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1104.01 General

Washington State Department of Transportation practical design policy requires formulating and evaluating alternatives while considering acceptable performance trade-offs to meet the need(s) of a project at the lowest level of investment. This chapter discusses how:

- Information determined from planning phases and [Chapter 1101](#), [Chapter 1102](#), and [Chapter 1103](#) is utilized in alternative solution formation
- To evaluate the alternative solutions developed

1104.02 Environmental Documentation Considerations

This chapter presents methods for developing alternatives. For projects requiring an Environmental Assessment (EA) or an Environmental Impact Statement (EIS), a final proposed alternative may only be determined through the National Environmental Policy Act (NEPA) process and/or the State Environmental Policy Act (SEPA) process (see Chapter 400 of the Environmental Manual for more information). If an EA or EIS has not been initiated under NEPA/SEPA, follow the procedures in this chapter. To help advance the project, consider and use appropriate NEPA/SEPA terminology. Perform public and agency outreach and document all information regarding alternatives development for use later in the NEPA/SEPA process, according to 23 USC 168 (d). Terminology used in this chapter assumes that NEPA/SEPA have not been initiated. In the event that the NEPA/SEPA process has been initiated and an EA or EIS will be required, coordinate with the region Environmental Office staff to make sure that this alternative formulation and evaluation is performed in accordance with NEPA/SEPA guidance.

1104.03 Alternative Solution Formulation

Identify alternatives that address the baseline need while balancing the performance trade-offs identified in the process. This performance-based, data-driven approach can include analysis of multimodal trade-offs and the formulation of multimodal/intermodal solutions, potentially reducing travel demand. Reference need identification and contributing factor analysis (CFA) in the alternative solution formulation (see [Chapter 1101](#) and Contributing Factors subsection of the [Guidance Document](#) for more information).

Beyond the no-build option, conduct alternative solutions formulation according to the following principles:

- Formulate alternatives that are compatible with context and design controls.
- Provide at least one alternative for evaluation that employs lower-cost approaches and efficiencies, such as Transportation Systems Management and Operations strategies ([see Section 1100.04\(6\)](#)).
- Consider incremental, phased solutions.
- Formulate alternatives that address, but do not exceed, the specific needs and problems. Consider possible forward compatible alternatives to better allow for future improvements.
- Form solutions around contributing factors or the underlying root reason(s) identified from CFA. Address the underlying root reason(s) determined from CFA in at least one alternative.

Evaluate the relative benefit between each alternative against the baseline (typically the no-build option) and contextual performance metrics to determine the optimally performing solution for the least cost. (See Section 1104.04(3) for information on calculating the benefit/cost of alternatives.) Document the multimodal, environmental, operations, safety, maintenance and other impacts of the alternatives as appropriate.

Planning phase corridor sketches or studies may be used to identify WSDOT's strategy for the corridor. If a planning phase has occurred, develop at least one alternative based on the strategy identified in the planning report. See the Alternative Strategies and Solutions subsection of the *Guidance Document* for more information regarding different strategies that may be considered.

If a planning study has developed specific alternatives, and those alternatives are still relevant, carry those alternatives into the alternative evaluation process.

1104.03(1) Complete Streets Alternatives (New Section 2023)

In addition to the preceding guidance to consider during alternatives formulation, the following additional requirements apply to Complete Streets projects and are generally the responsibility of the Project Engineer in consultation with the Complete Streets (CS) Team, with support from subject matter experts such as the Region Transportation Operation Office.

During the alternatives formulation process, develop and recommend several Complete Streets alternatives that specifically address and are in alignment with one or more of the following strategies:

- minor investments in existing facilities that can serve in place of additional investment on the state route
- reallocation of existing space to active transportation modes (See NCHRP 1036 Guide for Roadway Cross Section Reallocation for more information)
- expanding the cross section to accommodate active transportation modes, and measures to reduce vehicle speeds
- increase separation in order to achieve the target level of traffic stress

Once alternatives have been developed, seek feedback from the affected community, through a specific and targeted outreach effort, on the concepts developed during the alternatives formulation process described above. Incorporate feedback as appropriate to modify and improve the alternatives. Once feedback has been considered and incorporated, capture the findings in the BOD.

1104.04 Alternative Solution Evaluation

Alternative solution evaluation involves analyzing the design year performance benefits provided by a solution with respect to the amortized cost. It is the intent of the alternative solution evaluation process to:

- Compare solutions that resolve the baseline need(s) in consideration with the benefits or impacts associated with the contextual needs.
- Analyze the relative value of each alternative, including associated performance trade-offs. Considerations should also include agency risks, resource constraints, and life cycle operating and maintenance costs.
- Mitigate unacceptable performance trade-offs with proven countermeasures.
- Refine targets if mitigation measures applied yield unacceptable performance trade-offs.

1104.04(1) Alternatives Comparison

WSDOT's alternatives comparison process is intended to align with performance-based decision-making. The process is complementary to a practical design approach. The process centers around achieving the basic performance need, while understanding and when necessary, mitigating for the potential effects to other performance areas.

Use the [Alternative Comparison Table](#) (ACT) within the BOD to assist in evaluating alternatives with respect to the anticipated performance of each identified baseline and contextual needs, as well as other identified impacts to the project location associated with each alternative. The intent of comparing alternatives is to:

- Obtain an alternative solution for the least cost while understanding associated performance trade-offs.
- Compare alternatives against their ability to accomplish the baseline need.
- Evaluate alternatives against their relative effects on contextual needs.
- Provide the opportunity to incorporate mitigation or countermeasures.
- Document alternative formulation and evaluation outcomes that are consistent with the environmental process and expectations.

Note that if there are a large number of contextual needs and other impacts under consideration, it may be beneficial to prioritize or use a weighted evaluation of the contextual needs in order to expedite the alternative evaluation.

As discussed in Section [1104.03](#), at least one alternative based on the outcome of Contributing Factors Analysis should be compared against other alternatives.

1104.04(2) Performance Trade-off Decisions

In performance trade-off decisions, the intent is to give priority to the project's baseline needs. However, there will be situations where evaluations reveal that trade-offs are too significant, and there is an inability to adequately resolve them with low-cost countermeasures, phased solutions, or general acceptance of the performance trade-off. In these situations, it is appropriate to consider alternatives that still optimize the baseline performance metric, but do not necessarily obtain initial performance targets. Document refined performance targets on the Basis of Design.

Whether a design alternative achieves a particular contextual performance target is a consideration during the tradeoffs analysis. When no alternative adequately balances performance, lower-cost countermeasures can be employed to help mitigate performance issues and improve the viability of alternatives. Modifications to one or more design controls are another approach that can be used to achieve performance targets (see [Chapter 1103](#)), without adding cost. If all alternatives fail to find an acceptable performance balance targets may be refined.

Document changes to performance targets using the Basis of Design.

1104.04(3) Benefit/Cost Analysis

The overall benefit/cost for the alternatives proposed is inherent with understanding the performance trade-offs being considered. Although a factor for all potential alternatives, in some cases, decisions will be based on quantifiable life cycle operating and maintenance costs, as discussed in [Chapter 301](#). Some perceived benefits are a challenge to quantify and will need analysis such as that discussed in *NCHRP Report 642: Quantifying the Benefits of Context Sensitive Solutions*: www.trb.org/Publications/Blurbs/162282.aspx

1104.05 Preferred Alternative

The Project Team consults with the Advisory Team for input on the appropriate tools to employ when selecting the alternative to move forward and review the Alternatives Comparison Table and any other relevant documentation related to the alternatives evaluation. The goal is to select the alternative based on documented input from of all team members, included any changes, mitigation, tradeoffs to incorporate into the selected alternative as a result of this review.

The Project Engineer provides the final approval of the selected alternative, and also assumes responsibility for the alternative selection decision. Projects identified to implement Complete Streets may develop alternatives that propose to defer scope or Complete Streets elements, in part or whole, to a future project. The decision to defer work is approved by the Region Administrator or designee (See Design Bulletin #2023-01).

1104.06 Documentation

The [Alternative Comparison Table](#) (ACT) is used to assist in evaluating alternatives. Alternative formulation and evaluation will also be documented through the NEPA process. Environmental staff will help account for consistency with the environmental process, expectations and requirements throughout any alternative formulation and evaluation that occurs within project development.

1104.07 References

1104.07(1) Federal/State Directives, Laws, and Codes

[42 United States Code \(USC\) 4321](#), National Environmental Policy Act of 1969 (NEPA)

[Chapter 43.21C Revised Code of Washington](#) (RCW), State Environmental Policy Act (SEPA)

[Chapter 468-12 Washington Administrative Code](#) (WAC), WSDOT SEPA Rules

[Secretary's Executive Order 1090.01](#) – Advancing Practical Solutions

[Secretary's Executive Order 1018](#) – Environmental Policy Statement

1104.07(2) Guidance and Resources

[Environmental Manual](#), M 31-11, WSDOT

[Standard Plans for Road, Bridge, and Municipal Construction](#) (Standard Plans), M 21-01, WSDOT

[Understanding Flexibility in Transportation Design – Washington](#), WA-RD 638.1, Washington State Department of Transportation, 2005 www.wsdot.wa.gov/research/reports/fullreports/638.1.pdf

Direct link to the Guidance Documents:

www.wsdot.wa.gov/publications/fulltext/design/ASDE/Practical_Design.pdf

Direct link to Transportation Systems Management and Operations: <https://tsmowa.org/>

[NCHRP 1036 Guide for Roadway Cross Section Reallocation](#)

1104.07(3) Supporting Information

Designing Walkable Thoroughfares: A Context Sensitive Approach, Institute of Transportation Engineers, Washington D.C., 2010. www.ite.org

NCHRP Report 642 – Guidelines for Quantifying the Benefits of Context Sensitive Solutions, Transportation Research Board, Washington D.C., 2014

www.trb.org/Publications/Blurbs/162282.aspx

NCHRP Synthesis 443 – Practical Highway Design Solutions, Transportation Research Board, Washington D.C., 2013 www.trb.org/Main/Blurbs/168619.aspx

Consensus Decision-Making - A Virtual Learning Center for People Interested in Consensus
<https://www.consensusdecisionmaking.org/>

