****Quality Assurance /  
Quality Control Plan

Project Name

Month 2015

|  |  |
| --- | --- |
| Alliance Project Number | [PROJECT NUMBER] |
| Client Project Number |  |
| Client | [AGENCY NAME] |
| Client Project Manager –  Name and Contact Info |  |
| Project Location | [NAME OF CITY, REGION OR STATE] |
| Prime Project Name and Number | [If Alliance is not the prime, insert prime information] |
| Prime Project Manger –  Name and Contact Info | [if it changes during the project, then retain old info add new name and date of change] |
| Subconsultant | [Alliance Transportation Group – or, if  Alliance is Prime – name of the subcontractor] |
| Subconsultant Project Manager –  Name and Contact Info | [if there is no subcontractor, delete "Subconsultant" lines] |
| Notice to Proceed Date | [DATE OF NOTICE TO PROCEED] |

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# Introduction

The Quality Assurance/Quality Control (QA/QC) procedures and processes described in this document and made a part of the Project Management Plan for the xx project xx, are designed to provide assurance to xx client xx that 1) the outcomes of the project result in a quality product that meets project objectives; and 2) that adequate control is maintained during product development to ensure that products are delivered in an efficient manner with a minimum of problems due to chance errors or systemic irregularities. The two processes, Assurance and Control, have different applications and objectives and are, therefore, treated separately in the following sections.

This project specific QA/QC plan is part of the process established by Alliance to provide corporate-wide quality processes that will ensure that all Alliance products and services meet or exceed client expectations. The following is a brief outline of the Alliance Quality Goals.

## Alliance Transportation Group Quality Goals

The Alliance Corporate Leadership uses strategic quality planning to establish a vision for the Corporation and an action plan to achieve that vision. From that vision, the following set of corporate goals has been established:

* Maintain a corporate culture that values quality, and focuses on delivering quality products that meet or exceed client specifications and expectations;
* Implement quality processes at the management level that support the project teams responsible for the development and delivery of quality products and services to clients;
* Develop a strategic planning process to provide continual improvement in the quality of all corporate products and services;
* Identify internal and external customer requirements and make corporate decisions that support those requirements;
* Require that all employees work as a team to develop and support quality goals;
* Provide training and development to all employees on the processes and methodologies necessary to ensure the creation of quality products and services and the meeting of customer requirements;
* Establish an ongoing process for the collection and analysis of data relative to quality objectives;
* Create a process of improvements based on the analysis of that data; and
* Provide continual feedback to managerial and functional personnel for further quality process improvement.

# Quality Management Principles Used in this QA/QC Plan

This section is designed to give a brief overview of the definition of Quality Management that Alliance used in the development of the Alliance QA/QC policies, procedures and processes.

## References

Alliance Transportation Group, Inc, integrated several quality codes and documents into the development of this Quality Assurance/Quality Control Plan, including: Code of Federal Regulations, 10 CFR 50, Appendix B; ASME NQA‐1; ANSI/ASQC Q9001 (ISO 9001); 10 CFR 830.120; and US Office of the Secretary of Defenseguidance on total quality management.

## Terminology

There are many terms used within the transportation planning, engineering and data collection consulting community, as well as within the quality management movement in general. This section provides general definitions of the terms used in this QA/QC plan. This list is not intended to be all encompassing, but rather serves as a reference to facilitate clear communication.

Project Scope: The Project Scope is defined in the contract or work order signed by the client and Alliance. It also defines the products or services to be delivered under the contract, which are often referred to as deliverables.

Project Schedule:The Project Schedule is the timeframe under which the products or services are to be completed and delivered to the client. Sub-tasks that define the intermediary steps necessary to accomplish the project objectives are also included in the schedule. The schedule is determined in consultation with the client and clearly documented and published in a manner that can be shared with the Alliance Team members and client staff. The schedule also includes task dependencies, such that the relationship between the various elements of the schedule. Staying on schedule is part of meeting the contract requirements in a manner that addresses client expectations.

Project Budget:The Project Budget is defined in the contract or work order associated with the project, which is signed by both the client and Alliance. The budget is the amount of money for which Alliance has agreed to perform the scope of services defined in the contract. The budget management methodology will be set by the contract and the Alliance Administrative Division. For example, a contract may state that the budgeted amount must be managed by task, or that only those persons named in the contract can bill time to the contract. Completing the project within the constraints of the Project Budget is part of meeting the contract requirements in a manner that addresses client expectations.

Variance: A variance is a part of the process or product that deviates from established norms.

Risk: According to ISO 31000, a risk is the “effect of uncertainty on objectives”, and an effect of uncertainty is the “positive or negative deviation” from what is expected. Therefore, a risk is the chance that there will be a positive or negative deviation from the objective to be achieved; however, that deviation has not yet occurred. (For a more detailed description, please refer to the later section on Risk Management.)

Issue: An issue is a risk that has manifested. An issue is an identified factor that has occurred and has resulted in a negative impact to the delivery of the products or services described in the Project Scope, Schedule or Budget. An issue may need to be addressed through remediation or a modification of the project scope, schedule or budget, or client objectives and expectations. (For a more detailed description, please refer to the later section on Issue Management.)

Change: A change in official modification to the scope, budget, schedule or objectives for the project, approved by the client.

Alliance Divisions:Alliance Transportation Group has four internal divisions, each with a Division Manager: Administration; Human Resources; Planning; and Engineering. In addition, Alliance has four geographic offices: Austin (the main corporate office), Dallas, and Houston in Texas; and the Lake Charles office in Louisiana.

## Quality Principles

The principles of quality management that Alliance strives to incorporate into the corporate culture and business processes are described below. Alliance has based this QA/QC program on the following eight principles of quality management (according to the ISO 9000):

* Principle 1 – Customer focus
* Principle 2 – Leadership
* Principle 3 – Involvement of People
* Principle 4 – Process Approach
* Principle 5 – System Approach to Management
* Principle 6 – Continual Improvement
* Principle 7 – Factual Approach to Decision-Making
* Principle 8 – Mutually Beneficial Supplier Relationships

Quality Management is a process, a system-level approach, to developing products that meet or exceed client expectations. Quality control is also an ongoing deliberate process, which is planned and carried out by a team working together to achieve the desired outcome. Quality Management is based on the belief that:

* Quality processes should ensure that the work is done correctly the first time.
* Quality is achieved by focusing on preventing problems or errors rather than reacting to them.
* Quality is achieved by qualified individuals performing all work functions.
* Quality is achieved by providing proper training of personnel and ensuring that all personnel remain current on the knowledge and skills needed for their position.
* Quality is controlled by adequate planning, coordination, supervision, and technical direction; proper definition and a clear understanding of job requirements and procedures; and the use of appropriately skilled personnel.
* Quality is verified through checking, reviewing, and monitoring of work activities and associated documentation by experienced, qualified individuals who are not directly responsible for performing the work.

To implement the QA/QC Plan, the Project Manager will:

* Select and assign qualified professionals to perform the project tasks.
* Assign qualified specialists to oversee all elements of the work and carry out a consistent, deliberate program of quality control.
* Instill a sense of ownership and personal concern, felt by every person on the design team, towards quality and continually improving the quality process.
* Make certain that all personnel involved in performing the work have a clear understanding of the scope and intent of the overall project, and the appropriate design criteria and environmental concerns, in order to ensure that the work product meets or exceeds xx client xx expectations.
* Make certain that all personnel involved in performing the work are aware of the project schedule, and understand the importance of meeting intermediate deadlines as well as final completion dates.
* Make certain that designers and reviewers have a clear understanding of the work requirements and of their responsibilities.
* Arrange for peer reviews to be conducted by qualified personnel outside of the design team.
* Document the quality control process properly, to the degree appropriate to each project.

A quality process must adhere to three basic principles:

* Prevent errors from being introduced. At least as much effort should be placed on preventing errors as on finding the errors later.
* Ensure that errors are detected and corrected as early as possible. Therefore, quality controls, which include checking and back-checking procedures, must be implemented during all phases of the work.
* Eliminate the causes of the errors as well as the errors themselves. By removing the cause, the quality process has been improved.

## Analysis of Variances

Because processes are constantly changing, the quality process must address the variations in the processes in order to reduce their impact. The issue related to quality management is determining whether the variances have a **Common Cause** or a **Special Cause**.

**Common Cause** variations occur because of the process itself and/or the way the process is managed. **Special Cause** variations are the result of unpredictable anomalies that are not part of the process. When **Common Cause** variations occur, it is possible to predict (within limits), how the variation will affect the process. Alternatively, when **Special Cause** variations occur, it is not possible to predict with any certainty how the process will be affected.

Because **Special Cause** variations are often not easily detected, it is important that quality management processes carefully consider all of the systems affecting the variation before making a determination to implement modifications to process. If a change is made in the belief that the variation has a **Common Cause** when in fact it has a **Special Cause,** then potentially far-reaching negative effects can result, and the reverse is also true. Failing to implement a process change due to the belief that the variation has a **Special Cause** when it in fact has a **Common Cause** means that the quality of the results of the processes will not improve.

For example, suppose a manager sees that the data being collected by only one of ten teams of field data collectors has frequent gaps in the data being collected, while all of the other teams have very few gaps. If the manager assumes that the variation has a **Common Cause**, then the manager may provide additional training, change field supervisors, or replace team members with lower skill sets (and correspondingly lower labor costs) with team members with higher skills sets (and higher labor costs), expecting that the result of the changes made will improve the results. But, if the variation was actually a result of a **Special Cause**, e.g. equipment failure, then the manager will have increased costs and reduced team moral while failing to achieve improved results. Therefore, it is very important to carefully investigate and determine whether the cause of the variation is process related (**Common Cause**) or is related to external factors (**Special Cause**). This is the reason that the quality management process focuses on using multiple methods of data analysis prior to making process changes.

Quality Management sources outline seven basic quality tools for evaluating variances. These seven tools are a graphic means of displaying data, and are designed to be used by team members with a wide variety of statistical expertise. The seven tools are:

* Tool 1 – Flow Chart (also known as Stratification Chart or Run Chart)
* Tool 2 – Histogram;
* Tool 3 – Cause and Effect Diagram (sometimes called Fishbone Diagrams);
* Tool 4 – Check Sheet;
* Tool 5 – Scatter Diagram;
* Tool 6 – Control Chart; and
* Tool 7 – Pareto Chart.

Examples of the seven basic tools can be found Appendix B. Although these are considered the seven basic tools of quality management, there are more advanced statistical methods that are employed by Alliance’s statistical experts in the evaluation of technical products produced by Alliance. Examples of these more sophisticated tools include:

* Survey Sampling;
* Acceptance Sampling;
* Statistical Hypothesis Testing;
* Multivariate Analysis; and
* Regression Analysis.

Alliance quality processes use both the seven basic tools when analyzing identified variances in projects that require less statistical rigor, as well as the more sophisticated statistical tools when analyzing variances in technically complex projects, e.g. computer model development, calibration and validation.

## Risk Management

Risk Management is part of the Quality Management Process. Since October of 2009, Risk Management has been formally incorporated into the ISO standards for Quality Management (*ISO:31000:2009*, also known as *ISO 31000: Risk Management - Principles and Guidelines*). The standards were developed to address the need of organizations to manage the uncertainties that have a significant potential for impact on the quality of products and services as well as on overall corporate goals and objectives. For the purposes of this QA/QC Plan, the risk management strategies described will only reflect potential impacts to the quality, scope, budget or schedule of the xx project xx.

Definition of Risk: Risk is characterized as a potential future deviation from an otherwise expected outcome. It is computed from the probability of such an event becoming an issue and the impact this issue would have (Risk = Probability x Impact). Various factors have to be defined in order to analyze risk:

* **Event** (Risk) – define what could happen;
* **Probability** that event will occur – use a scale to indicate how likely the event is to happen;
* **Impact** if the event occurs – use a scale to indicate how significant the consequences of occurrence are;
* **Mitigation** options – consider what actions can be taken to reduce the probability of occurrence (and by how much);
* **Contingency** options – consider what actions can be taken to reduce the impact if the event occurs (and by how much);
* **Exposure** to damage – assess amount of risk after a mitigation or contingency option is exercised, i.e. the amount of risk that cannot be avoided (sometimes referred to as Threat, Liability or Severity of risk). This is essentially a cost/benefit formulation to determine whether the risk of implementing the change (mitigation or contingency option) is higher or lower than the risk of not implementing the change; and
* **Assumed Risk** – assess risk that cannot be avoided (e.g., a federally mandate). This factor is often used when deciding whether it is cost beneficial to undertake a project.

Purpose of Risk Management: The purpose of Risk Management is to:

* Identify situations which are potentially hazardous to the achievement of the quality goals of the project, i.e. completing all tasks and submitting all deliverables as defined in the Scope of Work, on time and under budget, and in a manner that meets or exceeds client expectations.
* Implement measures to determine the likelihood of a particular, hazardous situation occurring; and also the uncertainty in the measures. In other words, the uncertainty or the loopholes in these measures is also made a part of the process.
* Provide measures by which the risk of the occurrence can be reduced or countered.
* Evaluate the potential of the provided measures to counter risk.
* Put forward the appropriate strategic solution for the risk management decision to be based on.

Methods for Estimating Risk:Although there are many ways that risk can be measured, the following methods are the most likely to be used by this project to evaluate possible risks:

* Analyze the historical data.
* Compare with previous, similar situations.
* Use scenario based modeling.
* Classify the different aspects of a system. Some categories, for example, can be events, faults, hazards, etc.
* Compare with the most widely used methodologies.
* Combine more than one of the stated methods.

### Risk Management Process and Principles

Risk Management is a cycle of activities by which risks are identified; analyzed and assessed; remediating actions are planned and implemented; and results are monitored and measured so that new risks can be identified. The following diagram depicts that cyclical process.



The following is a further explanation of the terms used in this diagram.

Identify:The first step is to recognize possible risks. Reasonably, every project faces risks; however, the kinds of risks faced vary from project to project. The identification process begins by determining the source of the risk. Without finding the source, it is not possible to properly assess the risk and take actions necessary to remove or minimize it. Identifying the source of the risk can take the form of an environmental assessment or the use of variance data.

Assess/Analyze**:** Once identified, it is important to [assess the risk](http://www.best-practice.com/risk-management-best-practices/risk-assessment/risk-management-best-practices/risk-assessment/the-basics-of-risk-assessment/). This process includes preparing a risk assessment chart, such as in the example shown below, that mentions all the risks the project faces.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Risk # | Consequence | Probability of Occurrence | Effective Probability | Impact  of Occurrence | Effective Impact | Severity  of Occurrence | Effective Severity | Level  of Control over Occurrence | Total Risk Assessment Score |
| Risk 1 | Consequence 1 | High | High | High | High | High | High | Low | High |
| Risk 2 | Consequence 2 | Medium | Medium | Medium | Medium | Medium | Medium |  |  |
| Risk 3 | Consequence 3 | Low | Low | Low | Low |  |  |  |  |

Develop a Risk Mitigation Plan**:** Once the risk assessment chart has been prepared, a plan to mitigate the identified risks should be developed. The mitigation plan should address the risks with the highest total score first. Risk assessments may change with time, which is why it is important to continually reassess risks throughout the planning process.

Develop Contingency Plans**:** Contingency plans are designed to reduce the impact if the risk manifests into an issue. Contingency Plans are implemented under Issues Management.

Implement and Monitor the Mitigation Plan**:** Once a mitigation plan has been developed, then the mitigation plan will be implemented. The implementation of the mitigation plan should also be monitored to determine whether the risk has been reduced, eliminated, or is still a threat. Mitigation may not completely eliminate risk occurrence or negative consequences. Therefore, the risk and the mitigation actions should continue to be monitored until such time as it has been determined that the risk is no longer viable, or the risk occurs and becomes an issue that must be resolved as described in the following section. To properly implement and monitor all risks, they should be tracked in a risk register, such as the example shown below.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Risk # | Risk Description | Impact Description | Risk Trigger/ Causes | Impact | Probability | Risk Response Strategy | Response Strategy | Risk Owner | Completion Date |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

## Issue Management

An issue is a risk that has manifested, signifying that a problem has occurred. An issue needs immediate remediation as it has already had a negative impact on the quality, scope, budget or schedule of the project. Issues should be tracked through the quality management process, and recorded in an issue register, such as the example provided below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Issue Number | Date Added | Issue and Description | Project Impact | Target Due Date | Issue Status | Issue Resolution |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

## Change Management

Change Management is a structured process for officially modifying the key components of the project. It refers to a substantive change in the project scope, budget, schedule or client objectives for the project. Changes should be carefully documented and must be approved by the client. The following change management form should be used to track changes.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Change # | Date Added | Description  of Change | Date Change  Submitted to Client | Date Change  Approved by Client | Notes |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

# Quality Assurance Plan

Quality Assurance incorporates an established system of review procedures conducted by personnel not directly involved in the process of creating the products and services described in the relevant project work plan. The reviews are designed to verify that quality objectives have been met, and to give feedback to both management and production personnel working to achieve the quality goals of the project. The Alliance Quality Assurance process is a corporation-wide process and not project specific. Each project is assigned a Quality Manager who is part of the Corporate Management Team. This dual responsibility ensures that the resource needs of all projects are considered and appropriately distributed to project teams as needed.

## Purpose of Quality Assurance Plan

The purpose of this Quality Assurance (QA) Plan is to document the process by which Alliance provides clients with the confidence that the results, conclusions, recommendations and products delivered are accurate and reliable, and conform to agreed upon requirements and specifications, as well as applicable standards, laws and regulations. The QA Plan describes a process that is comprehensive, continuous and measurable. It is designed to insure that the execution of the scope of work for any given project will meet or exceed all product and service specifications and fulfill all associated quality requirements.

## Alliance Policies Related to the Quality Assurance Program

Alliance has adopted the following Quality Statement:

At Alliance, it is our intention to ensure that a) every member of the Alliance team understands that he/she is responsible for producing a quality product or service; and that b) the tools and resources needed to meet that responsibility are provided and available in a timely and effective manner.

Alliance has established a system of quality assurance functions that provide for review and documentation of project activities by Project Managers, Project Principals, Division Directors, Enterprise Managers, and the Quality Manager. The relationships of the Quality Assurance Plan components and associated functions are described in a later section.

## Scope of the Quality Assurance Plan

This Quality Assurance Plan addresses all aspects of the execution of the scope of services and delivery of products for professional services contracts, including:

* Preparation of Project Proposal;
* Negotiation of Budget, Scope and Contract;
* Conduct of all Project Initiation Activities;
* Conduct of all Accounting Activities;
* Conduct of all Project and Personnel Management Activities;
* Preparation and Execution of Project Management Plan;
* Preparation and Execution of Project Communication Plan;
* Completion of all Scope Requirements; and
* Delivery of all products.

## Alliance Quality Assurance Plan Components

In addition to incorporating the general Quality Assurance components described in this document into the xx project xx Project Management Plan, this project also has supplemental components consistent with the scope, scale and complexity of this project.

### Quality Assurance Reviews

Alliance will conduct extensive reviews of products and services, and the processes by which those products and services are produced, in order to ensure that an unbiased appraisal is made. To that end, Alliance will implement the following policies.

#### Peer Review

Reviews will be conducted by qualified personnel not otherwise involved in the project. Quality is assured through the use of this independent and objective review of the Quality Control process and the quality, completeness, accuracy, reasonableness, and operational efficiency of each project activity or deliverable.

#### Sub-Consultant Review

Alliance will also provide external quality reviews and audits of all sub-consultant procedures, processes and deliverables.

#### Steering Committee - External Review

On projects where a client has established a project management team or steering committee, Alliance will work with the client to facilitate the use of the project management team or steering committee to conduct an independent review of draft products.

### Roles of Quality Assurance Personnel

The following is a description of the specific roles and responsibilities of the Alliance Quality Assurance Team. Depending on the size of the project, one person may perform more than one of the roles listed below.

#### Division Director/Enterprise Manager

The Division Director, who is also an Enterprise Manager, has the key responsibility of being the link between the project team and the Enterprise Management Team. The Division Director has the following specific quality assurance roles and responsibilities:

* External Review of Quality Control Processes, providing additional insight into the quality control process from an experienced outside viewpoint;
* Review of Quality Control Processes with the Project Manager to ensure that the Project Manager is following established quality processes and procedures;
* Communication with the Enterprise Management Team related to any identified issues or concerns that should be addressed at the enterprise level;
* Coordination of Division Resources; and
* Coordination with other Divisions, through the Enterprise Management Team, of enterprise-level and other division resources.

#### Project Principal

The Project Principal is the enterprise-level contact for xx client xx for problem resolution that cannot be addressed by the Project Manager. The Project Principal is responsible for ensuring that client expectations are met or exceeded throughout the project, as well as after the project has been completed.

The Project Principal is also responsible for staying abreast of the status of the project at all times. Should the Project Manager be unable, for any reason, to complete the project, the Project Principal can step in and manage the project until such time as a replacement Project Manager acceptable to the client can be installed.

#### Project Manager

The Project Manager is the primary person responsible for engaging the client to be an active part of the quality management process, as well as for insuring clear communication of client needs and expectations.

The Project Manager coordinates with the Quality Manager, the Project Principal and the Division Manager, providing those team members with the data and information necessary to perform their assigned roles and responsibilities.

#### Quality Manager

The Quality Manager (QM) is an experienced senior team member, who provides guidance and oversight of the entire quality management process for the project. The QM is a resource for the Project Manager related to quality processes and procedures in general, as well as best methods for identifying and addressing variances and issues arising during the execution of the project. The Quality Manager will also perform periodic quality audits of the project, document the results of those audits, and communicate the results to the Project Manager, the Project Principal and the Division Manager.

### Project Quality Assurance Team

For the xx project xx, the Quality Assurance Team members are:

|  |  |
| --- | --- |
| Division Manager/Enterprise Manager | *Jim Harvey, AICP* |
| Project Principal | *JD Allen, AICP* |
| Project Manager | *JD Allen, AICP* |
| Quality Manager | *Jim Harvey, AICP* |

# Quality Control Plan

Quality Control relates to the procedures and processes used to continually monitor accuracy and reasonableness, and assure that the products and services provided to the client meet the requirements of specific project agreement. Quality Control is carried out by all members of the Alliance Team on a continuous basis and includes the documentation of the results of the quality control processes.

The Alliance Quality Control (QC) Plan is designed to analyze variances in the Alliance processes in order to determine whether the variances are Common Cause or Special Cause (see earlier section for description of Common Cause and Special Cause) in order to make the appropriate adjustments to the processes used to produce quality products and services.

The implementation of the QC Plan is part of the project management processes utilized by Alliance. The project management processes establish:

* The standard processes that will be implemented to accomplish the task described in the project work plan;
* The standard communication processes that will be used throughout the project;
* The standard templates for reports, technical memoranda, meeting exhibits, user documentation and other instruments by which products and services are delivered to the client;
* The schedule by which the tasks in the work plan will be completed; and
* The budget for completion of the tasks in the work plan.

This QC Plan, therefore, is designed to: 1) identify any variances from these standards; 2) develop and implement corrective actions; and 3) document the variances, corrective actions employed, and the results of the corrective actions.

## Purpose of Quality Control Plan

The purpose of the Quality Control Plan is to establish comprehensive, continuous and measurable processes and procedures that will support the achievement of the Alliance quality goals during the execution of the project. The QC Plan provides the steps by which these processes and procedures will be carried out.

## Scope of the Quality Control Plan

The Alliance Project Manager will meet or conference with xx client xx on a regular basis to ensure that there is clear communication regarding each step in the QA/QC process and that there is consensus that the project objectives are being met at each stage of the process. In addition, continuous oversight and review will be conducted internally through a set of steps carried out by senior staff and the project team. The necessary QC steps are described in detail in subsequent sections.

xx client xx is an important part of the Alliance Quality Control process. Feedback from xx client xx during Quality Assurance Reviews regarding submitted products will be incorporated into the project team deliberation process for consideration in further product revision or refinement. The deliberation and consultation process will continue iteratively until a consensus is reached that the product or service successfully achieves project objectives and meets or exceeds quality specifications.

## Alliance Quality Control Plan Components

In addition to the Quality Assurance Plan described in the previous chapter, the Alliance Team has established a system of routine technical activities to measure and control the quality of the products to be delivered for this project; data and other inputs to the project from external sources; and other project components. The Quality Control system is designed to:

* Provide routine and consistent checks to insure the quality of each product, or interim product;
* Provide routine and consistent checks to insure procedures are adhered to by the project team, and that products developed by Alliance meet or exceed stated quality specifications;
* Identify and resolve variances and provide feedback to the quality team; and
* Document and archive all project materials and record all Quality Control activities, including accuracy checks on data acquisition and calculations; consistent use of assumptions; and the consistent use of approved or standardized procedures.

### Quality Control Processes for Product Development

Alliance uses the following procedures and processes to ensure the quality goals and objectives of the project are met. These processes will be applied as described below, and also as defined in the specific calibration and validation controls and acceptance plans that will be developed for the highly technical elements of this project.

#### Reasonableness Checks

For this project, Alliance has established a methodology for conducting reasonableness checks at scheduled points during the development of project products and services.

This process will be supervised by the Project Manager. All issues identified through the scheduled reasonableness checks will be resolved by the team and documented by the Project Manager. The Project Manager will inform the Quality Manager of any reasonableness issues identified and corrective actions taken. The Quality Manager will provide oversight of all Quality Control processes, and provide assistance if any difficulties are encountered that need enterprise-level support. All quality documentation will be preserved by the Project Administrator.

#### Peer Reviews

Interim and final products or deliverables will be evaluated by other members of the Alliance Team with the appropriate level of technical expertise (both content specialists and technical writers) prior to submittal to the client. Peer Review Meetings will be facilitated by the Project Manager, and results will be communicated to the Quality Manager. Peer Review will be used to ensure that assumptions and procedures are reasonable, and that documentation is accurate and understandable to a third party. Peer Reviews will be used mostly to catch conceptual errors and to ensure good communication in the documentation of complicated procedures.

#### Statistical Checks

When developing a technical product, such as the updated xx client xx Travel Demand Model, statistical checks will be performed by the Project Manager to ensure that assumptions, procedures and data outputs are put to a rigorous test for accuracy and reasonableness. The results of these checks will then be communicated to the Quality Manager. Under normal circumstances, the acceptance criteria for statistical accuracy of each technical product should be established in collaboration with the client prior to initiating product development.

#### Replication of Calculations

An Alliance senior manager, with appropriate skills and certifications and who has not been involved in the development of the product being reviewed, will review the procedures and quality of all project-related technical calculations and assumptions by replicating the calculations for the overall result and for selected components of the process. This review will be documented in the quality log for that task, as shown in Appendix A.

#### Quality Audits

Quality Audits will be conducted by the Quality Manager on a regular basis to ensure that all quality control processes are being properly implemented.

#### Procedure Documentation

Each member of the Alliance Team is responsible for documenting individual activities related to each project on which the team member works. The elements to be documented include (but are not limited to):

* Procedures employed to assure the quality objectives of the project are met;
* Technical approaches employed in the conduct of the project;
* Dates of quality checks;
* Results of quality checks;
* Resolution employed to address any deficiencies identified; and
* Recommendations for future improvements to the Quality Control and Quality Assurance process.

In addition, the team member will make certain that procedural documentation is reviewed by the Technical Writer and approved by the Project Manager so that procedures can be more easily included in any technical memoranda used to document those processes.

### Corrective Action

The following steps will be taken by all Alliance Team members with regard to problems or variances identified in the project processes or detected in Quality Assurance Reviews:

* Team member writes a description of the identified variance as well as any actions taken or recommended to resolve the issue, and submits the info to the Project Manager and the Technical Lead for that activity, as well as records the variance in the appropriate quality log.
* If during a Quality Audit, the Quality Manager identifies a variance or issue that needs to be addressed, then the Quality Manager will write a description of the identified variance or issue. The description will include any recommended actions to resolve the issue. The Quality Manager will then submit the description to the Project Manager and the Technical Lead for that activity.
* The Project Manager shares all identified problems or issues at a Project Team Quality Meeting (either at a regular meeting or at a special meeting, depending on the time sensitivity of the issue identified). The Project Manager will include a description of all identified issues and problems on the agenda for the meeting.
* The Project Team discusses the issue and develops a planned response. The issue description, team discussion, and planned response are all documented by the Project Administrator. The Project Team may also discuss additional issues that come to light during the course of the meeting.

Subsequently, the Project Manager writes a high-level description of the issue in an error log along with any planned response procedures used to track and resolve identified issues, and submits the information to the Quality Manager. The Quality Manager then includes the issue or problem and planned response procedure in an External Review Meeting to either concur with the planned response or make alternative suggestions to the Project Manager.

If the issue cannot be unanimously resolved by the Project Manager and the Quality Manager, the problem will be taken to the Principal-in-Charge for resolution.

### Quality Control Processes for Managing Project Budget

Part of meeting client expectations is the management of the project budget in a manner consistent with xx client xx business processes as established in the contract. For this project, the Alliance Team members will employ the following methodology to manage the budget:

#### Division Manager

* Will review all timesheets submitted by project staff members to ensure that time has been charged to the appropriate task – any questions will be submitted to either the Project Manager (PM) or the team member for review and correction;
* Will meet with the PM on a monthly basis to review the correlation between work performed, work remaining, and budget expended;
* Will review all status reports prior to submittal to xx client xx; and
* Will approve any submittal for budget modifications that may become necessary, prior to submittal to xx client xx.

#### The Project Manager

* Will inform each task member of the proper method of recording the time spent working on project tasks in the Alliance accounting system, and monitor the time spent by each team member on the tasks assigned;
* Will review all invoices prepared by the Alliance accounting department for accuracy;
* Will prepare a progress report to accompany all invoices submitted to the client;
* Will monitor the expenditure of funds to ensure that the funds allotted to the project in the project budget adequately cover the tasks to be completed under the contract; and
* If necessary, will prepare a justification for any budget changes for submittal to xx client xx.

### Quality Control Processes for Managing Project Schedule

Performing the scope of work for the project under the schedule constraints defined in the project is a key part of meeting xx client xx expectations. Alliance will use the following processes to ensure that the approved schedule for the project is met:

* The Alliance Project Manager will submit the detailed schedule to xx client xx for approval at the kick-off meeting;
* The PM will monitor all activities to ensure that tasks are being completed according to schedule;
* The PM will notify xx client xx of any risks or issues related to completing the project on schedule; and
* If a formal change is required to extend the contract schedule, the PM will submit a justification for the change to the Division Manager, who will then review and approve or disapprove the change request prior to submittal to xx client xx.

# Overview of Roles and Responsibilities for QA/QC

This section describes the roles and responsibilities of each Alliance Team member for meeting the Alliance quality goals. The specific role that each Alliance Team member takes in the quality process may change from project to project.

## Corporate Leadership Roles and Responsibilities:

The Alliance Corporate Leadership has established a system of quality assurance functions that provide for review and documentation of project activities by the Alliance Project Manager, Principal-in-Charge, and the Quality Manager (who is also the Division Director).

The Alliance Corporate Leadership has adopted a quality policy and supports a corporate culture that values quality. The Corporate Leadership is dedicated to providing the resources and personnel to meet the corporate quality objectives, and deliver products and services that meet or exceed the client specifications. Furthermore, it is the responsibility of the Alliance Corporate Leadership to ensure that every member of the Alliance Team understands his/her role in the quality management process.

## Principal-in-Charge Roles and Responsibilities

The Principal-in-Charge is a member of the Corporate Management Team, who will provide direction to and oversight of the Project Manager to minimize risk and ensure quality throughout the Project duration. The Principal-in-Charge will therefore:

* Participate in client meetings, and will serve as the point of contact for the client relative to quality assurance.
* Resolve any identified quality problems that are not resolved by the Project Manager.
* Ensure that the Project Team receives corporate support and any necessary training and development at any point that areas of weakness are identified through the QA/QC process or by the Project Manager.
* Provide the oversight and communication necessary to ensure that the quality goals of the project are met. The Principal-in-Charge also has the corporate leadership role that will allow him to quickly address any quality problems that relate to other areas of the corporate structure outside of the purview of the Project Manager.

## Project Team Roles and Responsibilities for QA/QC

Every member of the Alliance Team understands that he/she is responsible for producing a quality product or service. The relationships of associated job functions are described in the following sections.

### Project Manager

The Project Manager will provide daily supervision of the project, and is ultimately responsible for ensuring that the Alliance Team completes all of the tasks and activities listed in the work plan and produces all deliverables on schedule. In addition, the PM will:

* Ensure that all quality control and quality assurance procedures and processes are followed by all members of the Alliance Project Team.
* Communicate to the client the results of the QA/QC program employed by the Alliance Team.
* Achieve the quality goals established in the Alliance QA/QC Plan through the daily monitoring of the quality control procedures and processes, and through the Project Manager’s role in the resolution of any problems identified by those policies and procedures that cannot be resolved by the functional members of the Alliance Team.
* Consult with the client regarding the establishment of quality criteria that will ensure that there is consensus on whether the Alliance Team has met the project objectives; and then communicate these criteria to the Alliance Team.
* Incorporate feedback from the client into the quality management processes.
* For projects of sufficient scale and complexity, maintain a risk and issue register that contains a log of all risks, issues, and the resolution of those risks and issues; and publish that register to allow use by the client and the Alliance Team.
* Conduct periodical statistical or other technical quality control checks to ensure that assumptions, procedures, and products are put to a rigorous test for accuracy and reasonableness.
* Direct the daily operations of the project.
* Establish and monitor the results of the continuous quality processes and procedures, and ensure that the resulting project outcomes meet or exceed client requirements and expectations.

### Project Team Members

Under the direction of the Project Manager, the entire Alliance Team for a project (including any sub-consultant members of the team), will review and clarify project requirements and client criteria for measuring product quality, and will be responsible for the following quality activities:

* Be familiar with and follow all appropriate elements of the Alliance QA/QC Plan;
* Build, test and integrate all QA/QC processes and procedures established in this plan as well as any specific project-related QA/QC processes or procedures added to the plan by the Project Manager;
* Ensure that all data or other project inputs meet quality standards;
* Ensure that all deliverables meet quality standards;
* Make a conscientious effort to incorporate established best practice standards and procedures in accomplishing project activities;
* Participate in Peer Review meetings called by the Quality Manager and/or Project Manager to evaluate the work of team members and report any quality problems. Peer Reviews will focus on identifying conceptual errors and establishing good lines of communication among the members of the Alliance Team; and
* Document all activities relative to quality control conducted by the individual team member, and conveying copies of that documentation to the Project Manager, Quality Manager, and Project Administrator for retention in the project files.

### Quality Manager

The Quality Manager for each project will be the respective Division Manager, unless the Division Manager is the Project Manager, in which case a different Enterprise Manager will be assigned as the Quality Manager. The Quality Manager is responsible for the following activities:

* In coordination with the Project Manager, call Peer Review meetings, and ensure that all results of quality control efforts are documented by the Project Manager and archived by the Project Administrator.
* Document all of his/her activities relative to quality control, and convey copies of the documentation to the Project Administrator for retention in the project files.
* Conduct periodic Quality Audits to detect technical errors. The Quality Manager reports directly to the Alliance Project Manager for purposes of this project.

### Project Administrator

For each project, a Project Administrator will be appointed, responsible for the following:

* Maintain of all project files, documents, meeting notes, and all documentation of the quality processes and procedures employed by the Alliance Team related to the project.
* Participate in the Peer Review meetings and other Quality meetings called by the Quality Manager or the Alliance Project Manager, and take minutes of the meetings.
* Perform other support functions as directed by the Project Manager.
* Ensure that all documents are preserved in an orderly and retrievable manner, and are easily assessable to all appropriate Managers and Team members.

### Technical Lead

For each project in which a Technical Lead is designated to assist the Project Manager in directing large scale or complex tasks, the Technical Lead will focus on ensuring the chosen technology and tools are used appropriately and efficiently to produce the highest quality products. In order to perform that function, the Technical Lead will:

* Work with the Alliance Project Manager to coordinate and perform all development lifecycle activities, including analysis review and confirmation, system design, build and test, technical knowledge transfer, conversion activities, and documentation and construction of all project deliverables.
* Ensure that Quality Control procedures and processes are followed in relation to data and technical product development under the tasks for which he/she is responsible.
* Document all of his/her activities related to Quality Control, and convey copies of that documentation to the Project Administrator for retention in the project files.
* Participate in the Peer Review meetings and other Quality meetings called by the Quality Manager or the Alliance Project Manager.

### Technical Writer

Each project will have an assigned Technical Writer, responsible for working with the Project Manager to ensure that an appropriate document style template is adopted for use in all final project documents. The Technical Writer will ascertain that all written products submitted to the client:

* Adhere to standard English spelling and grammar usage.
* Use a single project document style template.
* Are consistent in style and composition

The Technical Writer is also responsible for the following activities:

* Ensure that all documents are reviewed for the criteria listed above by a qualified copy editor, other than the original writer, prior to submission to the client.
* Establish a process for the retention of draft and final documents in a manner that is easily understandable and retrievable by other members of the Project Team.
* Submit all final documents, after approval by client, to the Project Administrator for archiving.

# Project Closeout Procedures

After all deliverables have been submitted for this project, the Alliance quality processes related to the project will continue until the following Closeout Procedures have been completed. A Closeout Check List can be found in the Appendix C.

## Final Client Meeting

After all deliverables have been accepted by the client, the Project Manager and Project Principal will schedule a final meeting with the client (usually 15 to 30 days after final submission) to discuss how well the project met the client’s expectations. The results of this informal meeting will be documented by the PM and included in the quality log of the project.

## Final Team Meeting

During a final project team meeting, the Project Manager will facilitate a discussion of the lessons learned and analyze any variances that may have impacted the processes to allow for appropriate adjustments of future QA/QC activities. The results of this final Team Meeting will be documented and submitted to the Quality Assurance Team for use in both division- and enterprise-level Quality Meetings.

## Lessons Learned

A record of the lessons learned (as described in the final team meeting, plus any other lessons recorded by the PM) will be documented in the project files and a copy submitted to the Division Manager, the Quality Manager, and any individual designated by either the contract or the Alliance Corporate Management Team.

## Key Word Descriptions in the Alliance Access Data Base

At the end of the project, the Project Manager will select all of the appropriate key words from the Alliance Project Descriptor Database that relate to this project, and will write a brief description of the project.

## Project References

At the end of the project, the Project Manager will record in the Alliance Project Database the name of the client PM and any other key individuals who can act as a reference for the work completed by Alliance on this project. All contact information for the reference(s) will also be recorded in the database. This information will be used to follow up with the client in the future to ensure that the delivered products continue to meet expectations.

## Archival of Project Materials

In coordination with the Project Administrator, the Project Manager is responsible for ensuring that all materials (both hard copy and electronic) related to the project are archived in a retrievable manner.

## Financial Closeout

The Project Manager will monitor Account Receivables for this project until the Alliance Administrative Division closes the account. The Project Manager is also responsible for responding to any client questions or concerns about invoices, progress reports and deliverables associated with the final project account closure.

Appendix A – Quality Log

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Quality Check # | Date Added | Quality Check Description | Issues | Required Action |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Appendix B – Seven Basic Quality Tools

Basic Quality Tools

<http://www.tutorialspoint.com/management_concepts/basic_quality_tools.htm>

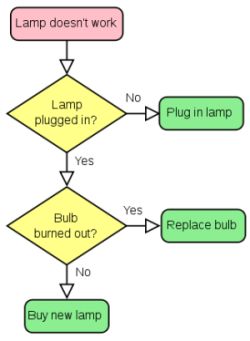
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Introduction:

Most of the organizations use quality tools for various purposes related to controlling and assuring quality.

Although there are a good number of quality tools specific to certain domains, fields, and practices, some of the quality tools can be used across such domains. These quality tools are quite generic and can be applied to any condition.

There are seven basic quality tools used in organizations. These tools can provide much information about problems in the organization assisting to derive solutions for the same.

A number of these quality tools come with a price tag. A brief training, mostly a self-training, is sufficient for someone to start using the tools.

Let's have a look at the seven basic quality tools in brief.

1. Flow Charts

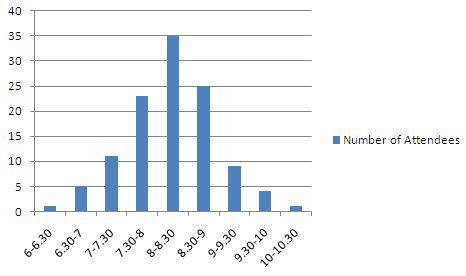
This is one of the basic quality tools that can be used for analyzing a sequence of events.

The tool maps out a sequence of events that take place sequentially or in parallel. The flow chart can be used to understand a complex process in order to find the relationships and dependencies between events.

You can also get a brief idea about the critical path of the process and the events involved in the critical path.

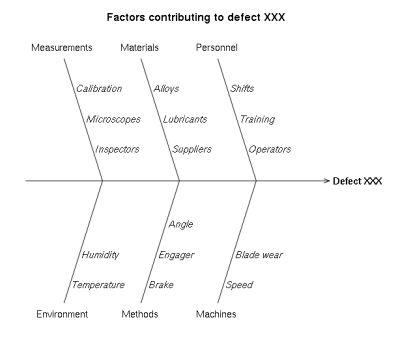
Flow charts can be used for any field and to illustrate events involving processes of any complexity.

There are specific software tools developed for drawing flow charts, such as MS Visio.

****You will be able to freely download some of the open source flow chart tools developed by the open source community.

2. Histogram

Histogram is used for illustrating the frequency and the extent in the context of two variables.

Histogram is a chart with columns. This represents the distribution by mean. If the histogram is normal, the graph takes the shape of a bell curve.

If it is not normal, it may take different shapes based on the condition of the distribution. Histogram can be used to measure something against another thing. Always, it should be two variables.

Consider the following example: The following histogram shows morning attendance of a class. The .x. axis is the number of students and the .y. axis the time of the day.

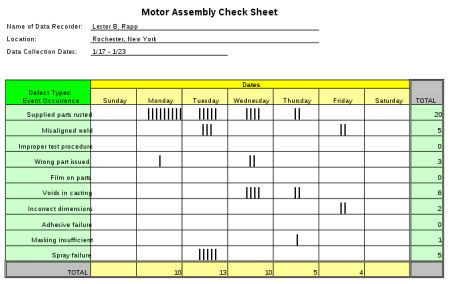
3. Cause and Effect Diagram

Cause and effect diagrams (Ishikawa Diagram) are used for understanding organizational or business problem causes.

Organizations face problems everyday and it is required to understand the causes of these problems in order to solve them effectively. Cause and effect diagrams exercise is usually a team work.

A brainstorming session is required in order to come up with an effective cause and effect diagram.

All the main components of a problem area are listed and possible causes from each area is listed.

Then, most likely causes of the problems are identified to carry out further analysis.

4. Check Sheet

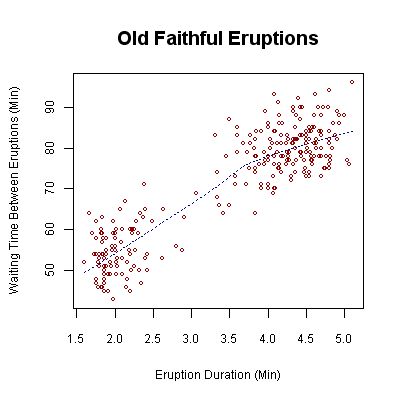
A check sheet can be introduced as the most basic tool for quality.

A check sheet is basically used for gathering and organizing data.

When this is done with the help of software packages such as Microsoft Excel, you can derive further analysis graphs and automate through macros available.

Therefore, it is always a good idea to use a software check sheet for information gathering and organizing needs.

One can always use a paper based check sheet when the information gathered is only used for backup or storing purposes other than further processing.

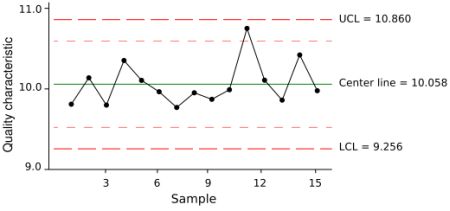
5. Scatter Diagram

When it comes to the values of two variables, scatter diagrams are the best way to present. Scatter diagrams present the relationship between two variables and illustrate the results on a Cartesian plain.

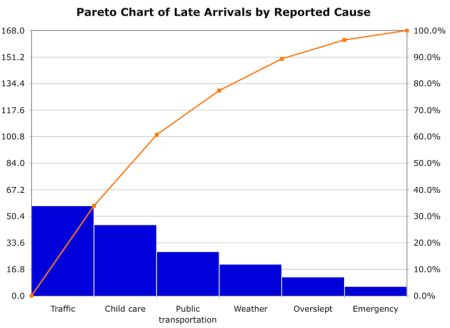
Then, further analysis, such as trend analysis can be performed on the values.

In these diagrams, one variable denotes one axis and another variable denotes the other axis.

6. Control Charts

Control chart is the best tool for monitoring the performance of a process. These types of charts can be used for monitoring any processes related to function of the organization.

These charts allow you to identify the following conditions related to the process that has been monitored.

* Stability of the process
* Predictability of the process
* ****Identification common cause of variation
* Special conditions where the monitoring party needs to react

7. Pareto Charts

Pareto charts are used for identifying a set of priorities. You can chart any number of issues/variables related to a specific concern and record the number of occurrences.

This way you can figure out the parameters that have the highest impact on the specific concern.

This helps you to work on the propriety issues in order to get the condition under control.

Conclusion

Above seven basic quality tools help you to address different concerns in an organization.

Therefore, use of such tools should be a basic practice in the organization in order to enhance the efficiency.

Trainings on these tools should be included in the organizational orientation program, so all the staff members get to learn these basic tools.

Appendix C – Closeout Checklist

|  |  |  |  |
| --- | --- | --- | --- |
| Closeout Activity | Description of Activity Completed | Completed By | Date Completed |
| Final Project Meeting |  |  |  |
| Final Meeting with Client |  |  |  |
| Lessons Learned Record |  |  |  |
| Key Word Descriptions |  |  |  |
| Project Reference(s) |  |  |  |
| Archival of Project Materials |  |  |  |
| Financial Closeout |  |  |  |