

Safety and NEPA:

Case Studies and Noteworthy Practices





FHWA-SA-22-047

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16. Abstract The National Environmental Policy Act (NEPA) is a procedural statute that requires Federal agencies to assess the environmental effects of their proposed actions on the human environment prior to making decisions. These case studies present examples from around the United States of how safety can be incorporated in NEPA. This case study document begins with a discussion of the Roadway Safety Management Process and its applicability to the broader project development process. The introduction and case studies then narrow the focus of safety analysis for the purpose of incorporating safety elements specifically within the context project purpose and need and the NEPA process. The document concludes with an Appendix of specific codes and federal regulations that help justify safety as a relevant part of the NEPA legal framework.				
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Introduction

The National Environmental Policy Act (NEPA) is a procedural statute that requires Federal agencies to assess the environmental effects of their proposed actions on the human environment prior to making decisions. The Council on Environmental Quality (CEQ) is responsible for implementing NEPA regulations and has issued numerous documents to guide agencies through NEPA compliance and regulation implementation. These regulations (40 CFR §1500-1508) guide NEPA compliance by detailing agency authority, NEPA classes of action, types of environmental review documentation, scoping, and time limits. In addition, the U.S. modal administrations, the Federal Highway Administration (FHWA), Federal Transit Administration (FTA), and Federal Railroad Administration (FRA), have joint NEPA implementing regulations related to NEPA compliance that must be followed (23 CFR §771). Due to the procedural nature of NEPA, an understanding of the implementing regulations and legal precedent is important to follow a defensible transportation decisionmaking process and develop associated documentation.

Safety is just one potential impact on the human environment along with several other planning considerations through the NEPA process (e.g., air quality, hazardous waste disposal, noise, and water conservation). Traffic crashes help quantify this impact, with an estimated 42,915 fatalities occurring in the United States in 2021 alone. Federal policy has stressed safety as a goal and fundamental consideration in the transportation planning and project development process.

There has been, and continues to be, a significant effort to advance safety research, practice, and policy as they relate to transportation design. The United States Department of Transportation (USDOT) <u>National Roadway</u> <u>Safety Strategy (NRSS)</u> touches on many of these points, particularly (USDOT, 2022):

- » Emphasis on the Safe System Approach to accommodate all users.
- » Improvement in data collection and management to support data-driven safety analysis (DDSA).

These advancements, combined with State guidance on the roadway safety practice, lend themselves to integration with the NEPA process. As stated in the Federal Highway Administration's (FHWA's) *Integrating Road Safety into NEPA Analysis: A Primer for Safety and Environmental Professionals* (2011b), the NEPA process is "an effective tool for maximizing safety benefits of transportation projects" and "provides a unique opportunity to apply the latest research and analytical techniques for project-level safety analysis" (p. 1). For instance, the human and natural environment are key considerations in the NEPA process, and the NRSS explicitly links safety with similar national priority areas, equity and climate. Fatal and serious injury crashes disproportionately occur in communities that have been historically underserved or affected by persistent income inequality (USDOT, 2022; p. 7). Likewise, providing safer transportation options for nonmotorized users is essential to promoting biking, walking, and transit and reducing emissions associated with motor vehicle traffic and congestion. These connections between safety and the human environment underscore the importance of appropriately using data analysis, observational studies, and stakeholder input to incorporate safety into the NEPA process and documentation. Every transportation project presents an opportunity to consider and implement appropriate safety improvements that support achievement of our national safety goals.

These case studies present examples from around the United States of how safety can be incorporated in NEPA. There are two primary audiences for these case studies:

1. NEPA specialists interested in learning how to effectively incorporate safety analysis into NEPA documentation and decision-making.

2. Safety specialists (i.e., planners and engineers) interested in understanding the NEPA process and where safety consideration can be incorporated.

This case study document begins with a discussion of the Roadway Safety Management Process and its applicability to the broader project development process. The introduction and case studies then narrow the focus of safety analysis for the purpose of incorporating safety considerations specifically within the context project purpose and need and the NEPA process. The document concludes with an Appendix of specific federal statutes and regulations that help justify safety as a critical part of the NEPA legal framework.

The Roadway Safety Management Process and Planning

The Roadway Safety Management Process extends to all aspects of safety-related project planning, development, and evaluation. Chapters in Part B of the American Association of State Highway Transportation Officials' (AASHTO) *Highway Safety Manual* (HSM) First Edition cover the sixstep approach to conducting a data-driven and safety performance analysis-based program (figure 1). Network Screening (Chapter 4) is the most applicable to the pre-NEPA stage of project development. Network screening is:

> "...a process for reviewing a transportation network to identify and rank sites from most likely to least likely to realize a reduction in crash frequency with implementation of a countermeasure" (AASHTO, 2010, p. 4-1).

In other words, segments or intersections highlighted



The HSM methods help practitioners assess the safety impacts of proposed project and design decisions. This is especially important when evaluating differences between nominal and substantive safety (i.e., safety performance analysis). Prior to the HSM, the default safety assumption focused on achieving prescribed design practices and standards. This stands in contrast with safety performance analysis, which defines safety in terms of actual performance as it relates to the frequency and severity of crashes. Safety performance analysis can be integrated into the NEPA process by presenting and defining safety performance (e.g., HSM analysis results) in terms that are meaningful to



"The National Cooperative Highway Research Program (NCHRP) 480, A Guide to Best Practices for Achieving Context Sensitive Solutions, explains that **nominal safety** refers to a design or alternative's adherence to design criteria and/or standards. **Substantive safety** refers to the actual performance of a highway or facility as measured by its crash experience."

Source: FHWA, 2011 (p. 22)

technical and nontechnical stakeholders. Furthermore, quantitative safety metrics should be identified early in the project development process (i.e., scoping and prior to purpose and need) so they can be applied appropriately to design decisions. Once in purpose and need, these metrics can be used as an evaluation parameter following project implementation (Institute of Transportation Engineers, 2015).



Figure 2. Graphic. The project development process and opportunities to implement the HSM. Source: FHWA, 2011.

Integrating Road Safety into NEPA Reviews

Although safety performance analysis applies broadly during the planning and project development process, the HSM and pre-NEPA planning are essential for incorporating safety into NEPA reviews. FHWA's Integrating Road Safety into NEPA Analysis: A Primer for Safety and Environmental Professionals (2011b) supports the use of quantitative and qualitative methods in NEPA reviews. The guide provides a general framework,

recommendations, and noteworthy examples for incorporating safety in NEPA reviews. The organization of the guide follows the principal steps of NEPA review (figure 3):

Safety in the NEPA Process



A project's purpose and need statement is the core component of a NEPA document. Safety should be adequately supported in order to be considered as part of a project's purpose and need statement. The 2011 guide notes four key components of incorporating safety in project purpose and need:

- I. Analysis results that define the existing problem.
- 2. Reference applicable safety plans (e.g., Strategic Highway Safety Plans or other State, metropolitan, and local road safety plans).
- 3. The results of public outreach.
- Considerations for all road users, including those likely to be more vulnerable in crashes such as pedestrians, bicyclists, wheelchair and other mobility device users, and transit users.

"The statement of the project purpose and need is the core component of the NEPA document. It describes the impetus for the project and serves as the benchmark against which project alternatives are evaluated."

Source: FHWA, 2011 (p. 21)

Project scoping can address these components and support safety as a project need. The 2011 guidance notes several methods for justifying safety as a project need:

- » Results of prior planning products¹ (23 U.S.C. §168).
- » Public and stakeholder outreach to document observational data from safety professionals or persons affected by safety issues.
- » Road safety audits (RSAs) or other formal site reviews conducted by a multidisciplinary team.
- » Safety data review of observed crashes or other objective safety data to diagnose crash patterns, contributing factors, or other persistent issues.
- » Safety analysis to identify the extent and nature of a safety problem. Predictive, HSM-based, methods can be used to support the following applications:
 - **Network Screening** can help normalize relative safety outcomes by road type. For instance, the Level of Service of Safety (LOSS) method can identify locations that experience a higher number of crashes than would be predicted for a similar road facility with similar annual average daily traffic

¹ "The term 'planning product' means a decision, analysis, study, or other documented information that is the result of an evaluation or decision-making process carried out by a metropolitan planning organization or a State, as appropriate, during metropolitan or statewide transportation planning under section 134 or 135, respectively." (Source: 23 U.S. Code §168(a)(3)).

(AADT) as opposed to using a statewide average. This would indicate a substantive safety issue with that location.

 Alternatives Analysis can reinforce a proposed project's effectiveness at addressing a safety need prior to NEPA. For instance, feasibility studies can compare a proposed alternative to a potential "nobuild" future scenario based on predicted crashes. Proposed alternatives that show a reduction in crashes over the study period can help support safety as a project purpose during NEPA initiation, particularly in combination with a documented safety issue (e.g., stakeholder input, observational study, crash pattern diagnosis, or network screening results).

Establishing safety in project purpose and need through adequate supporting evidence is essential for influencing safety in later NEPA stages. Examples related to figure 3 could include:

- » An **Alternatives Analysis** could incorporate analytical results from the Interactive Highway Safety Design Model (IHSDM), Enhanced Interchange Safety Analysis Tool (ISATe), or another HSM-based tool that compares safety performance analysis results of each alternative.²
- » Practitioners can define the **Affected Environment** according to specific road users or potential impact areas. This might include pedestrians and cyclists, certain age groups, or other underserved and disadvantaged groups that might be disproportionately affected by adverse safety conditions.
- » Environmental Consequences (beneficial or adverse impacts) can be linked to wildlife habitats and collisions with motor vehicles or reduced emissions resulting from a road diet or other complete streets applications.
- » Safety-related **Mitigation** considerations can apply to construction-related (e.g., work zone) or postconstruction-related (e.g., wildlife collision mitigation) activities and measures intended to reduce collisions on the roadway.

Case Studies

There are practical and statutory connections between the NEPA and the roadway safety management process. However, these connections are not always implemented at an institutional level. Furthermore, the state-of-practice for both safety and project development have evolved since 2011. For instance, the HSM, <u>systemic approach to safety</u>, and the <u>Safe System approach</u> (FHWA, 2022a) have gained widespread acceptance since the *Integrating Road Safety into NEPA Analysis* guide's publication. The six Safe System approach principles in particular strengthen the connection between traffic safety and the human environment:

- I. Deaths and serious injuries are unacceptable.
- 2. Humans make mistakes.
- 3. Humans are vulnerable.
- 4. Responsibility is shared.
- 5. Safety is proactive.
- 6. Redundancy is crucial.

² The Preface of the HSM (*Considerations and Cautions When Using the HSM*) notes that "The information in the HSM is provided to assist agencies in their effort to integrate safety into their decision-making process. The HSM is not intended to be a substitute for the exercise of sound engineering judgment." (AASHTO, 2010).

The following case studies provide noteworthy examples across the United States that have successfully incorporated safety as a key component of the NEPA process:

- » Incorporating Safety into Project Purpose and Need Agency Guidance Review.
- » North Dakota's US 85 Expansion: I-94 Interchange to Watford City Bypass.
- » Colorado's I-25 South Gap Environmental Assessment.
- » Kentucky's Second Street Corridor (US 60): Complete Street and Road Diet Project.

Several key themes and lessons learned presented in these case studies include:

- » Safety and environmental considerations should not be considered "either/or" in project development. The incorporation of safety improvements in a project does not always require expanding the footprint or potentially impacting more environmental resources. There is room for flexible and context-sensitive, performance-based practical design when creating innovative solutions to address safety.
- » Clear, well-developed guidance can benefit the incorporation of safety in NEPA. This is particularly true for institutional guidance that helps State and local agencies craft defensible purpose and need statements.
- » Meaningful public involvement and engagement are critical in understanding specific safety concerns within a project footprint. Feedback from routine travelers of a corridor provides insight on current conditions that may not be evident from historic data alone. For example, public engagement can help underscore traffic stress on vulnerable road users or highlight a lack of accommodations. The project team must fully understand these safety concerns to capture and evaluate them in the environmental review process. For instance, RSAs during NEPA reviews can be designed and leveraged as an effective safety planning and public involvement tool.
- » **Documenting safety concerns and quantitative analysis from pre-NEPA processes**, particularly through a Planning and Environmental Linkage (PEL) or feasibility study, provides a foundation for prioritizing safety throughout the project development process. This is particularly true when crash history alone is not the only potential justification for incorporating safety into NEPA.
- » The **HSM** and supporting tools can be used in alternatives analysis to incorporate safety performance analysis (i.e., substantive safety), rather than design standards alone (i.e., nominal safety), in alternative evaluations.
- » Safety can be incorporated in all stages of NEPA reviews, for all NEPA classes of action (i.e., Documented Categorical Exclusions³, Environmental Assessments and Environmental Impact Statements), and beyond. Using FHWA's proven safety countermeasures (FHWA, 2022b) in design alternatives, defining the affected human environment that

³ Pursuant to 23 CFR §771.117(d), these actions would require documentation that demonstrates that the specific conditions or criteria for these CEs are satisfied, and that significant environmental effects will not result. However, 23 CFR §771.117(c)(27) includes, "highway safety or traffic operations improvement projects, including the installation of ramp metering control devices and lighting," if the project meets certain constraints, which meets the criteria for CEs in the CEQ regulations (40 CFR §1508.4) and paragraph (a) of this section and normally do not require any further NEPA approvals by the FHWA.

could be improved through safe transportation, and considering safety in mitigation strategies are opportunities to incorporate safety in the NEPA process.

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Appendix A: Statutory and Regulatory Support for Safety in the NEPA Process

The Council on Environmental Quality (CEQ) is responsible for implementing NEPA through Title 40 of the Code of Federal Regulations (CFR) (initially promulgated as guidelines in 1971 and then issued as regulations in 1978). Specifically, 40 CFR §1500-1508 guide NEPA compliance by detailing agency authority, NEPA thresholds, types of environmental review documentation, scoping, and time limits. Due to the procedural nature of NEPA, an understanding of legal precedent is important to follow a defensible process and develop associated documentation. The United States Code (USC) is a consolidation and codification by subject matter of general and permanent laws of the United States. Within Title 23, the portion of the USC governing highways, there are multiple instances identifying the relevance and importance of including safety within the transportation planning and NEPA process.

- » 23 U.S.C. §109: This section identifies standards for plans and specifications for each proposed highway project covered by the chapter. Throughout the section, there are mentions of safety concepts and measures to be included in design standards and implementation efforts. Specifically, subsection (a)(1) states that a facility will "adequately serve the existing and planned future traffic of the highway in a manner that is conducive to safety, durability, and economy of maintenance;" subsection (c)(2)(D) dictates the use of the HSM when developing design criteria.
- » **23 U.S.C. §134 and §135:** These sections include policy for metropolitan (section 134), as well as statewide and nonmetropolitan (section 135) transportation planning efforts.
 - Per subsections 134(h)(1)(B) and 135(d)(1)(B), the planning process shall "increase the safety of the transportation system for motorized and nonmotorized users."
 - Per subsections 134(h)(2)(A) and 135(d)(2)(A), the planning process shall "provide for the establishment and use of a performance-based approach to transportation decision-making to support the national goals described in section 150(b) of this title and the general purposes described in section 5301 of title 49." Safety is referenced as a national goal in 23 USC §150(b)(1), and 49 USC §5301(b)(2) references the development and delivery of capital projects.
 - Per subsection 134(i)(2)(F), operational and management strategies shall "improve the performance of existing transportation facilities to relieve vehicular congestion and maximize the safety and mobility of people and goods."
- » 23 U.S.C. §168: This section integrates planning and environmental review. It permits lead or cooperating agencies to adopt or incorporate a planning product in the environmental review process. This planning product can reference safety-related considerations into the NEPA process through several mechanisms:
 - Per subsection 168(c)(1)(C), the purpose and the need for the proposed action.
 - Per subsection 168(c)(1)(D), preliminary screening of alternatives and elimination of unreasonable alternatives.
 - \circ Per subsection 168(c)(2), planning analyses that include travel demands, regional development, and built environment conditions.

- Per subsection 168(d)(3), the planning process that included broad multidisciplinary consideration of systems-level or corridor-wide transportation needs and potential effects, including effects on the human and natural environment.
- Per subsection 168(d)(7), the planning product has a rational basis and is based on reliable and reasonably current data and reasonable and scientifically acceptable methodologies.

Additional CFR parts that support the use of safety performance analysis in NEPA include:

» 23 CFR §771: This section outlines how Federal agencies, including the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), Federal Transit Administration (FTA), and USDOT, must adhere to 23 CFR §771 for processing highway, public transportation, and railroad actions in compliance with NEPA. Pursuant to 23 CFR §771.105, it is FHWA's policy that:

> "Alternative courses of action be evaluated, and decisions be made in the best overall public interest based upon a balanced consideration of the need for *safe* and efficient transportation; of the social, economic, and environmental impacts of the proposed transportation improvement; and of national, State, and local environmental protection goals."

- » 23 CFR §625: This section establishes design standards for highways, specifically reflecting 23 USC §109 statute. Section 625.2 states the transportation projects will, "adequately serve the existing and planned future traffic of the highway in a manner that is conducive to safety, durability, and economy of maintenance." The subsection reiterates the importance of safety, stating "an important goal of the FHWA is to provide the highest practical and feasible level of safety for people and property . . . and to reduce highway hazards and the resulting number and severity of accidents on all the Nation's highways."
- » 23 CFR §450.318: This section discusses how the results of a "multimodal, systems-level corridor or subarea planning study" can "be used as part of the project development process consistent with NEPA and implementing regulations." The results may help support:
 - Purpose and need or goals and objective statement(s).
 - General travel corridor and/or general mode(s) definition (e.g., highway, transit, or a highway/transit combination).
 - Preliminary screening of alternatives and elimination of unreasonable alternatives.
 - Basic description of the environmental setting.
 - Preliminary identification of environmental impacts and environmental mitigation.

Furthermore, applicable public documents or other source material produced or in support of the transportation planning process may be directly incorporated or referenced in subsequent documents.



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