

# Design Quality Assurance Plan

King County Metro Transit

**King County Metro Transit - Capital Project Delivery:  
Engineering Services Design Standard  
Professional Seal**

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EXPIRES 8/12/2022

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April 13, 2022

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Date

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### **References/Attachments/Appendices/Forms:**

- 30-60-90 Milestone Definition and Checklist: Civil and Corridor Facilities
- 30-60-90 Milestone Definition and Checklist: Industrial and Office Facilities
- KCMT Seal Page
- KCMT Bluebeam Review Procedures

**Acronyms**

DQAP	Design Quality Assurance Plan
FTA	Federal Transit Administration
KCMT	King County Metro Transit
PM	Project Manager
PE	Professional Engineer
PMBOK	Project Management Body of Knowledge
PS&E	Plans, Specifications and Estimate
QA	Quality Assurance
QC	Quality Control
QC/QA	Quality Control / Quality Assurance
QM	Quality Manager
QMP	Quality Management Plan

## 1 Introduction

King County Metro Transit's (KCMT) Design Quality Assurance Plan (DQAP) is a guideline document establishing uniform methods and defining expectations specific to quality management on KCMT Capital Project Delivery Section's Plans, Specifications, and Estimate (PS&E) projects and engineering study and alternative analysis projects.

KCMT approaches quality as a degree to which a set of inherent characteristics fulfills requirements as noted in the PMBOK, 6th Edition. KCMT's DQAP establishes a standard of expectations, or quality, for projects the agency delivers and serves as a resource for project teams to utilize while delivering projects, including consultant staff, project managers, construction managers. This document may also be utilized in grant submissions to FTA and other agencies.

KCMT's goals for executing the design quality assurance plan include:

- Establishing quality expectations and recommended quality management procedures
- Agency-wide understanding of staff roles, deliverable expectations, and terminology
- Meeting Federal Transit Administration design quality expectations
- Minimizing construction change orders
- Delivering projects more quickly and avoiding scheduling delays

Projects can only be delivered with quality through:

- Team-wide understanding of staff role, deliverable expectations, and applicable standards
- Adequate time in the project schedule for quality control and quality assurance review periods
- Adequate resources available to execute a quality management plan

It is expected that all KCMT project management plans (PMPs) for capital projects shall have a project-specific Quality Management Plan (QMP), which is tailored to specific project needs and may incorporate this document by reference.

### DEFINITIONS AND TERMS

**Acceptance:** The act of endorsing or adding positive authorization or both for apparent correctness, or to receive with consent.

**Agency:** King County Metro Transit.

**Assessment:** A generic term for any audit or surveillance.

**Audit:** A documented activity performed in accordance with written procedures or checklists to verify, by examination and evaluation of objective evidence, that applicable elements of the program have been developed, documented, and effectively implemented in accordance with specified requirements.

**Auditor:** Any individual who participates in the performance of an audit; may also be referred to as "Assessor."

**Back Checker:** Person who reviews the Checker's comments. The Back Checker should be the Originator, and cannot be the Checker. The Back Checker is also responsible for resolving any differences of opinion with the Checker.

**Basis of Design:** Documents the principles, assumptions, rationale, criteria, and considerations used for calculations and decisions required during design.

**Biddability Review:** Review of the contract documents to identify errors, omissions, and conflicts in the plans, specifications, and bid item schedule. Review shall include staff from Construction Management and Contract Specialists, if applicable.

**Check (Review):** A review of a work product using established procedures.

**Checker:** The person assigned to check work products developed by Originators, Designers, and Drafters in that discipline or section.

Code Compliance: All design elements shall meet applicable national, state and local jurisdictional codes.

**Constructability Review:** A review of project deliverables performed to identify and address opportunities to improve the cost-effectiveness of construction, the suitability of the design to traditional construction means and methods, and the clarity of the construction documents.

**Construction Documents:** Drawings (plans) and specifications that give a detailed and precise representation of the configurations and arrangements of the materials and items being constructed. Construction documents are not to be used for construction until they are approved for construction.

**Construction Drawings:** Technical drawing sheets forming part of the construction documents.

**Consultant:** A firm or individual in a contractual agreement to provide professional services to KCMT.

**Consultant Project Manager:** A Consultant employee serving as the direct point of contract to KCMT for a specific contract.

**Consultant Project Engineer:** A Consultant employee providing engineering leadership on an executed KCMT contract.

**Contract:** A formal and legally binding agreement.

**Corrective Action:** Measures taken to rectify conditions adverse to quality and, where necessary, to preclude repetition.

**Design:** Technical and management processes that commence with identification of design input and which lead to and include the issuance of design output documents.

**Design Document:** A drawing, specification, calculation, record, report, or other document, including shop drawings and special process procedures, which may be used for design, manufacture, fabrication, installation, testing, examination, and certification of items.

**Design Input:** The criteria, parameters, basis, or other design requirements upon which detailed final design is based.

**Design Output:** Documents such as drawings, specifications, and other documents defining technical requirements of structures, systems, and components.

**Design Process:** Technical and management processes that commence with identification of design input and that lead to and include the issuance of design output documents.

**Design Quality Assurance Plan (DQAP):** The agency-wide quality management guidelines to be utilized by a design team on KCMT PS&E work product development.

**Deviation:** Specific written authorization, granted after a task has been initiated, to depart from a particular performance or design requirement of a specification, drawing, or other document.

**Engineer of Record:** The professionally licensed individual taking legal responsibility over the construction document(s) and confirming work products bearing their professional seal have been developed under their supervision to the standard of professional care.

**Formal Review:** Review of project work products following established procedures at planned project milestones per the QMP, such as milestone reviews (i.e., 30/60/90 Percent Reviews).

**Informal Review:** Review of the project work products at intervals, or milestones, not identified in the QMP. Examples include an “Over the Shoulder” review.

**Inspection:** Examination or measurement to verify whether an item or activity conforms to specified requirements.

**Nonconformance:** A deficiency in product, characteristic, documentation, or procedure, which renders the quality of a product unacceptable or indeterminate. Examples include incorrect or inadequate documentation, work product delivery which does not meet established expectations, or unapproved deviation from established procedures.

**Maintainability Review:** A formal procedural check of the project design against established maintenance needs and guidelines. Review shall include staff from Transit Facilities Division and Vehicles Maintenance, if applicable.

**Managing Engineer:** Manager of Engineering Services in the Capital Project Delivery Section. The Managing Engineer oversees four engineering disciplines (Architectural/Structural, Civil, Electrical, Mechanical, and Trolley Overhead) within the Engineering unit and is responsible for the review and approval of all engineering documents prior to construction.

**Originator (Project Task Lead):** A team member responsible for the development of a specific work product which requires Quality Control and the responsible party to initiate the Quality Control process.

**Operability Review:** Formal review process to ensure a design meets Agency operational needs and guidelines. Review shall include staff from Vehicle Maintenance, Transit Facilities Division, Transit Operations, Transit Safety and Transit Service Quality, if applicable.

**Over the Shoulder Review:** An informal review of “in progress” work products by the project team to assess the current state of the work products. Goals of this review include highlighting remaining coordination needs within a project team, improving overall product value, assessing the value of work produced to date, and facilitating the resolution of significant project coordination needs before a formal review.

**Plans, Specifications and Estimate (PS&E):** Project construction documents including plans, technical specifications and construction cost estimates.

**Procedure:** A documentation or description of how any activity is to be performed. It may include description of duties, functions and responsibilities, methods to be employed, equipment or materials to be used, and sequence of operations.

**Procurement Facilitator:** A Metro Capital Section project control engineer assigned to facilitate contract procurement, or a King County Executive Services Contract specialist.

**Project Engineer (PE):** A KCMT engineer with project-specific engineering supervisory responsibilities on PS&E engineering work products.

**Project Manager (PM):** A KCMT staff member responsible to the agency for successful execution of the design project.

**Quality Assurance (QA):** All the planned and systematic actions necessary to provide adequate confidence that the design, manufacture, and/or construction of a structure, facility, system, or component will perform satisfactorily in service.

**Quality Control (QC):** The acts of examining, witnessing, inspecting, checking, and testing of in-process or completed design work, including in-progress plan sheets, studies, and reports to determine conformity with contract requirements. QC is part of the production process.

**Quality Control Record (QC Record):** A record, or evidence, that Quality Management for a work product is occurring or has been completed.

**Quality Management Plan (QMP):** Project-specific document listing quality management procedures and expectations for team use during the life of a project.

**Quality Manager (QM):** The person assigned to perform, or manage, QA reviews on all major work products before documents are finalized, and who oversees the QA/QC program for all the project team activities.

**Quality Record(s):** A project-specific document used in the execution of Quality Management. Examples include Quality Control Records, Quality Management Plans, Quality Assurance documents, Quality Audits, Checklists, and Quality Reports

**Quality Report:** A concise written report or memo, documenting a project has met all QMP requirements, PS&E documents are in alignment with the basis of design, and Quality Records have been stored. The final Quality Report shall include a professional seal and signature.

**Records Manager:** The person who is responsible to manage all work-in-progress project files and permanent records for KCMT. File formats may include electronic native and/or PDF files; and hard copy files in accordance with Permanent Record Archiving protocol. This person also manages the KCMT Engineering Records Center.

**Reject:** A disposition imposed for substandard work or for a nonconformance condition.

**Specifications:** The written portion of the construction documents that may consist of special conditions, project standard special provisions, King County KCMT project specifications, and other published specifications referenced in the construction documents.



**Verifier:** The person responsible to confirm additions, deletions, and corrections to work products during the quality control process have been completed.

**NOTE:**

- Whenever signature, stamp, and/or initial is used herein, it shall mean the signature, stamp, or first initial and last name and date, clearly legible and positively identifying the signing individual.
- The forms included herein are intended to show the level of information that is to be contained in them. Contract requirements may dictate the use of alternate formats.
- When required by context in these procedures, the singular shall be interpreted as the plural, and vice versa; and the feminine, masculine, or neutral gender shall be treated as such other gender as appropriate.
- Definitions in the contract take precedence over definitions contained herein, should any conflict exist.

## 2 Roles and Responsibilities

### **KCMT Engineering Management is responsible for the following:**

- Ensuring design work is in compliance with the requirements of the overall agency DQAP.
- Ensuring project teams have adequate resources to meet the requirements and expectations of the DQAP.
- Assessing the quality program regularly (every six months at a minimum) and implementing improvements for the DQAP to meet agency goals, improve the overall effectiveness of the agency, and improve work processes.
- Maintaining ultimate responsibility that quality assurance is completed on the design of all Capital projects.
- Ensuring KCMT's policy for stamping, signing, and approving Engineering and Architectural Plans and Specifications is implemented and revisions to policy are communicated to all relevant parties.
- Reviewing and approving the Project Quality Report prior to authorizing contract to be advertised for bids.
- Authorizing the placement of initials of the Managing Engineer on plan sheets and cover sheets of technical specifications prior to advertisement for construction bids.
- Assigning QC/QA responsibilities for projects at the project kickoff milestone.

### **The Project Engineer is responsible for the following:**

- Developing, implementing, and maintaining a QMP to meet the quality needs of a project.
- Serving as the project Quality Manager for KCMT led PS&E design projects.
- Ensuring the project team is aware of the QMP and capable QMP execution.
- Verifying compliance of work elements with the QMP.
- Reporting project quality status periodically to management.
- Conducting audits, assessments, and design reviews to verify the effective use of project procedures and investigating and documenting quality problems.
- Verifying quality records are prepared and stored for formal milestone submittals.
- Ensuring the final quality control review has occurred before the project is recommended for construction, with completion of the following:
  - Constructability Review
  - Biddability Review
  - Operability Review
  - Maintainability Review
- Prepare a Quality Report on KCMT-led PS&E projects before the project is recommended for construction, sign the report with a professional engineering seal and signature, and present the document to the Managing Engineer.
- Ensuring Engineering and Architectural Plans and Specifications are properly stamped and signed in accordance with all state and jurisdictional requirements. See Section 5.
- Ensuring initials of the engineer or architect who performed the quality control for plan sheets are correctly displayed on plans before delivery to the Procurement Facilitator.

- Verifying Consultant-designed projects have proper quality control documentation and quality assurance documentation; and the Consultant has submitted a Quality Report.
- Verifying comments received from an internal quality control review team have meaningful value to the project and do not provide conflicting direction to the final design team.
- For KCMT internally designed projects:
  - Ensure the design from different disciplines is coordinated into a complete and integrated overall design package.
  - Ensure staff assigned to quality control review duties are not the same staff leading the design effort.
  - Provide Quality Control of work products developed by others under their oversight if the Managing Engineer does not assign alternative staff.

**Project Task Leads are responsible for the following:**

Before initiating a Quality Control Review.

- Verify work products align with project scope, deliverable lists and meet criteria established within the Basis of Design, including verification of code and regulation compliance.
- Ensuring that design documents have been technically checked for accuracy, completeness, consistency, including design checklists, if applicable to the project.
- Previous design review comments relevant to the work product have been resolved.

Project Task leads may initiate a quality control review process when appropriate. During a Quality Control Review, their responsibilities include:

- Overseeing completion of the quality control process on work products they are responsible for completing.
- Assisting design staff in applying quality management procedures.
- Utilizing the QMP methodology.
- Verifying that nonconformance and audit findings have been satisfactorily corrected.

**Consultant Team responsibilities:**

- Identify a Quality Manager for Consultant led design work to the overall project team.
- Develop and execute a QMP applicable to the Consultant scope of work.
- Obtain KCMT approval of the Consultant-developed QMP before submittal of design deliverables.
- Completing the quality control process on work products developed under their leadership.
- Perform quality assurance on all work products developed under their leadership.
- Verify work products align with the project scope and the basis of design before starting the QC process on submittals.
- Check work products to ensure code compliance and they meet the intents of Basis of Design.
- Provide Quality Records to KCMT's Project Engineer using electronic methods with records compiled as a project team and not separated by firm or discipline. See Section 3 for further clarification on requirements.
- Prior to submitting final PS&E, engineering calculations, and project reports to KCMT, ensure all documents are properly dated, stamped, signed, and/or initialed by the responsible parties.

- Upon completion of Final PS&E work products, prepare and submit a Quality Report to KCMT Project Engineer, including a professional seal and signature.

**Prime Consultant responsibilities for Subconsultant Work:**

- The Prime Consulting firm has overall Quality Management responsibilities for all work products developed under a KCMT contract, including ensuring subconsultants:
  - Execute the QMP
  - Meet all contractual scope obligations
  - Produce quality records which can be combined into comprehensive project quality records when work products are advanced by multiple firms. All Subconsultant work shall have the same appearance as the prime firm and align with the QMP methodology.

### 3 Project Quality Management Plan Development

The primary steps for achieving design quality include the following:

- Ensuring a clear understanding of scope and requirements.
- Selecting and assigning the right resources to meet the unique needs of the project.
- Designing in accordance with defined procedures and requirements.
- Checking to verify compliance with requirements.
- Maintaining quality records providing objective evidence of execution of the QMP.
- Conducting or overseeing quality audits to verify compliance with procedures.

To help meet these goals, KCMT design projects shall have a formal QMP, which can be included within the project management plan. It is acceptable for the QMP to reference and adopt content within this document.

QMPs shall meet the needs of individual projects while also maintaining compliance with KCMT's design quality assurance plan.

Recommendations for QMP content include:

- Establishment of, or reference to, a basis of design, listing formal design criteria and standards to be met by the design work products.
- Quality management responsibility and roles, including assignment of a Quality Manager.
- Design workflow control procedures, including:
  - Workflow overviews
  - QC/QA procedures
  - Comment response tracking and verification
  - Quality Record documentation requirements
- Assignment of QC/QA responsibility for major work products, including a specific list of work products where formal QC/QA is required.
- Establishment of informal "over the shoulder" review expectations.
- Quality management training requirements and expectations.
- Quality audit processes.

#### **Quality Management Responsibilities and Roles:**

It is not possible to implement quality management without clearly defining team member roles and responsibilities. Clearly list responsibilities and roles for the following:

- KCMT project leadership
- KCMT internal staff
- Consultant team leadership and staff assigned to the project team
- Project-specific Quality Manager(s) assigned to the project team

#### **Deviation from Quality Management Standards:**

Projects often require variance from applicable standards and guidelines for justifiable reasons, including quality management. KCMT delivers work in a world with social, environmental, political, and economical constraints, and the delivery of work to solve problems may require non-standard solutions.

Deviation from standards should be submitted to and approved by KCMT Managing Engineer and included in the Quality Records. See Deviation Procedure stated in KCMT Design Standards.

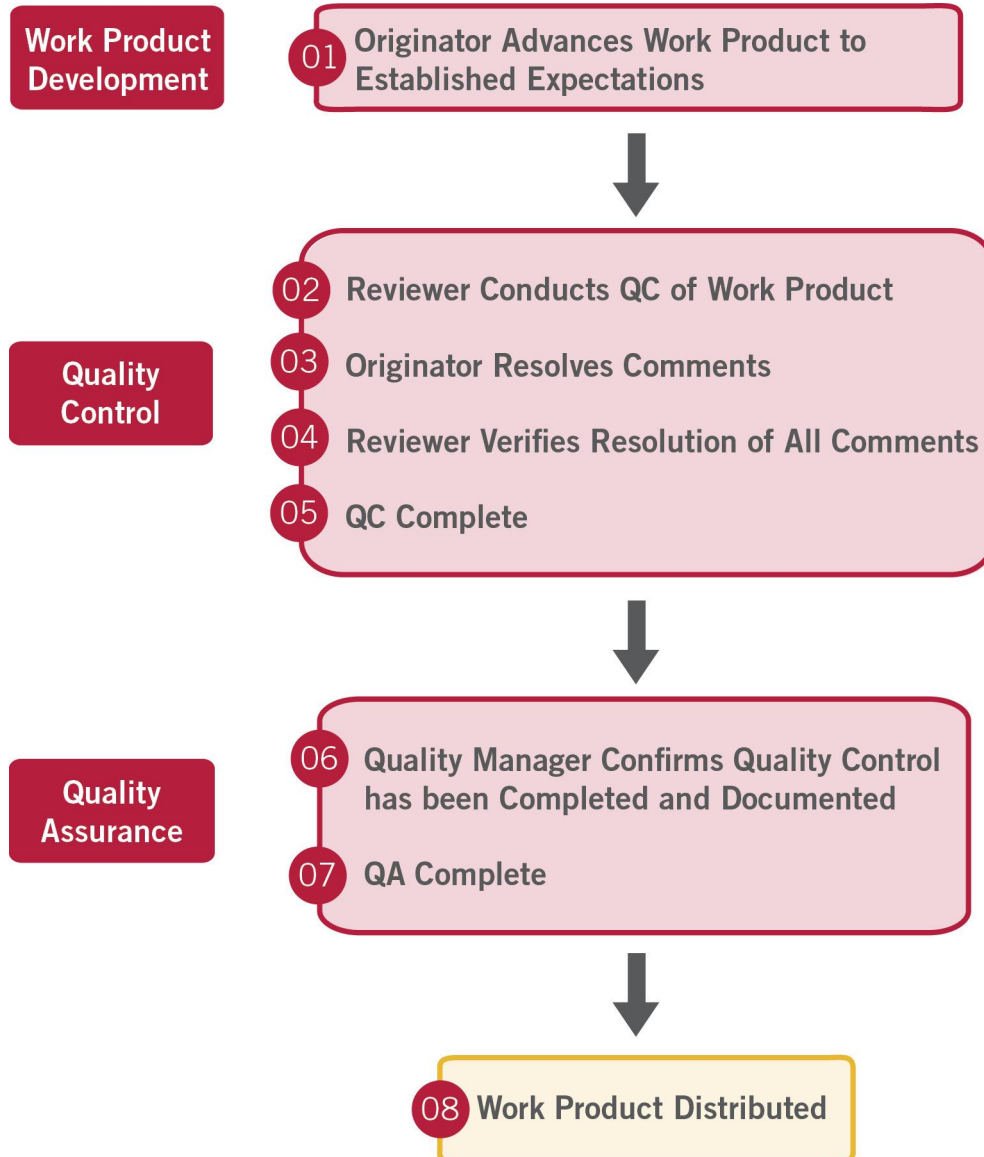
**Basis of Design:**

A basis of design shall be developed by the team to list formal design criteria and standards applicable to the project. The basis of design shall be a living document and developed at the beginning of the project design. As the project advances, adoption of new or revised engineering codes for use within the engineering work shall only be accepted as required by applicable KCMT policy or as directed by KCMT Management. Adoption of revised engineering standards midway through a project's design phase may require re-work and trigger extra expense, which may not be warranted or produce a superior end product. It is generally not advisable to modify the basis of design after permitting efforts have been completed.

## DESIGN WORKFLOW CONTROL PROCEDURES

### Workflow

The QMP shall include a QC/QA workflow overview for use by the team. A sample QC/QA procedure workflow procedure is presented below.



### QA-QC Documentation Procedures

The QMP shall establish a QA/QC review schedule, preferably at key milestones. Formal quality control documents for PS&E documents shall be developed using KCMT approved software and methodology, unless deviation is approved. QC records for documents such as reports, studies, or alternative analysis may be tracked in PDF or in Microsoft Word using a tracked changes methodology per the QMP requirements. Unless specified otherwise, milestone plan documents shall be submitted in PDF format; technical specifications in both Microsoft Word and PDF formats; and reports and studies in PDF format.

### Comment Response Tracking and Verification

When appropriate, work products shall be provided to stakeholders for formal review and comment. Several methods exist for recording and tracking comments, including:

- Electronic PDF commenting platforms, such as a Bluebeam design review session. KCMT has a formal review process using Bluebeam software. See the Appendix material.
- Formal Comment/Resolution Log may also be provided along with Bluebeam files
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Formal comments from stakeholders shall identify issues in writing or graphically and shall include the name of the comment author. The design team shall formally respond to comments in written text and document actions to be taken regarding the comment, which can include no action or change in course.

The design team shall ensure future submittals to stakeholders include responses to formal comments on the previous submittal. If warranted, the design team shall engage stakeholders to discuss resolution of comments. KCMT Management shall support this effort.

At conclusion of each milestone comment resolution phase, the design team shall submit all work products associated with their comments/resolutions to KCMT Records Manager for filing in accordance with KCMT Engineering filing protocol.

### Quality Records

- Quality records shall be managed for collection, distribution, filing, storage, retrieval, revision control, and disposition of quality records.
- Quality records shall include reports, drawings, and procedures, as well as instructions that describe activities affecting the quality of work products under the design team's control.
- Quality records of all team members shall be maintained in one location. Records will be legible and identifiable to the element of work involved.
- Quality records shall be documented by task number and formal submittal status, such as draft and final version.
- File names shall be concise and intuitive. They shall include facility and project identifications, document type and milestone callout.

Quality records are maintained using a filing system that is easily understood and operable with minimum training. The records shall be legible and are readily retrievable and accessible. The project team shall meet current KCMT documentation and retention standards and review current documentation standards at the time of project kickoff. Meet with KCMT Records Manager for filing structure and transmittal protocols.

- Quality records may include:
  - Design procedures (approved QMP)
  - Project quality training materials and training log (as applicable)
  - Applicable criteria used in design (basis of design) and approved design deviations
  - QC records, such as Drawings check sets and calculations
  - Report QC records
  - QA audit reports (as applicable)
  - Final Quality Report



### **Assignment of QC/QA responsibility for major work products on complex, multi-disciplinary projects.**

It is a recommended best practice to plan for and schedule a qualified independent team member for review of all major work products. Identification of quality control staff per the Work Breakdown Structure can reduce risk of schedule slippage and improve the overall work product.

### **Quality Management Training Requirements and Expectations**

For KCMT delivered work, it is the responsibility of the Project Engineer to ensure team members have been adequately trained in basic quality management principles relevant to their role on a project before beginning project work. KCMT Engineering Management shall facilitate training as needed. It is recommended that the Project Engineer ensure all project staff assigned quality duties understand the basic principles of quality management, understand how to execute a QMP, and be able to locate the project QC materials, including the QMP. The Project Engineer shall develop or provide quality training scaled to project and staff need. Training methods may vary between staff members and projects.

For Consultant staff, it is the responsibility of the Consultant to train staff in quality management methods used by KCMT before the Consultant staff member begins work on KCMT projects.

### **Quality Audit Processes**

The Project Engineer, or Quality Manager, should periodically audit quality records to monitor implementation of the QMP. The depth of an audit shall be determined by the risk profile of the project, professional judgement, and best practices of the industry.

The QMP shall identify planned frequency of quality audits and the responsible party, but audit frequency may be adjusted to resolve quality non-conformance issues.

Draft audit results in a written document shall be shared with the design team. The design team shall have the opportunity to comment and resolve shortcomings before a final audit report is recorded. Draft audit results shall not be included in the final Quality Report.

Results of the final quality audit shall be shared with KCMT Management, the Project Manager, and the design team. The goal of a quality audit is to ensure work products meet the documented standards of the project, with focus on the QMP. Auditors shall provide recommendations to the team if corrective action is warranted and may recommend rejection of a work product if a significant issue of non-conformance is identified.

The design team shall have the opportunity to resolve design issues identified in a quality audit as non-conformance with the quality expectation. If the design team is not able to resolve the non-conformance issue, management shall be notified to determine next steps for the project.

## 4 Project Design Quality Plan Implementation and Control

Topics covered in this section are recommended, but not required, for all projects. Professional judgement may be exercised to properly scale effort to the project needs.

The team shall execute the QMP during the project design life cycle and revise the QMP as needed.

Informal or formal training shall be provided for all project team members leading work product development or involved in the formal QC/QA process. The Project Engineer, or Prime Consultant on Consultant-led work, shall verify staff performing QC/QA on work products is well versed in the QMP, is qualified to perform the review, and has proper quality training.

### CONSULTANT-LED WORK

The Consultant design team should prepare interim sets of plans and specifications for quality control review. These interim sets of plans and specifications are generally prepared at 30% design, 60% design, and 90% design. The Appendix Material contains recommended checklists for deliverables at defined points of design development. It is recommended Consultant contracts include reference to these checklists as a deliverable to KCMT if applicable to the work at hand. KCMT uses these checklists when evaluating what design level a project has been advanced to.

During the design process, frequent and continuous communication between the Consultant design team and the in-house KCMT quality control team is encouraged to minimize engineering review comments at 30% design, 60% design, and 90% design milestones and avoid non-conformance.

### KCMT “OVER THE SHOULDER” REVIEW OF CONSULTANT-LED WORK

Some best management practices to advance design projects include “over the shoulder” reviews and follow up direct communication between a design team and KCMT reviewers. This may include the presentation of work in progress between milestone submittals to encourage team discussion and resolution on project issues, including resolution of formal design comments. Frequency of “Over the Shoulder” reviews shall be in alignment with project need and budget.

### FINAL PROJECT QUALITY REPORT

A Final Project Quality Report shall be prepared by the Quality Manager, as noted in Section 2, at the conclusion of the design phase. The report shall be stamped and signed by the licensed professional.

The report shall be scaled to the project size using professional judgement and shall include, at a minimum, the following content:

1. A statement confirming that the project team has achieved compliance with the QMP.
2. A recommendation for KCMT Management to advance the project into construction.
3. A statement confirming reviews for constructability, biddability, operability, and maintainability have been completed.
4. Summary of who performed quality assurance and quality control for the final work products.
5. Location of quality records.

A summary of the reviews and audits performed at various design levels may be included in the report.

## 5 Professional Stamping and Signing Procedures

This chapter defines KCMT's internal Transit Capital Project Delivery Section policy for stamping, signing, and approving the following documents:

- Final Engineering and Architecture Plans
- Final Engineering and Architecture Specifications
- Final Project Quality Control Report
- Preliminary Engineering and Architecture Plans
- Final Alternatives Analysis Report
- Final Engineering Calculations
- Final Basis of Design Report

KCMT projects shall adhere to Washington State RCW 18.43 and WAC 196-23 requirements at all times.

### FINAL ENGINEERING AND ARCHITECTURE PLANS

Prior to the advertisement for construction, or the issuing of construction work orders, for both in-house-designed projects and Consultant-designed projects, each engineering and architecture plan sheet shall have the stamp, signature, and date of signature of the licensed professional engineer or architect who is either responsible for the preparation of the plan sheet or directly supervised the work for that plan sheet.

In addition, each plan sheet shall have the stamps, signatures, and/or initials of:

- The Consultant staff who is responsible for engineering, design and drafting of the plans.
- The Principal or Engineer-of-Record of each consultant firm who is responsible for the design discipline.
- The KCMT engineer or architect who performed and is responsible for the quality control review for that plan sheet
- The KCMT Project Engineer to recommend. The KCMT Managing Engineer to approve.

### FINAL ENGINEERING AND ARCHITECTURE SPECIFICATIONS

Prior to the advertisement for construction, or the issuing of construction work orders, for both in-house-designed projects and Consultant-designed projects, each set of specifications shall have an engineering and architecture seals page for the technical specifications, which are defined as divisions 1 and beyond (based on the current CSI format).

The seals page shall have the stamps, signatures, and dates of signatures of the licensed professional engineers and architects who prepared the technical specifications. Adjacent to each stamp, information shall be provided identifying which divisions and/or sections of the specifications that person was responsible for preparing.

The seals page shall also include a signature line for the Managing Engineer, who shall apply the final signature to the [KCMT Seals Page](#).

### FINAL PROJECT QUALITY CONTROL REPORT

The final project quality control report shall have the stamp, signature, and date of the signature of the overseeing Professional as noted in the responsibilities listed in section 4.

The final project quality control report shall also be signed by the Managing Engineer upon acceptance of the final Quality Control Report.

### PRELIMINARY ENGINEERING AND ARCHITECTURE PLANS

Each engineering and architecture preliminary plan sheet shall have an unsigned stamp of the licensed professional engineer or architect who is either responsible for the preparation of the plan sheet or directly supervised the work for that plan sheet.

### FINAL ALTERNATIVES ANALYSIS REPORT

For most projects, an alternatives analysis report is prepared during the project life cycle. The alternatives analysis report shall analyze various alternatives and recommend the preferred alternative. The analysis shall include methodologies to evaluate the different alternatives, such as life cycle cost analysis.

If the alternatives analysis report was prepared by in-house staff, the final alternatives analysis report shall have the stamp, signature, and date of the signature of the in-house Project Engineer.

If the alternatives analysis report was prepared by a Consultant, the final alternatives analysis report shall have the stamp, signature, and date of the signature of the Consultant's Project Engineer.

The final alternatives analysis report shall also be signed by the Managing Engineer.

### FINAL BASIS OF DESIGN REPORT

For most projects, a Basis of Design report is prepared at the beginning of the project life cycle and refined during the pre-design phase, and recommended to be finalized prior to final design.

If the Basis of Design report was prepared by in-house staff, the final Basis of Design report shall have the stamp, signature, and date of the signature of the in-house Project Engineer.

If the Basis of Design report was prepared by a Consultant, the Basis of Design report shall have the stamp, signature, and date of the signature of the Consultant's Project Engineer.

The final Basis of Design report shall also be signed by the Managing Engineer.

## 6 King County Metro Transit Checklist Documents

Based on past project delivery, design content checklists for the 30%, 60%, and 90% milestone submittals have been developed for typical KCMT projects. It is recommended that these checklists, included in the appendix of this document, be utilized by the design team during the project design phase and that the checklists be maintained by the KCMT Project Engineer during project design life.

KCMT staff can obtain electronic copies of the checklists at the links below:

[30 – 60 -90 Civil and Corridor Checklist](#)

[30 – 60 – 90 Industrial and Office Checklist](#)

### APPENDICES

30-60-90 Civil and Corridor Checklist

30-60-90 Industrial and Office Facility Checklist

KCMT Seal Page

KCMT Bluebeam Review Procedures