

VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: Practical Design Flexibility in the Project Development Process		NUMBER: IIM-LD-255
SPECIFIC SUBJECT: Fundamentals of Common Sense Engineering		DATE: October 13, 2015
		SUPERSEDES:
RECOMMENDED for APPROVAL: Bart Thrasher, P.E. Recommended <u>October 13, 2015</u> State Location and Design Engineer	APPROVED: Mohammed Mirshahi, P.E. Approved <u>October 13, 2015</u> Deputy Chief Engineer	

EFFECTIVE DATE

- This memorandum is effective upon receipt.

INTRODUCTION

This memorandum provides VDOT's implementation strategy regarding Common Sense Engineering (CSE). The following information offers the foundation for overall thought and general policy to achieve more focused transportation improvements at lower costs. The goal of CSE is to appropriately allocate limited resources to optimize system wide transportation improvements. This type of approach allows VDOT to focus on maximizing transportation system improvements statewide, rather than maximizing improvements in a select few locations. The long term objective of CSE is to build good projects everywhere and not perfect projects somewhere. By taking a more systematic approach, this objective can be more readily achieved.

CSE does not dismiss engineering policies and/or standards. Rather, it aims to increase flexibility for the Project Team and Project Sponsor to produce more efficient and effective designs to meet the project purpose and need/scope. The most critical milestone in CSE is the purpose and need/scope. It is this stage where the fundamental engineering decisions of a project are made. CSE is a "design up" approach and not a "strip down" process. Rather than starting with the desired level of improvement and removing design items until a project budget is met, engineers are to look at the existing conditions and design only those essential improvements that meet the project's purpose and need/scope and budget. CSE requires use of sound engineering judgment to assess all the possible solutions while evaluating design tradeoffs and mitigating risks to the extent practical.

Common Sense Engineering Objectives

The results achieved by CSE must be tangible to the traveling public to gain their support. The traveling public does not understand simply meeting current standards. Tangible results include improvements to safety, accessibility, congestion, asset condition, modal choice, quality of life, economic growth, land use, and environment. Therefore all projects must be consistent with the following principles:

- **Safety**
 - ❖ Projects will either make the facility safer or maintain the existing safety level.
 - ❖ No project will degrade the overall system safety.
- **Optimization**
 - ❖ VDOT will continue to use an asset management approach to all multimodal transportation systems managing pavements, bridges and roadway operations and safety features to provide maximum flexibility while maintaining or exceeding safety.
 - ❖ Ensure engineered solutions do not produce a legacy of maintenance problems.
- **Public Support**
 - ❖ It is VDOT's responsibility to provide clarity regarding the project purpose and need/scope and to ensure that we accurately convey and provide the benefits to the traveling public.
 - ❖ CSE will help ensure localities bring their leadership (elected officials) into the design process earlier to ensure all stakeholders have a clear view on project expectation, costs and challenges.
- **Maximization of Project Budgets**
 - ❖ Setting the purpose and need/scope is critical in the plan development process so that funding can target the specific need.
 - ❖ Our purpose and need should clearly outline the scope of the project with the fiscally constrained obtainable solutions. Our goal is to get the best value for the least cost.

Common Sense Engineering Philosophy

Every proposed transportation improvement must look to achieve the most return for the least cost. However, VDOT will not overemphasize short-term cost savings without a clear understanding how such decisions could impact other objectives such as operational performance and life-cycle costs. It is the responsibility of the Project Team in conjunction with the Project Sponsor to provide the most efficient engineering solution (both cost and function) to achieve the purpose and need/scope of the project. This will require multi-disciplinary project development especially where innovations are included.

VDOT is transitioning to a new paradigm where the benefits of a project will be measured relative to its cost as required by the Commonwealth Transportation Board's (CTB) Policy and Guidelines for Implementation of a Project Prioritization Process, as adopted in June 2015. Funding decisions will be made based on the results of project scoring and prioritization.

The CTB's policy requires a project to be rescored if the scope or estimate changes significantly such that the calculation of benefit relative to cost would be impacted. The use of CSE is expected to result in more cost effective design solutions providing a better benefit to cost ratio for projects and a greater return on investment. CSE is expected to result in more stable cost estimating, minimizing the need for rescoring.

Common Sense Engineering

- Focus is on defining a very specific purpose and need/scope and then keeping within the confines of the project's purpose and need/scope and saving project resources to be utilized for additional improvement projects later or elsewhere on the system network.
- The design starts with the existing conditions and then builds upward to meet the objective of the purpose and need/scope. The use of design exceptions and waivers is to assist in meeting the project's purpose and need/scope. Consideration of design exceptions and waivers to decrease project costs will be evaluated on a case-by-case basis.
- Stakeholders need to be focused on the purpose and need of the project. Additional desires/wants must be within the purpose and need/scope of the project. This is accomplished by having the stakeholders involved in development of the purpose and need.
- Evaluate the life cycle costs when developing the purpose and need/scope of proposed projects.

Roles and Responsibilities

- The success of CSE is dependent upon the synergy generated between the two principal working groups responsible for project development-the Project Sponsor and the Project Team. Below is a brief description of these two group's duties and responsibilities in implementing CSE.

❖ Project Sponsor

- Assist in the development of the project's purpose and need/scoping.
- Provide a clear understanding of each project's overall impact to VDOT's program objectives.
- Provide budgetary expectations based upon the purpose and need/scoping of the project.
- Support project team when alternative solutions are provided to meet project objectives.

❖ Project Team

- Provide engineering improvements that meet the purpose and need/scope of the project and eliminate any proposed improvements that do not meet the purpose and need/scope of the project.
- Evaluate all plausible project improvements in a corridor context while exercising every effort to stay within the purpose and need/scope of the project.
- Engineer based on a "build up" philosophy from a project's existing conditions to meet the project's purpose and need/scope.
- Development of a sound and realistic budget based upon all available project information during the scoping phase.

- Coordinate CSE solutions with other stakeholders (both internally and externally) such as Residencies, Districts, Regions, other VDOT Divisions, Localities, Businesses, the Public and Emergency Service Providers, etc.

Summary

The overall objective of VDOT is to appropriately allocate limited resources to optimize system wide transportation improvements. In short, VDOT must ensure that every project, every engineering decision, every dollar spent on every project budget is focused on improving VDOT's overall transportation system. There must be an overall systematic synergy created between all facets of program development (planning, engineering, right-of-way acquisition, construction, operations and maintenance) which has a sole focus of improving VDOT's transportation system. Implementation of CSE will also necessitate cultural and systematic change. VDOT will adopt and adapt to a new way of thinking and the inclusion of alternative design strategies for delivering its transportation improvement program. This process will require full and complete integration of CSE methodology along with Context Sensitive Solutions ([IIM-LD-235](#)) throughout the agency to unify and enhance project planning, scoping, design, construction, and maintenance operations. The end result will improve and ensure VDOT's ability to deliver the best valued projects while enhancing safety, mobility and economic growth throughout the state.

Residency has the option to do Tier I work or can pass along to District

