Oregon Department of Transportation

Statewide Traffic Engineering Quality Plan

Engineering and Technical Services Branch
Traffic Engineering Section
Oregon Department of Transportation

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Oregon Department of Transportation

Engineering and Technical Services Branch

Traffic Engineering Section

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Revision History (the current revision is first entry)

Release Date	Change made by	Section(s) Updated	Summary of what, why changed
4/3/2025	Kevin Haas, P.E. State Traffic Standards Engineer	All	Replaced Traffic-Roadway Section with Traffic Engineering Section throughout document;
7/26/2023	Kevin Haas, P.E. State Traffic Standards Engineer	All	Update plan into Project Delivery QA/QC Program discipline template format; Update Traffic Quality Checklist for use in both internal and external delivered projects; Clarify TOAST role in managing QA process.
10/4/2021	Kevin Haas, P.E. State Traffic Standards Engineer	All	Initial version.

1. Quality Management

The Oregon Department of Transportation recognizes its success is determined, in part, by the quality of services and products it provides for its customers. Assuring quality requires not only a commitment but a consistent systematic approach. The ODOT traffic engineering quality control program endeavors to go beyond the review of work products to result in a continuous improvement of the processes and products associated with traffic engineering services.

The ultimate goal of quality control is to achieve an overall quality of work in all endeavors that meets or exceeds the goals of the agency. Within that context, the intent of implementing this quality control program includes the following:

- Emphasize the importance of quality in achieving the goals of the agency. In particular, to emphasize communication, collaboration, and care in completing traffic engineering work. This is consistent with the values enunciated in ODOT's Strategic Business Plan, "EXCELLENCE: We use our skills and expertise to continuously strive to be more efficient, effective and innovative."
- Assist in leveraging the highest levels of experience and technical expertise available, with respect to all projects, not just those that are large or complex.
- Assure and document compliance of traffic engineering plans and documents with design codes, standards of practice, legal requirements, and organizational policy.
- Allow for an analysis of the strengths and weaknesses of completed projects to develop a process of continual improvement.
- Support project designers. Collaborating with other experienced individuals helps the professional of record (POR) be more confident in their work and results.
- Provide mentoring for employees as they gain experience and expand their abilities. Often, the best training comes from working on a project with a reviewer who has more experience. Similarly, experienced staff often learn from recent graduates and young staff who have been exposed to recent advances in the profession through their educational experience and offer a fresh perspective uncolored by institutional inertia.
- Identify and address mistakes, oversights, and logic errors and to compensate for inexperience. All people can and do make mistakes despite their knowledge, experience, or level of effort. A collaborative approach to work and the involvement of independent reviewers will nearly always result in the elimination of mistakes or errors of logic that may not have been identified by a single dedicated individual.
- Producing quality traffic engineering products (PS&E) for construction (end user) without CCO or claims resulting from erroneous traffic designs.

The QC process does not relieve the POR of responsibility for their work products. Ultimately, the traffic engineering POR is responsible for checking their work and complying with applicable manuals, codes, policies, and standards of practice.

2. Quality and Technical Standards

The ODOT Project Delivery QA/QC Program website provides an overview of the ODOT Project Delivery QA/QC Program and access to the quality standards of practice. In addition, you'll find the following resources:

- Project Delivery Quality Program Manual.
- Quality plans and guidance documents, including:
    - Region technical center quality plans.
    - Statewide discipline quality plans.
- Associated quality forms and checklists.

The ODOT Traffic Engineering website provides links to several traffic discipline manuals referenced in this document including the ODOT Traffic Manual.

3. Roles and Responsibilities

Successfully implementing traffic engineering quality management takes a team of professionals across the range of disciplines that make up traffic engineering, including:

- Illumination.
- Signals.
- Signs.
- Pavement Markings (Striping).
- Work Zone Traffic Control.
- Operations.
- Traffic Analysis

Table 1: Traffic Engineering Quality Roles and Responsibilities

Roles	**Responsibilities & Requirements**
Traffic Engineering Professional of Record (POR)	• Designated person in responsible charge of one or all traffic engineering disciplines for a project. • Registered as a professional engineer with the state of Oregon. • Especially qualified in traffic engineering practices and principles.
Traffic Engineering reviewer	• Provide primary technical review for one or all traffic engineering disciplines for a project: each traffic engineering discipline has a designated reviewer. • Especially qualified in traffic engineering practices and principles; Oregon P.E. credential not required.
Region Traffic manager *Each region has at least one.*	• Manages engineers and designers who work in the region traffic unit and their work. • Where such individuals are not an Oregon-registered P.E., they may make use of a region traffic engineer with necessary traffic engineering expertise and assist in addressing technical issues. • Ultimate responsibility for Traffic QAQC program for the Region
Region Traffic engineer (RTE) *Each region has at least one.*	• Provide traffic engineering subject matter expertise within the region traffic unit. • Registered as a professional engineer with the state of Oregon. • Especially qualified in traffic engineering practices and principles. • May serve as either traffic engineering POR or traffic engineering reviewer. • Assist region traffic manager in addressing technical issues.

Roles	Responsibilities & Requirements
Headquarters engineers	• Subject matter experts in the various traffic engineering disciplines. • Based in Engineering and Technical Services Branch. • Registered as professional engineers with the state of Oregon. • Especially qualified subject matter experts in one or more traffic engineering discipline. • Responsible for standards and policies, including the development of this manual, traffic engineering work throughout ODOT, and agencywide QA reviews.
State Traffic engineer (STE)	• Manages headquarters engineers in traffic and roadway engineering disciplines. • Holds delegated authority from the chief engineer as the statewide traffic-roadway engineering subject matter expert. • Registered as a professional engineer with the State of Oregon. • Especially qualified with subject matter expertise in multiple traffic and roadway engineering disciplines. • Responsible for standards and policies for traffic and roadway engineering work throughout ODOT and agencywide QA reviews.
Chief engineer	• Supervises engineering section managers and oversees the work of all engineering disciplines. • Holds delegated authority from the Oregon Transportation Commission as the statewide engineering standards and policies authority. • Registered as a professional engineer with the state of Oregon. • Especially qualified in resolving disputes over engineering decisions or applications of standards and policies. • Responsible for the implementation of the quality program throughout ODOT.

3.1. Outsourced Work Products

When consultants develop work products or deliverables for ODOT projects, those documents will be completed under the requirements of a consultant-specific quality plan. ODOT will review and approve the plan, which is functionally consistent with the requirements of this chapter.

The consultant is responsible for QC and QA.

ODOT is responsible for conducting a QV review of the consultant's QC and QA processes. ODOT's review does not replace or supplant the consultant's QC or QA responsibilities.

ODOT staff may use the Traffic Quality Checklist (form 734-5372) for QV review of the consultant's QC and QA processes. At a minimum the consultant's QC and QA processes shall address items in the checklist.

Work products containing demonstrable errors at the time of submission to ODOT not only need correction, but are indicative of a failure in the consultant's QC and QA processes. As a result, a deeper programmatic review and action per Section 5.4 of the Project Delivery Quality Program Manual may be required.

4. Quality Control

The key documents produced during the QC process include:

- Traffic Quality Checklist, form 734-5372.
- Traffic Plans/Specs/Estimate Redlines
- Project Comment Log

The traffic engineering reviewer completes the traffic quality checklist for each phase of a project from design acceptance (DAP) through final plans, specifications, and estimate (PS&E). Checklist items with comments should be entered into the project comment log by discipline representatives and resolved by the traffic engineering POR.

Each subsequent phase of the project from DAP through Final PS&E results in a more detailed QC check and a new traffic quality checklist as more refined plans, specifications, and estimates are compiled into the final bid package.

The section below outlines some of the unique details for each phase starting with Scoping through Final PS&E.

4.1. Quality Control Milestones

For clarity, the ODOT project delivery process is divided into a series of milestones or phases. The traffic quality checklist is standardized for use across all ODOT regions, from the DAP through the final PS&E phase. Not all items on the checklist will be applicable for every project or phase of a project. Mark items with "N/A" when they are not applicable.

The traffic quality checklist is also expandable to include additional items not in the standardized checklist where applicable.

When project phases are removed from a project's delivery, remove those corresponding QC phases as well.

Table 2 summarizes the review phases of the project.

Table 2: QC Milestones and Corresponding Quality Documentation

Milestone	Document	Guidance
Scoping	--	This section will be updated in the future as the scoping process is further defined.
Project Initiation	Traffic Analysis Report	If Traffic Analysis Report is required but not completed at this phase it shall be completed by DAP
Design Acceptance Package (DAP)	Traffic Quality Checklist form 734-5372 STR form 734-5365 (filled out by ODOT)	--
Preliminary Plans	Traffic Quality Checklist form 734-5372	Optional phase that may be omitted on simple projects
Advance Plans	Traffic Quality Checklist form 734-5372	Optional phase that may be omitted on simple projects
Final Plans	Traffic Quality Checklist form 734-5372	--
PS&E	STR form 734-5365 (filled out by ODOT)	--

4.1.1 Scoping

Scoping is completed to identify which projects will be programmed into a future STIP.

At scoping, subject matter experts (including region traffic managers and/or region traffic engineers) review the business case (purpose and need) for a proposed project, as provided by the program manager. They identify the project elements required to meet the purpose and need, and draft "scoping level" estimates. This review frequently includes a site visit.

Scoping teams draft scoping notes outlining project elements and risks by discipline. Scoping teams also provide cost estimates to establish the budget required to deliver the complete project. These estimates have a large contingency and are typically based on average historic bid item prices.

Region traffic managers, region traffic engineers, and technical staff from the region traffic unit should participate in all scoping efforts. The region traffic manager or region traffic engineer is responsible to assess the project and determine the traffic engineering elements to include in the project, rather than the program manager or project leader.

The region traffic unit staff assigned by the region traffic manager to assist in scoping will produce:

- Traffic scoping narrative.
- Work Zone Decision Tree.
- Scoping estimate.
- Risk register.

Scoping notes need to clearly outline:

-
- Known traffic engineering elements.
    - Safety.
    - Operations.
    - Traffic Analysis
    - Signs.
    - Pavement markings.
    - Traffic structures.
    - Illumination.
    - Potential work zone traffic control issues.
- Identified traffic elements that will need STE/RTE approval.
- Risks associated with unknowns, such as:
    - Condition of above- and underground electrical equipment.
    - Public opposition to certain traffic control alternatives.
- Proposed methods for reducing risk during project.

The scoping estimate includes a cost estimate for design and a summary of resource needs.

4.1.2 Project Initiation

The traffic analysis report is completed shortly after project initiation. The report includes updates to key traffic data that has changed since scoping, along with the most recent traffic counts, crash data, and operations analysis for the corridor including intersections.

It is critical to identify any assumptions or conditions that have changed since scoping in the traffic analysis report. The report should also identify items that require RTE and/or STRE approval, including when the approvals will be requested.

4.1.3 DAP

The DAP phase is often the first time a project team will see plan sheets from all the engineering disciplines involved in the project compiled together, allowing discipline representatives to see how each discipline's work impacts others. From here, discipline representatives enter comments into a project comment log. The traffic engineering POR addresses and/or resolves each.

The traffic quality checklist and statement of technical review (STR) are the QC deliverables for the DAP phase that ensure all traffic designs were reviewed and all comments are addressed by the traffic engineering POR prior to final DAP.

4.1.4 Preliminary Plans

Project plans are approximately 70% complete at the preliminary plans phase.

Work conducted during this phase includes additional technical and construction reviews. Update the construction cost estimate at this point in the process to verify the current estimate is consistent with the available programmed funding for the project. Produce a revised construction schedule to determine the contract completion date.

Some phase milestones include the noise mitigation final design, utility coordination and revisions to the construction cost estimate.

4.1.5 Advance Plans

Specifications and special provisions are typically developed for a project during the Advance plans phase. This is often the first time specifications and special provisions are compiled with the plan sheets from all the engineering disciplines involved in the project.

Similar to the DAP phase, discipline reviewers enter comments into the project comment log and the traffic engineering POR addresses and/or resolves them. The traffic quality checklist is the QC deliverable for the Advance plans phase to ensure that all comments have been addressed by the traffic engineering POR prior to the project moving to the PS&E phase.

4.1.6 Final Plans

During the Final Plans phase, the 99% plan check occurs and errors and omissions are corrected.

Conduct the final QC check in this phase, rather than putting it off until the Final PS&E Phase. Similar to earlier phases, discipline reviewers enter comments into project comment log; the traffic engineering POR must address and/or resolve them.

The traffic quality checklist is the QC deliverable for this phase used to ensure all comments were addressed by the traffic engineering POR prior to bundling the bid package together in the Final PS&E Phase.

4.1.7 Final PS&E Phase

The Final PS&E phase is the final phase of a project, as the plans, specifications, and estimate are finalized and assembled into the bid package for bid letting.

By this phase, errors and omissions should be corrected, but occasionally issues are caught in Final PS&E. Similar to earlier phases, discipline reviewers enter comments into the project comment log; the traffic engineering POR must address and/or resolve each.

The STR form 734-5365 is the QC deliverable for the Final PS&E phase used to ensure all comments have been addressed by the traffic engineering POR prior to bundling the bid package together for bid letting.

4.2. Quality Control Reviews

QC reviews assist the traffic engineering POR in developing documents that are free of errors and mistaken assumptions. The reviews verify documents are consistent with applicable standards and guidance and there is consistency between calculation results and recommendations. Quality reviews should verify that prior QC review comments were understood and addressed.

For expediency and consistency, there are a variety of standard templates and checklists available. Templates and checklists assist designers and reviewers in completing their mission and to provide reminders of applicable guidance and standards. These tools are not intended to replace sound professional judgement nor to relieve the traffic engineering POR of their personal responsibilities.

4.3. Authority of the Reviewer

In the event of a minor or moderate technical disagreement between the traffic engineering reviewer and traffic engineering POR, the parties may elect to write a short justification to include with the electronic documentation.

If there is a major technical disagreement, elevate the issue within the discipline or region technical center, as applicable. If the issue is not resolved at that level, elevate it to the STE, and if needed, to the chief engineer.

ODOT has the right, responsibility, and authority to establish the procedures, policies, codes, standards of practice and level of quality expected for work products and tasks. Practice standards should be no less than the standard of care in the industry.

Most often, the traffic engineering reviewer and traffic engineering POR will address recommendations and changes collaboratively and create a work product that satisfies both parties. Situations may arise where that is not the case. For those cases, guidance to address the authority of traffic engineering reviewers to require changes in the work products or tasks follows:

- Recommended changes to the work generally fall into three categories:
    1. Advisory Changes – Those which represent different ways to analyze or view the work that are suggested or advisory.
    2. Difference of Opinion – Those that represent differences of opinion which do not violate the standard of care or impact the safety of the public.
    3. Standard of Care Violations – Those which violate the standard of care or impact the safety of the public.
- Advisory category changes are reviewer suggestions or feedback. The traffic engineering POR should respond to the reviewer but does not need to document their choice to not incorporate the suggested changes.
- For differences of opinion not violating the standard of care or impacting the safety of the public, the traffic engineering POR should respond to each item individually and document the reason they are not implementing the recommendation.
- For differences that either party (traffic engineering POR or reviewer) considers violate the standard of care or impact safety of the public which cannot be resolved, the traffic engineering POR will work with the region discipline manager. Consult the region discipline manager before escalating to the technical center manager. Other ways of resolving the issue include an approval to a deviation or design exception by the delegated authority for the discipline.
- Compromise and open-minded communication are crucial. It is the traffic engineering POR's first duty to try and solve the matter with the traffic engineering reviewer. The traffic engineering reviewer should make every possible effort to explain their position to the traffic engineering POR and listen to feedback. Failing resolution between the parties, the resolution will vary depending on the nature of the dispute.
- Traffic engineering reviewers cannot require licensed professionals to change work in a way that would endanger the public or violate the standard of care.
- Licensed professionals are expected to address issues of standard of care or public safety. Only if proposed changes jeopardize public safety or violate the standard of care would the licensed professional have an argument for not being responsible for sealing the work.

4.4. Software, Tool, and Data Validation

All software, tools, and data validation methods required for QC work are documented or referenced in the ODOT Traffic Manual.

For traffic analysis work, the traffic engineering POR and traffic engineering reviewer should follow procedures and methods outlined in the ODOT Analysis Procedures Manual.

4.5. Quality Control Documentation

Create quality records as project QC work is done to provide reviewable evidence documenting that quality work was done. Quality records also provide the basis for quality reviews and/or audits (performed by professional auditors).

Use of the traffic quality checklist is required to document the design elements checked, as described in manuals, guidance, or considered necessary to meet industry standard of care.

Documentation needs to occur as the QC work is completed throughout a project; it must not be postponed to the end of the project. By documenting QC at each phase of the project, and saving that documentation in an appropriate manner, subsequent reviewers can confirm the QC process was implemented throughout the life of the project.

Each reviewer will document all the work products and tasks they evaluate in the project file. They will list the items reviewed in the traffic quality checklist. The checklist provides a place for the reviewer to record their initials and note the date they accomplished the review.

Capture review comments and notes in the project comment log to the greatest extent possible. Doing so promotes transparency and minimizes misunderstandings. In addition, reviewers should have a conversation with the person who created the work product or task to go over their comments. This establishes a personal relationship that helps to lessen possible conflicts of ego. Reviewers' comments are not included in the QC documentation but should be retained in ProjectWise in the "Milestones" folder.

Document the process of deciding on the final approach to the extent reasonable. Retain unsealed drafts of professional deliverables within the project file. Electronic version control should be in accordance with ProjectWise file naming conventions. Retain drafts for significant projects with multiple iterations.

Store quality records in ProjectWise in their regular discipline or milestone directory, with either "QC," "QA," or "QV" in the document title or description, to facilitate searches for quality documentation. Add quality files from each discipline or milestone folder in ProjectWise to a set created in the ProjectWise "7_quality" folder for traffic: *T*_K#####_##. See ProjectWise 7_Quality folder FAQ's and guidance on How_to_Create_Document_Sets_QG.pdf.

Store each deliverable in ProjectWise with electronically signed documentation confirming a thorough QC review was completed at the time of production.

Electronic signature and initials are considered valid secure signatures. The electronic signatures must include the signer's name and date they signed the document.

4.6. QC Communications

The process described by this section defines the minimum level of communication and collaboration necessary to meet the requirements of the ODOT traffic quality plan.

Members of the project team are encouraged to freely communicate throughout the life of a project to assure a high level of service and quality, and reduce significant amounts of rework, errors, or omissions.

5. Quality Assurance

QA is a system undertaken to maximize the effectiveness of the quality program. The QA process assists in measuring the effectiveness of the quality efforts and provides input to continually improve the work and aid in identifying technical development needs.

The goals of an effective QA process are:

Verification – A primary purpose of the ODOT Quality Assurance Program is to ensure all elements of the QC process occurred at the right time and applicable standards were applied effectively.

Building Competency – The QA process assists in developing an agency-wide vision of current needs, with respect to technical knowledge and competence. The evaluation of where projects succeed or fail, and the role of the QC program in assuring success, will provide useful data that supports identifying gaps or weaknesses within the current knowledge base.

Continuous Improvement –The QA process enables continuous improvement within both the quality program as well as within the practice community providing traffic services for ODOT projects.

The QA process must be objective, transparent, and effectively communicated.

5.1. QA Review Process

5.1.1 Project Review

An in-depth review of the project documentation will address how well the project met standards and the extent to which the QC process contributed to the success of the project.

Collect, evaluate, and share the results of the in-depth reviews with the ODOT Traffic Operations and Standards Team (TOAST) on an as needed basis.

This effort is part of the continuous improvement process to revise and improve ODOT traffic engineering standards and guidance, including the ODOT Traffic Manual and corresponding traffic subdiscipline manuals.

5.1.2 Completeness Review

Region traffic offices will gather initial information on completed projects from ProjectWise. A QA team comprised of region and headquarters traffic engineers will complete reviews and evaluations on an as needed basis.

They will focus on the completeness and timeliness of the QC documentation and will present their findings and recommendations to TOAST for possible revisions and improvements to

ODOT traffic engineering standards and guidance, including the ODOT Traffic Manual and corresponding traffic subdiscipline manuals.

5.2. QA Documentation

At a minimum, QA documentation presented to TOAST will include a summary of the QA findings and any recommendations for proposed changes to ODOT traffic engineering standards and guidance.

Present QA documentation to TOAST using Microsoft PowerPoint, MS Word, or Adobe Acrobat PDF format.

Provide a copy of QA reviews to the Project Delivery QA/QC Program.

5.3. QA Communications

TOAST manages the QA processes and QA reviews.

The internal TOAST channel on Microsoft Teams contains a complete searchable archive of all agendas, minutes, and presentations for TOAST meetings.

Share major changes to ODOT traffic engineering standards and guidance resulting from the QA process with the Technical Standards Peer Group comprised of all engineering disciplines across the agency.

Both internal and external customers will see the results of the QA process through regular published updates to ODOT traffic engineering standards and guidance manuals accessible on the agency's external website.

Appendix A – Glossary

Table A-3: Glossary of Terms, Titles, and Acronyms

Term	Acronym	Explanation
Automated Traffic Recorder	ATR	Traffic volume recording devices deployed and maintained by ODOT Transportation Data Section.
Design Acceptance Package	DAP	Statewide phase gate project delivery milestone.
Intelligent Transportation Systems	ITS	Intelligent devices designed, deployed, and maintained by ODOT Maintenance and Operations Branch.
Manual on Uniform Traffic Control Devices	MUTCD	Federal manual defining the standards used by road managers nationwide to install and maintain traffic control devices on all public streets, highways, bikeways, and private roads open to public travel.
Professional of Record	POR	Designated professional engineer responsible for one or more engineering disciplines and/or subdiscipline. Especially qualified in their discipline's practices and principles.
Plans, Specifications & Estimates	PS&E	Statewide phase gate project delivery milestone.
Quality Assurance	QA	Focused on the process and assurances that quality requirements are fulfilled. • Verifying QC was done following the quality processes. • Reviews of QC and QA processes, supporting continuous improvement. • Project and program level QA reviews.
Quality Control	QC	Focused on the product fulfilling quality requirements as it is developed.
Quality Management	--	Policies, processes, activities, and responsibilities that ensure the overall quality of tasks and deliverables in project delivery. Implemented by means such as quality planning, quality control, quality assurance, and continuous improvement within the system.
Quality Verification	QV	Review process to ensure technical sufficiency of all deliverables, verify performance of all quality tasks, and to document the completion of those tasks.
Right of Way	ROW	Engineering and Technical Services Branch section providing expertise in real estate and right of way matters to ODOT. Expertise includes appraisal, acquisition and management of property acquired for public projects.

Term	Acronym	Explanation
STE		State Traffic engineer
Technical Sufficiency	--	Technical review process checking the deliverable complies with all applicable laws, rules, regulations, technical standards, guidance, policies and procedures, suitable for a given milestone. An initial check of key elements can be used to decide whether further review is warranted.
Traffic Operations and Standards Team	TOAST	The internal ODOT statewide traffic engineering peer group focused on ODOT traffic engineering standards, guidance, and quality management. Comprised of Traffic-Roadway Section managers, headquarters engineers, region traffic managers and region traffic engineers


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