

D.1 IMPACT ASSESSMENT METHODOLOGY

Impact Assessment Methodologies

As part of the Environmental Review Process for

I-80/I-580/US 395

Spaghetti Bowl Interchange Reconstruction

Washoe County, Nevada

Federal Highway Administration, Nevada Division

Nevada Department of Transportation



March 2017; updated July 2017; updated March 2018

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this Impact Assessment Methodology document is to communicate the Lead Agencies' proposed tools, assumptions, level of detail, evaluation criteria, and screening procedures that will be used in the environmental impact assessment process. The Lead Agencies seek collaboration on this Impact Assessment Methodology from other cooperating and participating agencies to promote an efficient and streamlined process and early resolution of concerns or issues.

United States Code (U.S.C.) Title 23 Section 139 requires Lead Agencies for proposed federally funded transportation projects to determine the appropriate methodology and level of detail for analyzing impacts, in collaboration with Cooperating and Participating Agencies.¹ Consensus on the methodology is not required, but the Lead Agency must consider the views of the cooperating and participating agencies with relevant interests before making decision on a particular methodology.² Well-documented, widely accepted methodologies, such as those for noise impact assessment and evaluation of impacts under Section 106 of the National Historic Preservation Act, require minimal collaboration. If a cooperating or participating agency has concerns about the proposed methodology for a particular environmental factor, the agency should describe its preferred methodology and why it is recommended.

1.2 PROJECT BACKGROUND

The Federal Highway Administration (FHWA) and NDOT will prepare an Environmental Impact Statement (EIS) to evaluate transportation deficiencies and potential improvements along Interstate 80 (I-80), Interstate 580 (I-580) and U.S. 395, including

¹ The congressional Conference Report accompanying the 2005 federal transportation bill, Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) states: "Collaboration means a cooperative and interactive process. It is not necessary for the Lead Agency to reach consensus with the Participating agencies on these issues; the Lead Agency must work cooperatively with the Participating agencies and consider their views, but the Lead Agency remains responsible for decision making." FHWA's National Environmental Policy Act (NEPA) regulations (23 Code of Federal Regulations [CFR] 771) require that those federal agencies with jurisdiction by law (permitting or land transfer authority) be invited to be Cooperating Agencies for an EIS. SAFETEA-LU created a new Participating Agency category for the EIS process. Participating Agencies are federal and non-federal governmental agencies that may have an interest in the project because of their jurisdictional authority, special expertise, and/or statewide interest.

² The methodology used by the Lead Agency must be consistent with any methodology established by statute or regulation under the authority of another federal agency.

the I-80/I-580 Spaghetti Bowl, located in Washoe County, Nevada (Figure 1). The tentative study area for the project has the following limits:

- I-80 Western Limits: Keystone Avenue
- I-80 Eastern Limits: McCarran Boulevard East
- I-580/US 395 Northern Limits: Parr Boulevard/Dandini Boulevard
- I-580/US 395 Southern Limits: Meadowood Mall Way
- Includes 10 service interchanges and the Spaghetti Bowl system interchange

The Spaghetti Bowl was originally constructed between 1969 and 1971 for a metropolitan population of about 130,000 people. The current population of Washoe County has increased to approximately 420,000 people, with a forecasted growth rate exceeding state and national averages. The existing Spaghetti Bowl is nearing its design capacity, and the proposed project will provide necessary National Environmental Policy Act (NEPA) and design studies to determine appropriate measures to reconstruct the interchange to safely accommodate future travel demand.

The EIS will discuss why the project is needed, reasonable alternatives considered (including a do-nothing alternative), the affected environment, environmental consequences of the proposed action, and the results of coordination with agencies and the public. The EIS will also demonstrate compliance with applicable environmental laws and regulations and will be available for public review.

2.0 ALTERNATIVES TO BE EVALUATED IN THE EIS

The Draft EIS will evaluate reasonable alternatives (15 percent level of design detail) and the No Build Alternative. The reasonable build alternatives will be presented as single-line drawings on an aerial photo base.

The concepts will include refined locations and alignments, conceptual interchange layouts, off-system improvements if needed, and worst-case construction footprints.

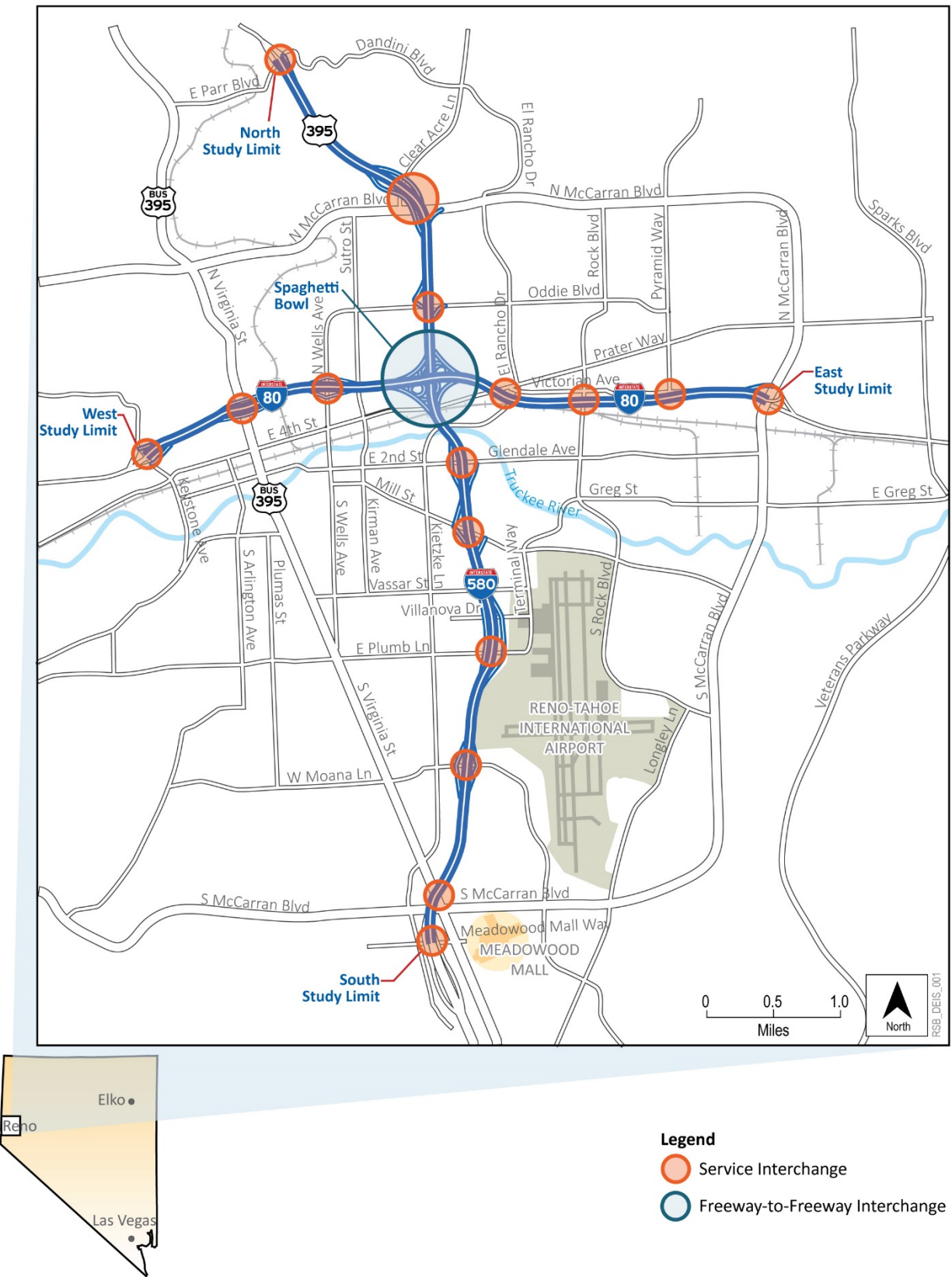


Figure 1. Study Area

3.0 AFFECTED ENVIRONMENT, IMPACTS, AND MITIGATION

3.1 TRAFFIC NOISE IMPACT METHODOLOGY

The project team will evaluate highway noise impacts in accordance with the following key laws, regulations, or guidelines:

- FHWA, 23 CFR Part 772 - Procedures for Abatement of Highway Traffic Noise and Construction Noise, July 2010
- FHWA, Highway Traffic Noise: Analysis and Abatement Guidance, FHWA-HEP-10-025, December 2011
- FHWA, Technical Advisory T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents, 1987
- NDOT, Traffic and Construction Noise Analysis and Abatement Policy, February 2018 update

3.1.1 Goals

Transportation projects are evaluated for traffic noise impacts and abatement measures to help protect the public health and welfare, to provide traffic noise abatement criteria, and to provide information to local officials for land use planning near highways. The traffic noise analysis also provides information on noise generated from typical construction equipment during the construction period.

A Traffic Noise Technical Report will document the methodology, assumptions used to guide the analysis, impact assessment, and evaluation of abatement measures.

3.1.2 Methodology

The team will identify land uses and locate noise-sensitive properties impacted by the project, as described in 23 CFR 772. The team will note physical and terrain features that affect traffic noise propagation and features that may be altered during construction. The team will then conduct a traffic noise study based on the FHWA and NDOT procedures listed above.

The team will conduct noise measurements at 8 to 16 representative noise-receptor monitoring-site locations to calibrate the traffic noise model and to document existing noise levels. All measurements will be conducted for 15-minute-minimum sampling periods during free-flow traffic conditions during off-peak hours. At each measurement site, traffic counts will be conducted concurrently with the noise measurements. All

noise sources will be noted and those that may interfere with future mitigation determination will be identified. Traffic volumes counted during the noise measurement survey along with the field sound-level measurements will be modeled using the current version of the FHWA Traffic Noise Model (TNM), and the team will compare the resulting sound levels with the measured sound levels to validate the model.

Once the model has been validated, existing peak-hour traffic will be used with posted speed limit speeds to calculate existing peak-hour noise levels. (If peak hour traffic is operating at slow-stopped condition, the analysis will use traffic volumes during periods with higher speeds). The team will model the design year traffic noise level (2040) for each of the reasonable alternatives and the No Build Alternative using TNM. Peak hour or adjacent-to-peak hour traffic-level noise in the design year for the reasonable alternatives will be modeled at selected noise-sensitive receptors based on forecast traffic volumes. The TNM will be used to predict the traffic noise levels at each of the receptors, assess the number of properties within 500 feet of the project that would be affected, and determine the increase in traffic noise and amount of reduction at each noise sensitive receptor as a result of mitigation.

In accordance with FHWA and NDOT's Traffic and Construction Noise Analysis and Abatement Policy, traffic noise abatement barriers will be considered at locations along the alignments where traffic noise impacts are predicted. The analysis will provide location, length, height, profile, estimated cost, and number of benefiting noise-sensitive properties for each proposed barrier. The analysis will discuss affected areas that do not meet the NDOT's criteria for abatement and specifically note reasons for not including mitigation.

Construction activities that may cause annoyance at nearby noise-sensitive land uses will be qualitatively assessed and evaluated in relation to local laws applying to construction noise.

3.2 AIR QUALITY IMPACT METHODOLOGY

Air quality impacts are evaluated in accordance with the following key laws, regulations, or guidelines:

- Clean Air Act as amended (42 U.S.C. 7401)
- U.S. Environmental Protection Agency (EPA), Determining Conformity of Federal Actions to State or Federal Implementation Plans (40 CFR 93)
- FHWA 2017 Carbon Monoxide Categorical Hot-Spot Finding with MOVES2014a (FHWA, 2017)

- EPA guidance Using MOVES2014 in Project-Level Carbon Monoxide Analyses (2015)
- EPA Guideline for Modeling Carbon Monoxide from Roadway Intersections (1992)
- EPA and FHWA, Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in PM_{2.5} and PM₁₀ Non-attainment and Maintenance Areas, November 2015
- FHWA Technical Advisory T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents, 1987
- FHWA, Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, October 2016

3.2.1 Goals

EPA has set national ambient air quality standards (NAAQS) for six principal air pollutants (also referred to as criteria pollutants): carbon monoxide (CO), lead, nitrogen dioxide (NO₂), ozone, particulate matter (PM), and sulfur dioxide. Transportation contributes to CO, NO₂, ozone, and PM emissions. The air quality analysis of the project will evaluate whether the proposed project will cause new violations, or exacerbate existing violations, of the NAAQS. The EPA has designated the RSB project area in attainment for ozone, lead, sulfur dioxide, and PM less than or equal to 2.5 microns in diameter (PM_{2.5}). The project area is in a designated maintenance area for CO and PM less than or equal to 10 microns in diameter (PM₁₀). The project is therefore subject to transportation conformity requirements. The air quality analysis will evaluate whether the project demonstrates conformity at both the regional and project-levels. Mobile source air toxic (MSAT) impacts will also be evaluated.

A separate Air Quality Technical Report will describe the methods and results of the air quality analyses and mitigation measures in detail. A map indicating nearby land use and sensitive receptors will be included in the Air Quality Technical Report and the EIS.

3.2.2 Methodology

Regional conformity of the project will be demonstrated by the inclusion of the project in the latest conforming regional transportation plan and the federal transportation improvement program by the Washoe County Regional Transportation Commission (RTC).

Project level conformity will be evaluated for nonattainment or maintenance pollutants, including CO and PM₁₀.

- CO Hot Spot Analysis: Up to six worst-case intersections will be selected for each alternative following the EPA *Guideline for Modeling Carbon Monoxide from*

- Roadway Intersections* (1992). The selected worst-case intersections will be examined for applicability under FHWA's 2017 Carbon Monoxide Categorical Hot-Spot Finding (CO Categorical Finding) to determine if quantitative CO modeling is required. Intersections within the range of the CO Categorical Finding would not require quantitative CO modeling to demonstrate conformity. For intersections that do not fall within the range of the CO Categorical Finding, NDOT will perform quantitative CO hot-spot modeling using the MOVES2014a and CAL3QHC models, for the existing condition, No Build Alternative, and reasonable build alternatives. The analysis will follow the EPA guidance *Using MOVES2014 in Project-Level Carbon Monoxide Analyses* (2015) and the *Guideline for Modeling Carbon Monoxide from Roadway Intersections* (1992). The results of the modeling will be compared to the CO NAAQS to demonstrate compliance with the NAAQS.
- **PM₁₀ Hot Spot Analysis:** Following the EPA/FHWA *Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas* (November 2015), the project was determined not to be a Project of Air Quality Concern based on the project's traffic information; therefore, a quantitative PM₁₀ air dispersion modeling analysis is not required to demonstrate project-level conformity for PM₁₀. The Air Quality Technical Report and the EIS will document the determination that the project is not a Project of Air Quality Concern.
 - **MSAT Analysis:** In addition to the conformity analysis, the team will perform a mobile source air toxics (MSAT) analysis following FHWA's 2016 *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*. Although the project AADT is projected to be 140,000 or greater by the design year (2040), no meaningful difference in traffic volumes or vehicle mix between the No Build and build alternatives are anticipated. Therefore, the project is determined to be a project with low potential MSAT effects and the team will perform a qualitative MSAT analysis per FHWA guidance.

Short-term air quality impacts from project construction will be evaluated qualitatively based on construction duration, construction activities, and the implementation of emission minimization and reduction measures.

Once the impacts of the project construction and operation are determined, mitigation measures for identified significant impacts (if any) will be investigated.

3.3 VISUAL CHARACTER/AESTHETICS METHODOLOGY

Visual impacts for transportation projects are evaluated based upon the following key guidance:

- FHWA's Technical Advisory T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents, 1987
- FHWA, Guidelines for the Visual Impact Assessment of Highway Projects (FHWA-HEP-15-029), January 2015

3.3.1 Goals

The visual impact assessment will identify the visual character of the project corridor, characterize the visual quality of the viewshed, identify viewer groups to the extent practicable, describe the visual change that will occur because of the proposed transportation improvements, qualitatively characterize the change, identify areas where adverse visual impacts would occur, and identify where measures that have been used by NDOT to mitigate adverse visual effects along I-580 and I-80 would be applied.

3.3.2 Methodology

The analysis will be based upon the FHWA's methodology to objectively consider potential visual effects from roadway projects on adjacent landscapes, as described in the FHWA *Guidelines for the Visual Impact Assessment of Highway Projects*.

The area of potential effects (APE) for aesthetic/visual resources will encompass areas from which proposed project features would be visible. In most places, this distance will be approximately 0.25 to 0.5 mile on either side of the existing freeway. The team will review local and state plans, policies, and design guidelines to identify important views and visual resources. Online resources (such as Google Earth) and aerial photographs will be examined to identify areas within the APE that contain sensitive viewers (people who may be concerned with changes to the views they have). Sensitive viewers are typically found in residential areas, parks, etc.

Project scoping did not uncover concern from the public and agencies related to potential visual impacts associated with the project. The Reno-Sparks Indian Colony (RSIC) was the only stakeholder to specifically express an interest in how the alternatives might be viewed from residential areas within the RSIC. Those concerns were specifically addressed and are described below.

As per the FHWA methodology, the analyst, in concert with NDOT staff, established 30 preliminary key observation points (KOPs) for assessment. Six locations were selected in consultation with RSIC staff to use as KOPs for visual simulations. In addition to the KOPs of interest to the RSIC, up to nine additional KOPs related to historic properties will be selected in consultation with historic resource technical staff and reviewing agencies. Visual simulations of alternatives will be developed for each of the KOPs (described below).

Staff photographed views toward the proposed project from each KOP. In addition, photographs from other locations within the APE will be used to illustrate the existing landscape character of the APE. The locations of the KOPs will be mapped for inclusion in the Affected Environment and Impact Assessment sections of the EIS.

The analyst will divide the APE into landscape units (smaller geographic areas that assist in evaluating large areas), as per the FHWA methodology. The analyst will describe the general visual/aesthetic conditions of the landscape units and will assemble a series of character photographs to depict the general landscape character and visual quality of the APE.

Visual simulations of the proposed reasonable alternatives will be developed for each of the 15 KOPs (that is, the six KOPs of interest to the RSIC and the nine related to historic resources). Some KOPs could warrant more than one alternative simulation, whereas others may only require one. Overall, it is assumed that a total of up to 45 simulations for the 15 KOPs will be developed. Changes in visual quality will be evaluated using the simulations for each of the KOPs, in accordance with the FHWA methodology.

The analysis will consider mitigation measures employed by NDOT along portions of I-580 and I-80 in the vicinity of the APE. In addition, the team will consult the NDOT document titled *“Pattern and Palette of Place: A Landscape and Aesthetics Master Plan for the Nevada State Highway System”* when considering mitigation measures. The analysis will include up to four visual simulations of potential visual mitigation measures within the project area. The FHWA rating sheets will be used to ascertain the effectiveness of the mitigation measures.

3.4 COMMUNITY IMPACTS METHODOLOGIES

3.4.1 Commercial/Residential Displacement Impact Methodology

Commercial and residential displacements for transportation projects are evaluated in accordance with the following key laws, regulations, and guidance:

- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended (42 U.S.C. 4601 as implemented through 49 CFR 24)
- FHWA’s Technical Advisory T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents, 1987
- FHWA Community Impact Assessment: A Quick Reference for Transportation (FHWA-PD-96-036), September 1996

3.4.1.1 Goals

The analysis will assess each alternative's impact on residences and commercial and industrial interests in terms of access changes, ease of goods movement, and relocations both during and after construction. The analysis will assess each alternative's impact on populations living adjacent to the project, on mobility and transportation access to health care services, employment, government services, and shopping.

A Relocation Impact Analysis Report will tally the land acquisition and business and residential displacements of the alternatives. The EIS will summarize the results of the relocation analysis and the impacts of the alternatives on mobility and access to services.

3.4.1.2 Methodology

Using available GIS databases, aerial photography, or other mapping, with confirmation through project area reconnaissance, the team will locate businesses and residences throughout the project APE and incorporate them into the project base map. Impacts will be evaluated using design drawings and by overlaying the alternatives onto the existing base map.

Impacts to business will include an estimate of the number and types of businesses potentially displaced, number of employees/jobs affected, any special characteristics, and availability of replacement business sites. The team will also evaluate impacts to businesses as a result of changes in access, which could include relocating, combining, or eliminating existing driveways, reductions in parking, restricting turning movements to and from adjacent properties due to median barriers, and modifying or closing existing intersections or interchanges.

The evaluation of impacts to residences will estimate the number of homes to be potentially displaced; changes in access during and after construction; available comparable decent, safe, and sanitary housing in the area; any measures to be taken when replacement housing is insufficient; and identify any special relocation needs. The team will also evaluate impacts on populations living adjacent to the project, mobility and transportation access to health care services, employment, government services, and shopping.

The EIS will include a conceptual stage relocation discussion that will estimate the availability of replacement housing and business sites based on available information, such as property listings, and cost estimates.

3.4.2 Socioeconomic Impact Methodology

General socioeconomic impacts for transportation projects are evaluated in accordance with:

- FHWA Community Impact Assessment: A Quick Reference for Transportation (FHWA-PD-96-036), September 1996
- FHWA's Technical Advisory T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents (1987)
- Executive Order 13045, Protection of Children From Environmental Health Risks and Safety Risks, 1997 (62 FR 19885)

3.4.2.1 Goals

The socioeconomic impact assessment will include a review of the social conditions and economic conditions in the project area. The intent is to evaluate the potential impacts of the project on business operations, neighborhoods, tax revenues, social groups, and travel accessibility.

This topic will not be documented in a separate technical report.

3.4.2.2 Methodology

The analysis will use project mapping of businesses and residences; information on neighborhoods, services, and other social amenities from local and regional land use plans, comprehensive plans, and development plans; economic information from the most recent American Community Survey 5-Year Estimate; and discussion with Tribal, Reno and Sparks officials. NDOT and FHWA will use demographic information obtained from the Reno-Sparks Indian Colony (RSIC) in addition to the U.S. Census American Community Survey. The team will conduct a project area reconnaissance to supplement and verify this information. If data and information regarding children's health status and asthma rates in specific locations is available, it would be used for a qualitative discussion of environmental health effects for children who may be exposed to noise or air quality effects from the project improvements.

Using alternative overlays, design drawings, traffic volume projections, and input from service providers, the EIS will describe the neighborhoods and the potential impacts to community cohesion, social groups (i.e., elderly, handicapped, transit-dependent, low-income, and minority), travel patterns, and accessibility including non-motorized, public services, and safety.

The qualitative economic analysis will identify current economic conditions in the project area, describe impacts of the reasonable build alternatives, and identify

mitigation measures. The economic analysis will also include a review of the ways construction and operation would affect tax revenues and economic activity both positively and negatively. The project may result in construction-period economic impacts; temporary and long-term changes in traffic patterns and business access; changes in parking (on-street and off-street); effects on economic development trends and viability; effects on employment opportunities; and effects on existing and planned business development.

This topic will not be documented in a separate technical report. The EIS will document the analysis.

3.4.3 Recreational Resources

Public use land impacts (existing and planned public parks and recreation areas) are inventoried and evaluated for potential impacts due to acquisition or changes in access from the reasonable alternatives.

3.4.3.1 Goals

Impacts to parks and recreational properties are regulated under Section 4(f) of the Department of Transportation Act (23 U.S.C. 138; 49 U.S.C. 303) and Section 6(f) of the Land and Water Conservation Fund Act (LWCF) (16 U.S.C. 4601). The evaluation will include an inventory of such resources in the study area and a description of the resources, including existing and planned use, funding sources, and jurisdictional agencies. The goal is to ensure the transportation improvements are located and designed to avoid or minimize impacts to recreational properties to the extent practicable. The Lead Agencies will coordinate with the jurisdictional agencies to obtain information on resource use and funding and management, and to obtain input on potential effects and possible mitigation measures.

3.4.3.2 Methodology

This evaluation will include park/recreation resources within 1,000 feet of the project center line. FHWA guidance specifies for projects that are evaluated with an EIS, the Section 4(f) evaluation should be included as a separate section of the EIS. Given the overlap in regulation under Sections 4(f) and 6(f), the full evaluation of the project on parks and recreational resources under both statutes will be addressed in the Section 4(f)/6(f) Evaluation (see Section 3.15 below).

3.4.4 Land Use Impact Methodology

Land use impacts are evaluated in accordance with the FHWA Technical Advisory T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents (1987).

3.4.4.1 Goals

The goal of this task is to assess changes in land use that would be caused by the reasonable build alternatives and the consistency of the reasonable alternatives with the comprehensive development plans adopted for the area by Tribal, local, and state officials.

3.4.4.2 Methodology

The team will collect available land use and/or zoning information from Reno, Sparks, and Washoe County as well as the RSIC Tribal Council's zoning and land use plans. The team will describe existing land use from available land use data sources and aerial photography interpretation of the study area.

The team will analyze the project's potential impacts to existing land use, evaluate the consistency of the reasonable build alternatives with land use plans, and develop and consider measures to avoid, minimize, and mitigate potential impacts.

No separate technical report will be created for this topic. Results of the analysis will be documented in the EIS.

3.4.5 Schools, Churches, and Public Services Impact Methodology

Institutional impacts for transportation projects are evaluated in accordance with the following key laws, regulations, or guidance:

- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended (42 USC 4601 as implemented through 49 CFR 24)
- FHWA's Technical Advisory T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents, 1987

3.4.5.1 Goals

The impact assessment will include a review of the public services and institutions in the project area, such as churches, schools, publicly owned buildings, police, and emergency medical and fire protection. The intent is to evaluate the potential impacts of the project on the accessibility and delivery of these services in the project area.

This topic will not be documented in a separate technical report. The EIS will document the analysis.

3.4.5.2 Methodology

Using available GIS databases, aerial photography, or other mapping, with confirmation through project area reconnaissance, the team will locate schools, churches and publicly

owned buildings throughout the project APE and incorporate them into project base map.

The team will use design drawing to evaluate impacts by overlaying the alternatives onto the existing base map. The EIS will evaluate each reasonable alternative's impact on these properties and services in terms of access changes and relocations (if required) both during and after construction.

3.5 ENVIRONMENTAL JUSTICE IMPACT METHODOLOGY

Environmental justice impacts for transportation projects are evaluated in accordance with the following key Executive Order and federal guidance:

- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 1994
- FHWA Guidance on Environmental Justice and NEPA, Memorandum, December 16, 2011
- U.S. Department of Transportation (DOT) Order 5610.2(a), Final DOT Environmental Justice Order, May 2, 2012
- FHWA Order 6640.23A, FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, June 14, 2012
- Federal Interagency Working Group on Environmental Justice & NEPA Committee, Promising Practices for EJ Methodologies in NEPA Reviews, March 2016

3.5.1 Goals

The goal of the Environmental Justice analysis is to determine whether the proposed project would result in disproportionately high and adverse impacts on minority and/or low-income populations with respect to human health and the environment. The methods, data, and analysis will be documented in a separate Environmental Justice Technical Report.

3.5.2 Methodology

The distribution of minority and low-income populations in the study area will be mapped and based on income and race information from the most recent American Community Survey 5-Year Estimate (currently 2011-2015) by the U.S. Census Bureau, from the RSIC and other records, as available (e.g., public school data) and a survey of residences and businesses in areas that the project may affect. The demographics assessment will also use an Environmental Justice survey of residents and service providers within the project area. Information from local agencies/organizations and the

public gained through public involvement and community outreach activities will supplement the demographics assessment.

The project team will implement measures to involve minority and low-income populations in assessing project impacts. These measures will be developed in conjunction with the public outreach team and may include reaching out to advocacy groups for minority and low-income populations, targeted briefings, and community events. The outreach will include translated materials and the use of translators if needed. The measures used to engage minority and low-income populations will be documented in the Environmental Justice evaluation. A summary of effects identified by minority and low-income populations within the study area will be provided.

The impact analysis will consider the location, intensity, and duration of the anticipated impacts in relation to the Environmental Justice populations. For each resource evaluated in the EIS, the team will qualitatively assess the project's likelihood for causing adverse impacts on minority and/or low-income populations and will determine if there would be disproportionately high and adverse impacts by comparing the impacts to these populations with impacts to the general population. The analysis will also assess whether benefits would accrue to a higher degree to minority and/or low-income populations. The evaluation will also consider the effectiveness of avoidance, minimization, and mitigation measures to address potential adverse impacts to minority and low-income populations.

The evaluation will include FHWA's final determination of whether or not the project would result in disproportionately high and adverse impacts on minority and/or low-income populations.

3.6 TRANSPORTATION IMPACT METHODOLOGY (INCLUDES SAFETY)

Traffic and safety impacts are evaluated using the following documents and tools, among others:

- FHWA National Performance Management Measures: Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program (23 CFR 490)
- FHWA National Performance Management Measures: Highway Safety Improvement Program (23 CFR 490)
- FHWA Traffic Analysis Tools
- National Cooperative Research Program (NCHRP) Project 17-45, Safety Prediction Methodology and Analysis Tool for Freeways and Interchanges (ISATe), 2012

- American Association of State Highway and Transportation Officials (AASHTO) *Highway Safety Manual*, 2014
- NDOT Traffic Forecasting Guidelines, August 2012

3.6.1 Goals and Methodology

The evaluation of transportation performance is intended to measure the effectiveness of the reasonable alternatives to address the existing and forecasted operational deficiencies and safety issues along the freeways and the impacts to crossroads and interchanges from the proposed improvements. The evaluation of the highway system's performance will consider criteria such as traffic operations and capacity, system safety performance, regional and local system continuity, and accessibility. The EIS will document the impact of the reasonable alternatives on traffic operations, safety, and access and will directly assess how each alternative would meet the elements of the project purpose and need.

A Transportation Impact Analysis Report will document the traffic and safety analysis.

3.7 WATER RESOURCES IMPACT METHODOLOGY

Wetlands and water resource impacts are evaluated in accordance with the following key laws, regulations, or guidelines:

- Clean Water Act, 33 U.S.C. 1251, including Section 303(d), impaired waters, and Section 404 and Section 401
- Clean Water Act, 40 CFR Part 230, Section 404(b)(1), Guidelines for Specification of Disposal Sites for Dredged or Fill Material
- U.S. Army Corps of Engineers (Corps) Regulatory Guidance Letter (RGL) No. 16-01 (October 2016)
- Executive Order 11990, Protection of Wetlands, 1977 (42 Federal Register [FR] 26961)
- EPA and Corps joint rule on Compensatory Mitigation for Losses of Aquatic Resources (33 CFR 325 and 332; and 40 CFR 230)
- U.S. DOT Executive Order 5660.1A, Preservation of the Nation's Wetlands
- Fish and Wildlife Coordination Act as amended (16 U.S.C. 661-667)

- 23 U.S.C. 650 Subpart B, Erosion and Sediment Control on Highway Construction Projects, FHWA Policy Guide, December 1994
- FHWA policy and procedures for evaluation and mitigation of adverse environmental impacts to wetlands and natural habitat (23 CFR 777)
- FHWA Technical Advisory T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents, 1987
- Washoe County Development Code Article 420, Storm Drainage Standards
- U.S. District Court for the District of Nevada, Consent Decree, filed July 28, 2016, NDOT compliance with the Clean Water Act
- Floodplain impacts are evaluated in accordance with the following key laws, regulations, or guidelines:
 - Executive Order 11988, Floodplain Management, 1977 (42 FR 26951)
 - U.S. DOT Executive Order 5650.2, Floodplain Management and Protection; Policies and Procedures (23 CFR 650)
 - FHWA, 23 U.S.C. 650 Subpart A, Location and Hydraulic Design of Encroachments on Floodplains, FHWA Policy Guide, December 1994
 - Truckee Meadows Flood Management Authority regulations
 - Washoe County Development Code Article 416, Flood Hazards

3.7.1 Goals

Transportation improvement alternatives are developed to minimize impacts to wetlands, waters, and water quality to the extent practicable through a sequence of avoiding wetlands and waters where possible, minimizing impacts to wetlands and waters that cannot be avoided, minimizing water quality impacts through the use of sound erosion control and stormwater management practices, and mitigating unavoidable wetlands and aquatic habitat loss.

If wetlands would be affected by the preferred alternative, Executive Order 11990 requires a finding that, given a consideration of all impacts, the preferred alternative is the only practicable alternative and that wetland impacts cannot be avoided. If FHWA finds that there is no practicable alternative that avoids wetland impacts, in accordance with Executive Order 11990, that finding will be included in the Final EIS.

Transportation improvement alternatives are also developed to minimize impacts to floodplain values and stream hydraulics to the extent practicable by sizing new and replacement bridges, culverts and retaining walls to minimize floodplain encroachment and increases in the regional floodplain elevation. If FHWA finds that there are no practicable alternatives regarding floodplain impacts, in accordance with Executive Order 11988, that finding will be included in the Final EIS.

No standalone technical report will be completed for floodplains or wetlands. The Draft EIS will document the analysis.

3.7.2 Wetland Impact Methodology

The preliminary estimate of wetlands in the project area will be established based on secondary sources, including the U.S. Geological Survey 7.5 minute topographic maps, U.S. Fish and Wildlife Service National Wetland Inventory maps, maps of hydric (wetland) soil units produced by the U.S. Department of Agriculture Natural Resources Conservation Service, and aerial photo interpretation.

For evaluating impacts of the reasonable alternatives, more precise boundaries will be required to establish the limits of wetlands and waters that are subject to regulation under the Clean Water Act. Detailed field studies will be conducted to delineate wetlands in accordance with the Corps' *Wetland Delineation Manual* (1987 Manual) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (ERDC/EL TR-08-28, 2008). Waters will be delineated in accordance with *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Corps ERDC/CRREL TR-08-12, 2008). Delineated wetland and water boundaries will be located in the field using the Global Positioning System and incorporated into the project base map.

The impact evaluation will assess existing conditions, such as water quality and fishery resources, in all waters. The team will perform the initial assessment of direct impacts through an overlay of alternatives and will evaluate the extent and quality of wetlands and other waters that fall within the project APE.

Other effects, such as impacts to water quality from highway stormwater runoff, will also be assessed in light of the stormwater best management practices (BMPs) that are typically included in highway design, in accordance with NDOT design standards.

The team will also evaluate stormwater runoff quantity to determine approximate right-of-way needs for stormwater management by developing relationships between factors that affect stormwater runoff and the associated areas needed for BMPs. These

relationships will then be applied to drainage areas within the corridor to approximate the type and size of BMPs needed to control post-construction discharge rates.

The team will prepare a conceptual stormwater management plan that will be summarized in the EIS. The conceptual stormwater management plan will include information on existing drainage conditions, conceptual stormwater quantity and quality control measures, and preliminary locations for BMPs. A final stormwater management plan will be developed in a future design phase when more detailed information is available with respect to drainage and other factors.

The extent to which erosion control and stormwater management measures are proposed in the EIS depend on the type of transportation improvements being proposed, the construction timeframe, and the extent of wetland and water resources in the project area.

3.7.3 Floodplain Impact Methodology

The extent of the regulated floodplain, particularly the extent and elevation of the 1 percent annual chance flood (also known as the 100-year flood), is established using the current Federal Emergency Management Agency (FEMA) floodplain maps and studies.

The impact evaluation will assess existing conditions, such as vegetative cover in the floodplain and floodplain functions and values. The evaluation will also include discussions with the Truckee Meadows Flood Management Authority and Washoe County Department of Community Development, who administer local floodplain and/or shoreland protection ordinances. The team will initially evaluate impacts by overlaying the reasonable alternatives and assessing the area of the floodplain that falls within the project APE. The impact to the floodplain must also consider hydraulic factors of any road or bridge crossings that could affect flood flows and elevations.

The EIS will discuss the extent of floodplain impacts of each reasonable alternative, along with measures to minimize floodplain impacts and to restore and preserve the natural and beneficial floodplain values. The EIS will also discuss the consistency with the National Flood Insurance Program standards and state and local ordinances; the coordination with FEMA, state floodplain authority, and local floodplain administrator; commitments for future analysis and design criteria; and permits required.

The extent to which floodplain management measures are proposed in the EIS depends on the type of transportation improvements being proposed and the extent of water and floodplain resources in the project's area of potential effect.

A statement that there are no practicable alternatives regarding floodplain impacts will be needed if the preferred alternative cannot avoid floodplains, in accordance with

Executive Order 11988 and 23 CFR 650.113. If FHWA makes this determination, it will be included in the Final EIS.

3.8 PLANT, ANIMAL, AND FISH IMPACT METHODOLOGY

Plant, animal, and fish impacts, including threatened, endangered, and sensitive species, are evaluated in accordance with the following key laws, regulations, or guidelines:

- Fish and Wildlife Coordination Act as amended (16 U.S.C. 661-667)
- FHWA policy and procedures for evaluation and mitigation of adverse environmental impacts to wetlands and natural habitat (23 CFR 777)
- Endangered Species Act of 1973 (7 U.S.C. 136; 16 USC 1531)
- FHWA Technical Advisory T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents, 1987
- FHWA guidance memo, Management of the Endangered Species Act Environmental Analysis and Consultation Process, 2002
- FHWA/US Fish and Wildlife Service guidance memo on Endangered Species Act consultation process, February 18, 2005
- Migratory Bird Treaty Act (16 USC 661 and 50 CFR 10.12)
- The Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. Sec. 668[a])
- Nevada Division of Forestry's list of fully protected plant species; NAC 527

3.8.1 Goals

The goal of this analysis is to inventory the natural habitats within the study area and to consider the impacts to vegetation, wildlife, and fish in evaluating the reasonable alternatives.

The impact evaluation for threatened and endangered (T&E) species includes a determination of the presence or absence of any federally listed threatened or endangered species or their critical habitat in the project "action area." For the T&E species analysis, the action area can differ from the area of potential effect for other resources because it includes the area directly or indirectly affected by the project. It includes the area of ground disturbance of the project and areas peripherally affected by changes such as lighting, noise, water quality, and water quantity. For this project, the action area includes the study area around the freeways and extends downstream

along the Truckee River to include Pyramid Lake because of potential impacts to T&E fish species. The presence or absence determination is made in consultation with the Fish and Wildlife Service and may include field inventories by qualified resource biologists.

If a federal T&E species or its critical habitat is present and cannot be avoided by location and design refinements to the proposed transportation project, FHWA and NDOT would proceed with consultation steps under Section 7 of the Endangered Species Act (ESA).

The impact evaluation for migratory birds, bald and golden eagles, and state-sensitive species includes a determination of the likely presence or absence of federally protected migratory birds and eagles, fully protected state-listed plant species, and species on the Nevada protected and at-risk species lists for Washoe County, obtained from the Nevada Natural Heritage Program's (NNHP) database. The likely presence or absence determination is made in consultation with the Nevada Department of Wildlife (NDOW) and the NNHP.

If any sensitive species is found to be present or suitable habitat is identified and cannot be avoided, the Fish and Wildlife Service and NDOW will be consulted on measures to avoid or mitigate for impacts.

A Biological Resources Report will summarize the natural habitats in the project area and potential impacts to plants, animals, and fish.

3.8.2 Plant, Animal, and Fish Impact Methodology

The extent of natural habitats in the study area will be inventoried using current aerial photographs. Field reconnaissance will confirm the identified areas and generally assess the habitat characteristics. The wildlife population will be assessed from observations and publications of fish and wildlife that are typical of the identified habitats.

Impacts of the reasonable alternatives will be assessed by identifying habitats in the area of the proposed alternatives, using aerial photos and data collected from field surveys such as the water resources and wetlands surveys. The evaluation will take into account peripheral impacts. Impacts to aquatic habitats will be assessed in conjunction with the water resources impact task.

3.8.3 Threatened and Endangered Species Impact Methodology

The T&E species evaluations will follow the steps outlined under Section 7(a)(2) of the ESA.

The initial analysis will include a search of the project action area using the Fish and Wildlife Service's Information for Planning and Conservation (IPaC) online feature, powered by the Fish and Wildlife Service Environmental Conservation Online System (ECOS). The data obtained through IPaC will be used to formally ascertain if potential exists for T&E species or critical habitat to be present in the action area.

Two federally listed T&E fish species are known to exist in Washoe County: the cui-ui (*Chasmistes cujus*, endangered) and the Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*, threatened). Two federal T&E plant species are known to exist in Washoe County: Webber ivesia (*Ivesia webberi*, threatened) and steamboat buckwheat (*Eriogonum ovalifolium* var. *williamsiae*, endangered). The Fish and Wildlife Service has also designated critical habitat for Webber ivesia in Washoe County. The North American wolverine (*Gulo luscus*, proposed threatened) is also known to occur in Washoe County.

Upon determining that T&E species or critical habitat may be affected by the project, the team will contact NDOW, NNHP, and the Fish and Wildlife Service to obtain known records of the species and potential habitat locations within the action area. The T&E fish species are mobile and will be assumed to inhabit the Truckee River within the action area if one of the following applies:

- Records indicate they are present in nearby sections of the river.
- The Fish and Wildlife Service indicates, based on species biology and available habitat, that it is a reasonable assumption that either species may occur in the project area.
- Fish passage projects are proposed or completed that will allow the two species to move into or through the project area.

Based on critical species information published in the June 3, 2014. Federal Register and consultation with the Fish and Wildlife Service, it is assumed that no Webber ivesia, steamboat buckwheat, or North American wolverine are present in the project area. It is also assumed that no aquatic surveys will be required. Biologists will perform a field examination for evidence of threatened or endangered species or habitat in the construction staging area, which is yet to be determined.

In accordance with Section 7(a)(2) of the ESA, NDOT will initiate informal consultation with the Fish and Wildlife Service for any T&E species that may be affected by the project. A Biological Assessment (BA) is being prepared to evaluate the project's impact on any listed species that it may affect. If NDOT anticipates no effects to certain species, a No Effects Letter will be prepared for those species and included in the BA. NDOT will

request formal consultation with the Fish and Wildlife Service for any T&E species that would likely be adversely affected by the project. The BA will be prepared in accordance with standard methodologies.

The BA shall meet the needs and requirements of the Fish and Wildlife Service and shall include the following:

- A brief description of the proposed project, and of the project action area where impacts are anticipated
- A brief description of alternatives considered and the reasons for their elimination
- Information on the general methods and timing of project construction
- A description of the target species and a qualitative description of the habitats within the project action area
- An assessment of the potential impacts of the proposed project on the target species and designated critical habitat
- A preliminary determination of effect, and supporting justification, for each target species and critical habitat
- Recommended conservation measures (both general and specific to individual target species)
- A bibliography and list of experts consulted in preparing the BA

The BA shall include, as appropriate, an assessment of the cumulative and indirect effects of the project on the target species and their habitats, and shall identify and address any interrelated or interdependent actions. Based in part on information provided in the BA, the Fish and Wildlife Service will concur with the effects of each alternative on the target species and propose conservation measures. If the Fish and Wildlife Service does not concur with the effects analysis, they will propose an alternative effects analysis and/or specify additional measures to avoid, minimize, or mitigate impacts on which their determination is contingent.

3.8.4 Sensitive Species Impact Methodology

Initially, the team will query the NNHP database for the list of sensitive species with potential to occur in the APE. Using this list, the team will contact NDOW and NNHP to obtain known records of the species and potential habitat locations within the APE. The team will also consult the state agencies and Fish and Wildlife Service to identify known occurrences or areas of potential habitat for migratory birds and eagles.

The team will determine potential effects by identifying and evaluating habitats within the APE from aerial photographs and by using data collected through agency consultation and other resource studies. The team will field verify areas of potential habitat identified through the aerial photo interpretation. Avoidance and minimization measures will be developed as part of the analyses.

The EIS will summarize information regarding state sensitive species, migratory birds, and eagles.

3.9 HAZARDOUS MATERIALS IMPACT METHODOLOGY

The impacts of potential environmental contaminants are evaluated in accordance with the following key laws, regulations, or guidelines:

- Resource Conservation and Recovery Act of 1976 as amended (42 U.S.C. 6901)
- National Emission Standard for Hazardous Air Pollutants of 1973 as amended (40 CFR 61)
- ASTM E1527-13, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process
- FHWA Technical Advisory T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents, 1987

3.9.1 Goals

Investigations for contamination are typically performed in advance of property acquisition because of the risk to the buyer of assuming liability for remediation of hazardous waste. Protective measures may also be needed to protect workers from contact with the waste during construction, and there may be special disposal requirements for contaminated soils or groundwater. Therefore, the presence of hazardous waste can affect the cost and construction of a project.

The process and information used to screen for the presence of hazardous/contaminated sites in the project corridor will be documented in a Hazardous Materials Technical Report.

3.9.2 Methodology

The following activities will screen for the presence of hazardous/contaminated sites in the project corridor:

- Conduct a search of available federal and state online Geographic Information Systems (GIS) maps to identify potential sites of environmental releases within the corridor as an initial screening step.
- Conduct a regulatory database search for the project corridor area using search criteria specified in standard ASTM E1527-13, including available historical aerial photos, Sanborn maps, and historical topographic maps.
- Conduct a site reconnaissance of the project corridor where ground disturbance activities will occur, using the results of the GIS and database searches described above as a guide for focusing on parcels that are more likely to exhibit potential environmental impacts and to potentially be encountered during construction. The site reconnaissance will be conducted from the public right-of-way or parking/driveway areas open to the public. The field crew will document site observations for each site on a field documentation sheet.
- Document the findings of the site screening process and list identified sites/parcels that have an increased potential to contain hazardous waste/contamination that may affect the planned parcel acquisition and construction. Identified sites/parcels will be incorporated into the project base map.
- Rank sites/parcels according to the following categories that prioritize the sites for Phase 2 sampling investigations. The three general categories are:
 - **High Risk:** Sites where petroleum constituents or other hazardous substances are documented to have been released into the environment (generally in soil or groundwater) or where petroleum constituents or other hazardous substances are likely present in soil or groundwater as a result of a regulatory listing or other condition.
 - **Medium Risk:** Sites where petroleum constituents or other hazardous substances have the potential to be present in the environment (generally in soil or groundwater) based upon records that petroleum constituents or other hazardous substances were used or stored on the site or where site features suggest conditions or activities that are potentially associated with petroleum constituent or other hazardous substance storage or disposal. Generally, medium-risk sites do not have specific indication that petroleum constituents or other hazardous substances were actually released into the environment.
 - **Low Risk:** Sites where petroleum constituents or other hazardous substances have a reduced potential to be present in the environment as a result of the site activities, based upon available documentation.

For high-risk sites/parcels found in the project corridor, additional available information will be collected from appropriate agencies including:

- Agency interviews:
 - At the local level – fire department, public works/environmental service, economic development/redevelopment (brownfields)
 - On the state level – Nevada Division of Environmental Protection and NDOT Environmental Service
- National Response Center spills database search, in particular reports of spills along highways and railroads
- U.S. DOT, Pipeline and Hazardous Material Safety Administration database search
- The collected information will be used to identify where Phase II subsurface sampling for soil or groundwater contamination may be needed during detailed design/prior to construction, but Phase II sampling will not be performed.

The Phase I report will document the results of the research and potential conflicts with contaminated sites for each reasonable alternative. The need for future Phase II field investigations to characterize actual contamination for each alternative will be documented in the Phase I report.

3.10 CULTURAL RESOURCES

3.10.1 Area of Potential Effect and Identification

As part of the impact evaluation, qualified cultural resources specialists, in coordination with NDOT staff, will identify the project area of potential effects (APE). The NDOT Cultural Resources Specialist staff, in consultation with the NDOT project manager, is responsible for describing and establishing the APE, which will include separate APEs for direct and indirect impacts. NDOT will draft a screening form for submission to FHWA and other participating agencies for review and comment. NDOT will compile and address any comments received. After those comments have been addressed, NDOT and FHWA will request review and comment on the APE from the Nevada State Historic Preservation Officer (SHPO).

Cultural resources in the APE, including known historic properties (National Register-eligible or listed historic properties, including districts), will be identified using archival research, GIS, and field inventory.

Archival research will focus on obtaining copies of assessor's records and previous cultural resources surveys from the Nevada SHPO and other appropriate sources for a 1-

mile buffer around the APE to identify known or potential historic properties. Minimally, this will include searching the Nevada Cultural Resource Information System (NVCRIS), the National Register database, the Nevada Register of Historic Places, and the Reno Register of Historic Places. The team will overlay the APE on the assessor's property map using GIS, and then cross-reference the assessor's records to determine the age and location of other potential historic properties within the APE. The team will also use shapefiles available from NVCRIS to identify historic properties that are within the APE or potentially intersect it.

The architectural survey for the Spaghetti Bowl Project will be broken up into nine (9) different survey sections. These survey sections are as follows:

- RSB Survey Area A: South Leg of the Direct APE along I-580
- RSB Survey Area B: Reno Sparks Indian Colony
- RSB Survey Area C: North Leg of the Direct APE along I-580
- RSB Survey Area D: West Leg of the Direct APE along I-80
- RSB Survey Area E: East Leg of the Direct APE (to include Indirect at Sparks' Nugget) along I-80
- RSB Survey Area F: Northwest section of Bowl (to include Direct and Indirect APE)
- RSB Survey Area G: Northeast section of Bowl (to include Direct and Indirect APE)
- RSB Survey Area H: Southeast section of Bowl (to include Direct and Indirect APE)
- RSB Survey Area I: Southwest section of Bowl (to include Direct and Indirect APE)

The survey is broken up into sections due to the large size of the survey area. A phased survey will allow the earlier survey batches to be completed and then reviewed by NDOT staff, so that the surveyor can learn from NDOT and SHPO comments received on the first area of surveys and then apply those to subsequent areas, accomplishing a more streamlined and efficient survey of such a large area. Secondly, a phased survey allows the SHPO to review smaller batches of survey forms rather than thousands of pages to review at once. The SHPO staff can then do a better, more efficient review and provide concurrence as the batches are submitted rather than NDOT having to wait for SHPO concurrence on all properties at the end of the months-long identification and evaluation process.

3.10.2 Architectural Resources Impact Methodology

Architectural resources impacts for transportation projects are evaluated in accordance with the following key laws, regulations, or guidance:

- Section 106 of the National Historic Preservation Act as amended (54 U.S.C. 306108) and its implementing regulations at 36 CFR 800
- 23 CFR 774, regulations for implementing Section 4(f) for parks, recreation areas, wildlife and waterfowl refuges, and historic sites
- FHWA Section 4(f) Policy Paper, July 20, 2012

3.10.2.1 Goals

Qualified cultural resources specialists will evaluate the resources identified to determine eligibility for the National Register of Historic Places in consultation with the Nevada SHPO, Federal Agencies, Native American Tribes, and other parties indicating an interest in the historic resources. Qualified cultural resources specialists will determine the effects on historic properties from the project, and will prepare and implement agreements reached to mitigate adverse effects, if necessary.

3.10.2.2 Methodology

Fieldwork to document architectural resources will include descriptive notes and photographs. Resources may consist of buildings, bridges, walls, other structures, objects, or districts. The team will assess the condition and integrity of these resources to the degree possible depending on access/right of entry. The team will then assemble all field and archival data to update existing documentation if needed or produce new documentation for all historic-age architectural resources identified within the APE. The cut-off date for these resources established by NDOT cultural resources staff is 1977.

All historic-age resources within the APE will be evaluated by applying the National Register criteria for eligibility.

An Architectural Survey Report will identify historic buildings in the APE per the National Register Bulletin *How to Apply the National Register Criteria for Evaluation* (2002) and Chapter 6, "Procedures and Documentation Standards for Historic Architecture" in the NDOT Cultural Resources Handbook. This report will include the project description, historic context, determinations of eligibility. It will also include appropriate maps and Architectural Resource Assessment (ARA) forms. NDOT will forward the report for consultation to the Nevada SHPO, RSIC Tribal Historic Preservation Office (THPO), and other consulting parties. Once SHPO or THPO, as appropriate, concurs with the determinations of eligibility, qualified cultural resources specialists will evaluate the

project's effects on historic properties and prepare an effects finding report for SHPO/THPO concurrence.

3.10.3 Archaeological Resources Impact Methodology

Archaeological impacts are evaluated in accordance with the following key laws, regulations, or guidance:

- Section 106 of the National Historic Preservation Act as amended (54 U.S.C. 306108) and its implementing regulations at 36 CFR 800
- 23 CFR 774, regulations for implementing Section 4(f) for parks, recreation areas, wildlife and waterfowl refuges, and historic sites
- FHWA Section 4(f) Policy Paper, July 20, 2012
- Native American Graves Protection and Repatriation Act (NAGPRA) (25 U.S.C. 32)
- Archaeological Resources Protection Act of 1979 (ARPA) (16 U.S.C. 470aa et. seq.)
- Sections of Nevada Revised Statute 383.011, 383.150, 383.400, and 383.500, relating to historic preservation and archeology

3.10.3.1 Goals

The project team will identify direct impacts to archaeological resources in the direct effects APE, which generally consists of existing and proposed right-of-way, temporary and permanent easements, equipment staging areas, and other land that would be disturbed by the project.

Qualified archaeologists will perform archaeological investigations to determine if there are archaeological resources present in the APE. Any archaeological resources identified will be evaluated to determine eligibility for the National Register of Historic Places. Qualified archaeologists will determine the effects of the project on archaeological resources that qualify as historic properties, and will prepare and implement agreements reached to mitigate adverse effects, if necessary.

The archaeological studies will be included in the Archaeological Resources Report. NDOT will forward this report for consultation to the Nevada SHPO, the tribes, and other consulting parties.

3.10.3.2 Methodology

The team will perform an archaeological investigation to survey and record all archaeological resources in the project APE. The team will evaluate archaeological resources identified within the APE, applying the National Register criteria for eligibility.

NDOT and FHWA will determine the eligibility of the archaeological resources. NDOT and FHWA will request SHPO and RSIC THPO concurrence on the determinations of the Archaeological Resources Report. Documentation and findings from the archival research, GIS, and field inventories, pertaining to Cultural and Archaeological Resources will be provided to the RSIC THPO.

3.10.4 Effect

Analysis of anticipated impacts of the proposed project improvements will be carried out in accordance with the Criteria of Effect (36 CFR 800.5) for historic properties and possibly reported in a separate document. Should there be adverse effects to historic properties, the steps provided by 36 CFR 800 will be followed.

3.11 CONSTRUCTION IMPACT METHODOLOGY

Construction impacts are evaluated in accordance with the following key regulations or guidelines:

- FHWA Technical Advisory T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents, 1987

3.11.1 Goals

The goal of this analysis is to identify temporary impacts that may be experienced during construction of the project. No separate technical report will be completed for this topic. The EIS will summarize the results of the analysis.

3.11.2 Methodology

The team will qualitatively assess the impact of construction on the project area, businesses and residents, and freeway travelers, including access to buildings and services, emergency response, air quality (emissions and fugitive dust), noise, vibration, water quality (erosion and sedimentation), and construction solid waste/hazardous waste as applicable.

Additional construction-related information will include available info about construction material sources (borrow sites), staging areas, energy, public transportation, and major utility adjustments/associated impacts.

No standalone technical report will be completed for this topic. The EIS will document the analysis.

3.12 INDIRECT AND CUMULATIVE EFFECTS METHODOLOGY

Indirect and cumulative effects are evaluated in accordance with these key regulations and guidance:

- CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1501 *et seq.*)
- CEQ publication, Considering Cumulative Effects under the NEPA, 1997
- FHWA Technical Advisory T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents, 1987
- FHWA Secondary and Cumulative Impact Assessment in the Highway Development Process (April 1992)
- FHWA Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact Considerations in the NEPA Process, January 31, 2003
- National Cooperative Research Program (NCHRP) Report 466, Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects, 2002

3.12.1 Goals

The goal of this analysis is to qualitatively describe foreseeable impacts that are not directly caused by or wholly attributable to the project.

Indirect effects are caused by the proposed action and are later in time or farther removed in distance, but they are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 CFR 1508.8, CEQ regulations for implementing NEPA).

Cumulative effects are impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7, CEQ regulations for implementing NEPA).

The indirect and cumulative effects analysis will be conducted using an expert panel approach. This approach is one of the forecasting tools described in NCHRP Report 466, and it has been used in many environmental impact studies nationwide.

A separate indirect and cumulative effects technical memorandum will be developed.

3.12.2 Indirect Effects Methodology

The indirect effects analysis methodology includes the following key components:

- Define the APE. The APE is typically an area that encompasses a 1-mile radius from the project alignment and is defined as the area within which there is potential for induced development as a result of the project. The demographic area is defined by the Census tracts and block groups that encompass or partially intersect the APE. The team will collect data within this area with respect to population growth trends. A base map(s) will be created, including boundaries of Census tracts and block groups.
- Define the timeframe for the analysis. The timeframe for the analysis will correlate with the design year of the traffic analysis.
- Inventory the APE and notable features such as land use/development patterns, demographics, protected species, natural communities, architectural features and historic sites, and potential hazardous material sites as collected for other tasks.
- Describe the regional development and overall population trends, primarily between 1990 and 2015, and employment characteristics of Reno, Sparks, Washoe County, and the State of Nevada. Employment by industry will be analyzed at the state and county level. The team will also characterize commercial development patterns for the APE, including descriptions of urban areas and regional centers within the influence area of the project.
- Identify and describe local plans and ordinances. Based upon data collected during interviews with local planners, the most up-to-date land use and zoning plans, if available, will be assessed. The EIS will include a discussion of consistency or potential conflicts the proposed project may have with these plans.
- Identify and describe current transportation plans. Based upon data collected during interviews with local planners and transportation staff, the team will identify current and future transportation projects within the Transportation Improvement Program (TIP). The team will interview NDOT and/or RTC staff and review available long-range transportation plans other than the TIP for consistency or potential conflicts of the proposed project.
- Identify development trends, currently pending development proposals, and other known future development proposals in the APE.
- Identify impact-causing activities of the proposed reasonable alternatives.

- Evaluate various factors to determine whether indirect impacts are likely as a result of the project action and ascertain if more detailed analysis is merited. These factors include:
 - The project action and consistency with local plans
 - The project action’s explicit economic development purpose
 - The project action’s result to serve specific development
 - The project action’s potential to stimulate land development having complementary functions
 - Notable natural resource features present in APE
- Assess the potential magnitude of land use change as a result of the project, including the following:
 - Change in accessibility
 - Forecasted growth
 - Land supply versus land demand
 - Availability of water/sewer
 - Market strength
 - Public policy such as growth management policies that are in place
- In association with NDOT, assemble an expert panel consisting of six to eight local planners, developers, realtors, a representative from the RSIC, and others in related professions that are knowledgeable of growth and development activities in the APE. The team will interview the expert panel members separately and use their input to identify major indirect effect issues.
- Analyze indirect effects, describe their significance for the reasonable build alternatives, and evaluate assumptions.
- Identify general strategies for public agencies to consider as tools for managing growth and development and to minimize harmful effects of development to the environment. This analysis will consider existing local and state agency environmental and development regulations to determine the level of mitigation that could be achieved.

3.12.3 Cumulative Effects Methodology

The cumulative effects analysis methodology includes the following key components:

- Identify the resources to consider in the cumulative impact analysis with input from knowledgeable individuals and reliable information sources.
- Define the geographic boundary for each resource to be addressed in the cumulative impact analysis.
- Identify the direct and indirect effects of the project that might contribute to a cumulative impact.
- Characterize the resources in terms of their response to change and capacity to withstand stress.
- Characterize the stresses affecting the resources and their relationship to regulatory thresholds.
- Define a baseline condition for the resources.
- Identify the important cause and effect relationships between human activities and the resources.
- Determine the magnitude and significance of cumulative effects and the incremental difference in the area's future transportation improvement, development, resource use, and resource preservation trends with and without the project.

The analysis is supported by input and information from local officials, agencies, and community outreach activities.

3.13 SECTION 4(F) AND SECTION 6(F) EVALUATION

Impacts to public use land (existing and planned public parks, recreation areas, wildlife and waterfowl refuges, other public-use lands) and to eligible historic sites for transportation projects are evaluated in accordance with the following key laws, regulations, or guidance:

- Section 4(f) of the U.S. DOT Act (23 U.S.C. 138; 49 U.S.C. 303)
- 23 CFR 774, regulations for implementing Section 4(f) requirements for parks, recreation areas, wildlife and waterfowl refuges and historic sites.
- FHWA Section 4(f) Policy Paper, July 20, 2012
- Section 6(f) of the Land and Water Conservation Fund Act (LWCF) as amended (16 U.S.C. 4601)

- Federal Aid in Sport Fish Restoration Act (Dingell-Johnson Act) as amended (16 U.S.C. 777)
- Pittman-Robertson Wildlife Restoration Act (16 U.S.C. 669)

3.13.1 Goals

Section 4(f) of the U.S. DOT Act applies only to the actions of agencies within the U.S. DOT, including FHWA. While other agencies may have an interest in Section 4(f), FHWA is responsible for applicability determinations, evaluations, findings, and overall compliance. Section 4(f) applies to public parks, recreation areas, wildlife and waterfowl refuges, other public-use lands, and eligible historic sites.

Section 6(f) of the LWCF applies to all projects that affect properties, typically public parks and recreational areas, which have received LWCF funds. As a rule, all Section 6(f) properties also fall under Section 4(f).

The evaluation will include an inventory of resources that are covered under each statute in the study area, a description of the resources, including existing and planned use, funding sources, and jurisdictional agencies. The goal is to ensure the transportation improvements are located and designed to avoid or minimize impacts to public use land and historic properties to the extent practicable.

Where Section 4(f) resources cannot be avoided, impacts would be analyzed in accordance with 23 CFR 774 in terms of effects on the features, functions, or attributes that qualify the property for Section 4(f) protection. Section 6(f) resources can be affected in three ways: 1) acquisition; 2) construction staging on 6(f) park property that exceeds 180 days; or, 3) obtaining an air rights easement over 6(f) park property. The Section 6(f) evaluation will focus on the area of the property to be affected for the project and an assessment of the features and functions of that area, as needed to assess impacts and to identify replacement property required by Section 6(f).

The Lead Agencies will coordinate with the jurisdictional agencies to obtain information on resource use, funding, and management and to obtain input on potential effects and possible mitigation measures.

A separate Draft 4(f)/6(f) Evaluation document will be prepared to document compliance with these statutes and included in the EIS.

3.13.2 Methodology

This assessment will include park/recreation resources within 1,000 feet of the proposed project center line that qualify for protection under Sections 4(f) and 6(f) and historic properties within the cultural resources APE. The team will identify these

properties using GIS resources, online aerial photography tools (such as Google Earth), applicable parks maps and field reconnaissance. Park/recreational resource trail maps, comprehensive plans, and/or parks master plans will be obtained from online sources, as available, and through early coordination with the City of Reno, the City of Sparks, and Nevada State Parks officials. Historic properties that are eligible for the National Register of Historic Places and subject to Section 4(f) will be determined through the Historic Resources and Archaeological Resources tasks. Parks that have received LWCF funds will be identified using the National Park Service's LWCF website, which contains a listing of grants by county and by property (park) name. The team will cross-reference the list to all parks in the project area to determine if any have received LWCF funding. The team will confirm LWCF funding through early coordination with parks officials.

Using property/resource boundaries and design drawings, the team will determine whether the project will affect a Section 4(f)/6(f) property. As defined in the regulations, a "use" of a Section 4(f) property may include direct impacts and/or changes in access to the property. Per Section 6(f), the team will measure the direct impacts in acres to any Section 6(f) properties. The team will identify the activities, features, and attributes of the affected Section 4(f)/6(f) property, with emphasis on areas where an impact may occur. Potential traffic noise impacts to these properties will be evaluated under the Traffic Noise task (see Section 3.2).

If the project has the potential to result in the use of Section 4(f)/6(f) properties, the project team will examine potential ways to avoid or minimize the impact.

For properties that cannot be avoided, impacts under Section 4(f) will be evaluated for qualification under temporary use, *de minimis*, Section 4(f) programmatic agreements, and individual Section 4(f) evaluation criteria. If there is permanent incorporation of land and FHWA determines that the impacts are not *de minimis*, the team would prepare a "No Feasible and Prudent Avoidance Alternatives" discussion.

The Section 6(f) impact evaluation will proceed as specified in the National Park Service's LWCF Manual. The results of the impact assessment will inform any future post-EIS Section 6(f) conversion proceedings, wherein replacement land would have "equivalent usefulness and location" of the land it is replacing. If the official with jurisdiction for a Section 6(f) property designates specific potential replacement properties, the team will vet the properties through the "suitability criteria" in the LWCF manual. The replacement value of the properties will be described in terms of how potential replacement properties would adequately replace the lost features, attributes, and functions of the existing recreation property where a conversion would occur. If the official with jurisdiction does not specify replacement properties, the document will include a description of the process that will be used when the time comes to convert

the property (i.e., “during final design” or “once construction funding has been identified for the project and right-of-way acquisition can begin”). Details of the final Section 6(f) conversion proposal, such as land appraisals or property boundary surveys, will occur during final design.

Coordination with officials with jurisdiction will proceed as required to gain concurrence on the applicability of Section 4(f)/6(f) to resources, the description of Section 4(f)/6(f) resources, measures to minimize harm, and use/impact determinations (including any *de minimis* and/or temporary occupation exception findings). The determinations will be summarized in Section 4(f)/6(f) agreement(s) with officials with jurisdiction. NDOT will coordinate all Section 4(f)/6(f)-related agreement(s) with the officials with jurisdiction and with FHWA.

