibilities, stakeholder analysis, stakeholder management strategy, teaming agreements,	
Deliverable 1.1 Project Management Plan (PMP) v2 1	
Deliverable 1.2 Communications Plan v2 0	
Deliverable 1.3 Quality Assurance Plan (QAP) v2.1	
Deliverable 1.4 Configuration Management Plan (CMP) v2 1	
Deliverable 1.5 Issue Management Plan v2.0	
Deliverable 1.6 Change Control Plan v2.1	
Deliverable 1.7 Risk Management Plan (RMP) v2.0	
Deliverable 1.8 FUNCTION Plan v2.0	
Deliverable 1.9 Requirements Management Plan v2.1	
Deliverable 1.10 Kickoff Meeting v2.1	
Deliverable 1.11-12 Ongoing Tasks and Final Report v2.2	
F Wall Map v2.0	MS-Excel
Schedule 1.1 Project Master Schedule v2.2	MS-Project
Deliverable Expectation Documents (DED)	
Change Management Plan	
Communication Management Plan Final 082709	
Configuration Management Plan	
Contract [Procurement] Management Plan 02192010 final	
Cost Management Plan	
• Cost performance baseline	
Human Resources Management Plan	
Issue Management Plan final 080309	
Phase I Team Lessons Learned 122109	
Master Project Management Plan 03-19-2010	PDF
Quality_Management_Plan 0 7	THIS DOCUMENT. See Revision History page ii
• Process Improvement Plan	
Requirements Management Plan	
Risk Management Plan final 072209 mw	
Schedule Baseline	
Schedule Management Plan	
Scope baselines:	
• Scope statement	
• WBS	
• WBS dictionary	
Scope Management Plan	