Environmental
Impact Statement

Record of Decision

in support of the
Environmental Impact Statement

S.R. 108 from S.R. 127 to S.R. 126 in Davis and Weber Counties

Federal Highway Administration
Utah Department of Transportation

UDOT Project No. STP-0108(13)4E
FHWA-UT-EIS-07-3-F

October 28, 2008

Contents

Exhibits

1.0 Decision

This document is the Federal Highway Administration (FHWA) Record of Decision regarding the proposed State Route (S.R.) 108 project from S.R. 127 (Antelope Drive) to S.R. 126 (1900 West) in the cities of Syracuse, West Point, Clinton, Roy, and West Haven, Utah. This Record of Decision approves the selection of the Minimize 4(f) Impacts Alternative as the Preferred Alternative as identified in the Final Environmental Impact Statement (Final EIS) dated August 2008. This approval constitutes FHWA's acceptance of the Preferred Alternative as the Selected Alternative alignment for S.R. 108 and completes the approval process for the environmental evaluation.

This Record of Decision presents the basis for a decision to implement a transportation project consisting of the following elements:

- Construct a five-lane (110-foot) cross-section consisting of four 12-foot travel lanes, a 14-foot median (either a two-way left-turn lane or a raised center median), 8-foot shoulders, 4-foot bicycle lanes, 2.5-foot curb and gutter, 4.5-foot park strips, 4-foot sidewalks, and 1 foot between the back of the sidewalk and the edge of the right-of-way.
- Improve most intersections with dedicated right-turn and left-turn lanes. Dual left-turn lanes will be provided at 1700 South (southbound only), 1800 North, 5600 South, 4800 South, and 1900 West (eastbound only).
- Include enough shoulder width to accommodate bus service.
- Support bicycle use along S.R. 108 by providing Class II bicycle lanes.

This Record of Decision approves the full build-out of the selected alternative as evaluated in the Final EIS. The SR-108 Project as proposed is part of a fiscally constrained long range transportation plan (WFRC 2007 Urban Area Regional Transportation Plan). However, the project will be built in phases based on available funding. UDOT will make interim improvements within the scope of the Final EIS to improve safety and reduce congestion. These improvements could include, full build-out of segments along the length of the roadway, widening the existing two-lane road to three lanes and constructing intersection improvements or other phasing as determined through engineering studies to best meet current needs while anticipating full build-out. UDOT anticipates that the full project scope will be completed as described in this Record of Decision well before 2035.

FHWA has carefully reviewed all concerns in the course of approving the Selected Alternative and has concluded that this alternative reasonably

maximizes the transportation benefit, minimizes environmental impacts, and effectively meets the project's purpose.

This Record of Decision is issued under the requirements of Chapter 40 of the Code of Federal Regulations (CFR) 1502.2 and Chapter 23 CFR 771.127. The following information in this Record of Decision is based on the information presented in the S.R. 108 Final EIS prepared by FHWA and the Utah Department of Transportation (UDOT) and released for public review during September and October 2008. The Final EIS and the entire project record are available for review upon request to the FHWA Utah Division.

2.0 SAFETEA-LU Section 6002

The public and agency involvement program for the S.R. 108 project was conducted in a manner consistent with National Environmental Policy Act (NEPA) and Section 106 regulations. The program was designed to be consistent with the Transportation Equity Act for the 21st Century (TEA-21) of 1998 and the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) of 2005. The participating agencies were notified of the requirements of SAFETEA-LU Section 6002 at the agency scoping meetings.

The S.R. 108 EIS process met the intent of this regulation by reaching out to agencies and the public and giving them an opportunity for involvement by providing input into and collaborating on the processes of defining the project purpose and need, defining the range of alternatives, and collaborating on the methodologies to be used when identifying the project alternatives. The participating agencies in the S.R. 108 process were:

- U.S. Fish and Wildlife Service
- Utah Transit Authority
- Utah State Historic Preservation Office
- Wasatch Front Regional Council
- City of Syracuse
- City of Roy
- City of West Point
- City of Clinton
- City of West Haven

3.0 Alternatives Considered (Chapter 2 of the Final EIS)

The primary purposes of the project are to improve local and regional mobility in Syracuse, West Point, Clinton, Roy, and West Haven; eliminate roadway deficiencies in order to reduce accident rates; and enhance the opportunities for multimodal use of S.R. 108 by providing improved bicycle, pedestrian, and transit facilities.

This Record of Decision is based on the consideration of the alternatives that were described and evaluated in Chapter 2, Alternatives, and Chapter 4, Environmental Consequences, of the Final EIS. As part of the initial alternative screening process, potential options were evaluated to determine whether they would meet the project's purpose as described above.

3.1 Summary of the Alternative Development Process

A range of alternatives to consider in this EIS was developed through the NEPA public and agency involvement process. Eight initial alternatives were developed during the scoping phase of the project. These initial alternatives were put through a two-step screening process to determine which alternatives would be carried forward for detailed study. The two steps used in the screening process are:

- **Level 1 Screening.** The initial alternatives were evaluated to determine how well they met the three elements of the project's purpose. The alternatives that did not meet all of the project's purpose were eliminated from further study. The alternatives that did meet all of the project's purpose were further evaluated with level 2 screening.
- **Level 2 Screening.** The alternatives that made it through level 1 screening were evaluated to determine their impacts to the community (such as relocations and Section 4(f) impacts) and their impacts to the natural environment (such as wetland impacts) so that the alternatives with the least amount of impacts would be carried forward for detailed study and the alternatives with the greatest impacts would be eliminated.

3.1.1 Development of the Initial Alternatives

Eight initial alternatives were developed during the project scoping process. These initial alternatives were developed with input from existing land use and transportation plans, the public, local cities, and resource agencies. The input was collected during public meetings, at alternative development workshops with the public and cities, and from comments that were submitted on the project Web site or mailed in (see Exhibit 3-1).

Exhibit 3-1: Initial Alternatives

Alternative	Description
No-Action	No improvements to S.R. 108 would be made under this alternative except for routine maintenance.
TSM (Transportation System Management)	This alternative consists of timing and coordinating traffic signals along S.R. 108 and adding left-turn and right-turn lanes at key intersections.
Transit Only	This alternative includes the TSM Alternative plus more-frequent bus service. The current bus service (Route 626) operates hourly and would be increased to high-frequency bus service that would operate every 15 minutes. Other modes of transit, such as commuter rail and light rail, were not considered prudent for S.R. 108 because they would not connect to other local or regional fixed-guideway transit such as the proposed commuter rail along I-15 about 3 miles east of S.R. 108. In addition, fixed-guideway transit on S.R. 108 is not compatible with the Utah Transit Authority's (UTA) or the Wasatch Front Regional Council's (WFRC) long-range plans for transit in the area. Bus service on S.R. 108 would connect to UTA's proposed commuter rail line along I-15 into Salt Lake City and would provide the necessary regional connectivity.
Three Lanes	This alternative consists of two travel lanes with a raised center median and dedicated turn lanes. The alternative includes left-turn and right-turn lanes at intersections, appropriate shoulders for local access, and pedestrian, bicycle, and transit facilities.
TSM, Transit Only, and Three Lanes	This alternative is a combination of the TSM, Transit Only, and Three-Lane Alternatives.
Five Lanes	This alternative consists of four travel lanes with a raised center median and dedicated turn lanes at intersections. The alternative includes left-turn and right-turn lanes at intersections, appropriate shoulders for local access, and pedestrian, bicycle, and transit facilities.
Seven Lanes	This alternative consists of six travel lanes with a raised center median and dedicated turn lanes at intersections. The alternative includes left-turn and right-turn lanes at intersections, appropriate shoulders for local access, and pedestrian, bicycle, and transit facilities.
Improve Other Area Roads	This alternative consists of widening 1000 West or 3000 West to five lanes and building the proposed North Legacy Parkway. No improvements to S.R. 108 would be made under this alternative.

3.1.2 Level 1 Screening

Level 1 screening was performed on the eight initial alternatives (see Exhibit 3-1: Initial Alternatives above). If an alternative did not meet all three elements of the project's purpose, it was not carried forward for detailed analysis. Alternatives that were considered and eliminated are described in Section 2.1, Alternative Development Process, of the Final EIS.

As shown in Exhibit 3-2, there is no initial alternative or combination of the initial alternatives, other than the Five-Lane Alternative, that would meet all of the project's purpose while avoiding the excessive impacts of the Seven-Lane Alternative. Therefore, only the Five-Lane Alternative was carried forward for level 2 screening.

Exhibit 3-2: Evaluation of Alternatives Considered

	Alternative							
Purpose Element	No-Action	TSM	Transit Only	Three Lanes	TSM, Transit Only, and Three Lanes	Five Lanes	Seven Lanes[a]	Improve Other Area Roads
Reduce roadway congestion on S.R. 108.	No	No	No	No	No	Yes	Yes	No
Eliminate the roadway deficiencies associated with a lack of shoulders and turn lanes in order to reduce accident rates on S.R. 108.	No	No	No	Yes	Yes	Yes	Yes	No
Enhance the opportunities for multi-modal use of S.R. 108 by providing improved bicycle, pedestrian, and transit facilities consistent with local and regional land use and transportation plans.	No	No	Yes	Yes	Yes	Yes	Yes	No

[a] The Seven-Lane Alternative was determined to be unreasonable because it would have substantially more impacts to homes (due to relocations) and environmental resources.

3.1.3 Level 2 Screening

The purpose of level 2 screening was to further refine and develop the alternatives that met all of the project purpose elements in level 1 screening. For this project, the only alternative that passed the level 1 screening was the Five-Lane Alternative. The level 2 screening was conducted to ensure that the alternatives with the least amount of impacts to the communities and the natural environment would be carried forward for detailed study and that the alternatives with the greatest impacts would be eliminated.

Five different alignment alternatives were developed and evaluated in more detail to develop a range of reasonable alternatives to be considered in the EIS. The five alignment alternatives represent the different alignment variations that could

be implemented under the Five-Lane Alternative. Exhibit 3-3 below describes the five alternatives that were evaluated during level 2 screening.

Exhibit 3-3: Preliminary Five-Lane Alternatives

Alternative	Cross-Section Width	Description
Center Alignment	110 feet	Widen the roadway equally to the west and east.
Minimize 4(f) Impacts Alignment	110 feet	Widen the roadway both west and east to minimize Section 4(f) impacts.
Center Meander Alignment	110 feet	Widen the roadway both west and east to minimize overall property impacts, regardless of Section 4(f) status.
East Alignment	110 feet	Widen the roadway primarily to the east.
West Alignment	110 feet	Widen the roadway primarily to the west.

The five preliminary alternatives were evaluated against the screening criteria. The screening criteria included relocations, potential relocations, total property impacts, and impacts to Section 4(f) properties, farmland, and wetlands. Exhibit 3-4 provides a summary of the impacts from the preliminary five-lane alternatives.

Exhibit 3-4: Summary of Impacts from the Preliminary Five-Lane Alternatives

Alternative	Number of Relocations[a]	Number of Potential Relocations[a]	Number of Strip Takes	Total Property Impacts[b]	Number of 4(f) Uses (Adverse)	Number of APAs Affected[c]	Acres of Wetlands Lost
Center Alignment	31	133	299	463	27	4	0.025
Minimize 4(f) Impacts Alignment	61	47	246	354	14	4	0.025
Center Meander Alignment	42	93	244	379	25	4	0.025
East Alignment	147	42	87	276	33	2	0.039
West Alignment	108	57	167	332	22	2	0.025

[a] Includes residential and commercial.

[b] Includes relocations, potential relocations, and strip takes.

[c] Agriculture Protection Areas (APAs) are geographic areas where agriculture activities are given special protections.

Exhibit 3-5 below summarizes the reasons why the Center, Center Meander, and East Alignments were eliminated from further study and why the Minimize 4(f) Impacts and West Alignments were carried forward for detailed study.

Based on the historic evaluation conducted on the homes along S.R. 108, the properties that were considered Section 4(f) properties have similar integrity and were considered to have equal value when determining which alternative to carry forward. Section 4(f) impacts were given the most consideration when determining which alternative to carry forward.

Exhibit 3-5: Level 2 Screening Results (Evaluate Community and Environmental Impacts)

Alternative	Level 2 Screening Results	Discussion
Center Alignment	Eliminated	• Third-highest number of combined direct relocations and potential relocations (164). • Highest number of total property impacts (463) when potential relocations and strip takes are included. • Second-highest number of adverse Section 4(f) uses (27). • Highest number of APAs affected (4). • **Screening Result:** Because it had the highest number of total property impacts and the second-highest number of adverse Section 4(f) uses, the Center Alignment was eliminated from further study.
Minimize 4(f) Impacts Alignment	Carried forward	• Fewest number of adverse Section 4(f) uses (14). • Lowest number of relocations and potential relocations (108). • Highest number of APAs affected (4). • **Screening Result:** Because it had the fewest number of adverse Section 4(f) uses along with the lowest number of relocations and potential relocations, the Minimize 4(f) Impacts Alignment was carried forward for detailed study.
Center Meander Alignment	Eliminated	• Second-lowest number of combined direct relocations and potential relocations (135). • Second-highest number of total property impacts (379). • Third-highest number of adverse Section 4(f) uses (25). • Highest number of APAs affected (4). • **Screening Result:** Based on the high number of adverse Section 4(f) uses and total property impacts, the Center Meander Alignment was eliminated from further study.

Exhibit 3-5: Level 2 Screening Results (Evaluate Community and Environmental Impacts)

Alternative	Level 2 Screening Results	Discussion
East Alignment	Eliminated	• Highest number of combined direct relocations and potential relocations (189). • Highest number of adverse Section 4(f) uses (33). • Would require relocation of Syracuse Elementary School, which would result in an impact to the community. • Highest number of wetlands impacts (0.039 acres). • Lowest number of APAs affected (2). • **Screening Result:** Based on the high number of relocations and potential relocations, adverse Section 4(f) uses, the relocation of the elementary school, and impacts to wetlands, the East Alignment was eliminated from further study.
West Alignment	Carried forward	• Second-lowest number of adverse Section 4(f) uses (22) and total property impacts (332). • Lowest number of APAs affected (2). • Would improve the level of service and safety by eliminating many access points along one side of S.R. 108, which would improve overall traffic operations and safety. • **Screening Result:** Because it had the second-lowest number of Section 4(f) impacts and total property impacts and because it would improve the level of service and safety, the West Alignment was carried forward for detailed study.

3.2 Alternatives Considered for Detailed Study

3.2.1 No-Action Alternative

NEPA requires an analysis of the No-Action Alternative. This alternative serves as a baseline for comparison and enables decision-makers to compare the environmental effects of the action alternatives. The No-Action Alternative assumed that no capacity improvements to S.R. 108 or adjacent transportation facilities would be made other than those improvements already identified in the WFRC Regional Transportation Plan to enhance mobility in the area. If no action is taken on S.R. 108, UDOT and the cities would likely continue to make minor maintenance improvements such as rehabilitating pavement and improving shoulders, turn lanes, sidewalks, and curb and gutter. Overall, the basic two-lane configuration of S.R. 108 would not change under the No-Action Alternative.

3.2.2 Minimize 4(f) Impacts Alternative (Environmentally Preferred and Selected Alternative)

The Minimize 4(f) Impacts Alternative involves widening S.R. 108 to a 110-foot, five-lane cross-section. In order to minimize the use of Section 4(f) properties, the alignment varies between the center alignment, west alignment, and east alignment. The main features of this alternative are:

- Five-lane (110-foot) cross-section consisting of four 12-foot travel lanes, a 14-foot median (either a two-way left-turn lane or a raised center median), 8-foot shoulders, 4-foot bicycle lanes, 2.5-foot curb and gutter, 4.5-foot park strips, 4-foot sidewalks, and 1 foot between the back of the sidewalk and the edge of the right-of-way.
- Although the exact location of raised medians would be determined during the final design of the project, raised medians between intersections would be considered in high-traffic areas such as commercial districts and schools to improve safety. Proposed medians between intersections to improve school safety would be at 1700 South mid-block for Syracuse Elementary and Syracuse Junior High Schools, at 700 South in Syracuse adjacent to the new high school, and at 550 North in West Point.
- Improve most intersections with dedicated right-turn and left-turn lanes. Dual left-turn lanes would be provided at 1700 South (southbound only), 1800 North, 5600 South, 4800 South, and 1900 West (eastbound only). Dual left-turn lanes were required at these high-traffic intersections to maintain a level of service of LOS D.
- Include an 8-foot shoulder width that will accommodate bus service.
- Support bicycle use along S.R. 108 by providing Class II bicycle lanes.

This alternative is identified as the environmentally preferred alternative because it would have the least amount of farmland impacts, the fewest impacts to historic properties, and the fewest residential and business relocations. In addition, the Selected Alternative would have the least amount of 4(f) uses.

3.2.3 West Alternative

The West Alternative also involves widening S.R. 108 to a 110-foot, five-lane cross-section. The centerline of this alignment is located such that the proposed right-of-way line along the east side of S.R. 108 matches the existing right-of-way line along the east side of S.R. 108. Due to this design, the alignment misses all properties on the east side of S.R. 108. Other design features would be the same as those described above for the Minimize 4(f) Impacts Alternative.

4.0 Section 4(f) (Chapter 5 of the Final EIS)

The FHWA Section 4(f) regulation (23 CFR 774) states:

> The [FHWA] may not approve the use of Section 4(f) property unless (a) the Administration determines that: (1) there is no feasible and prudent avoidance alternative to the use of the land, and (2) the action includes all possible planning to minimize harm to the property resulting from such use; or (b) the Administration determines that the use of the property, including any measure(s) to minimize harm (such as any avoidance, minimization, mitigation, or enhancement measures) committed to by the applicant, will have a *de minimis* impact on the property.

Chapter 5, Section 4(f) Evaluation, of the Final EIS provides a detailed discussion of the Section 4(f) resources within the project study area, the impacts to these resources from the various alternatives, and approaches to avoiding and minimizing impacts to those resources.

The Selected Alternative will involve 4(f) uses of historic architectural properties only. No parks or other recreation areas or wildlife refuges will be used, and there are no Section 6(f) resources along S.R. 108.

4.1 *De Minimis* Findings

For a *de minimis* impact determination, FHWA must determine that the use of the property, including any measure(s) to minimize harm (such as any avoidance, minimization, mitigation, or enhancement measures) committed to by the applicant, will have a *de minimis* impact on the property. For historic sites, *de minimis* impact means that FHWA has determined, in accordance with 36 CFR 800, that no historic property will be affected by the project or that the project will have "no adverse effect" on the historic property in question.

Sixty-one architectural properties adjacent to S.R. 108 are eligible for the National Register of Historic Places (NRHP). Based on the 4(f) evaluation, the Selected Alternative will result in a 4(f) use of 54 architectural properties. Of these, 14 will be adversely affected, and there is no feasible or prudent alternative to the use of the land. The remaining 40 properties will have "no adverse effects" and are therefore considered *de minimis*. The Utah State Historic Preservation Office (SHPO) concurs with these findings.

4.2 Section 4(f) Use (Non-*De Minimis*)

FHWA determined that the Selected Alternative will use the remaining 14 historic architectural properties. FHWA has determined that there is no feasible

and prudent alternative to the uses of the land from these properties and sites and that the Selected Alternative includes all possible planning to minimize harm to these Section 4(f) properties. These findings are explained in Chapter 5, Section 4(f) Evaluation, of the Final EIS and are summarized below.

4.2.1 Consideration of Avoidance Alternatives

If the action alternatives would use the land from a 4(f) property, it is necessary to evaluate alignment alternatives that avoid these properties. Although the No-Action Alternative would not have any impacts to Section 4(f) properties, it does not meet the project's purpose and was not considered prudent and feasible. Total avoidance alternatives were considered for the Selected Alternative (Minimize 4(f) Impacts Alternative) and the West Alternative, including an off-corridor alignment.

Consideration of an Off-Corridor Avoidance Alternative

The feasibility of improving other north-south roads besides S.R. 108 was evaluated. During the S.R. 108 scoping process, several public comments suggested that improvements should be made to other north-south roads adjacent to S.R. 108 to reduce congestion and the need for improvements to S.R. 108. Some comments suggested that widening 1000 West and 3000 West would reduce the need for improvements to S.R. 108. In response to these comments, the Improve Other Area Roads Alternative was developed and evaluated in Chapter 2, Alternatives, of the Final EIS.

The Improve Other Area Roads Alternative would not meet the project's purpose and would result in a greater number of 4(f) impacts to architectural properties and parks than would improvements to S.R. 108. It was also determined that improving 1000 West and 3000 West would not be consistent with local or regional land-use and transportation plans or planned growth, would not eliminate roadway deficiencies, and would not improve multimodal use of S.R. 108. 1000 West and 3000 West would be used by less traffic than a similarly sized road such as S.R. 108, therefore increasing congestion on other roads. In addition, improving 1000 West or 3000 West would not provide regional connectivity. For these reasons, the Improve Other Area Roads Alternative was eliminated from further study. These reasons also prevent 1000 West or 3000 West from being used as an off-corridor avoidance alternative to avoid impacts to 4(f) properties along S.R. 108.

Consideration of a Reduced Roadway Cross-Section

Section 2.1.3.1, Development of the Preliminary Five-Lane Alternatives, of the Final EIS describes the evaluation of the 110-foot cross-section developed for the

action alternatives. The analysis concluded that reducing the cross-section to less than 110 feet would not allow the project to meet the purpose of eliminating roadway deficiencies associated with a lack of shoulders and turn lanes in order to reduce accident rates on S.R. 108. In addition, reducing the cross-section would not provide improved bicycle, pedestrian, and transit facilities. Finally, reducing the lane and shoulder widths would reduce the capacity of the road. With reduced shoulder and lane widths, the capacity of the Five-Lane Alternative would be reduced from 42,000 vehicles per day to 36,000 vehicles per day, which will result in a level of service of LOS F for three of the nine segments. This would not meet the local and regional mobility objectives in the screening criteria.

Consideration of a New In-Corridor Avoidance Alternative

The existing S.R. 108 alignment was used as a starting point for a new in-corridor avoidance alternative. Where the roadway was widened, any new pavement was placed adjacent to the existing pavement to avoid 4(f) resources. In addition, during the design process, the Selected Alternative alignment was shifted to avoid direct use (relocation) of architectural properties as much as possible and to limit constructive use of the properties. However, given the number of 4(f) resources on both sides of the road, at some locations it was not possible to completely avoid a resource. As discussed in Section 5.5, Avoidance Alternatives for Section 4(f) Properties, of the Final EIS, individual avoidance alternatives were developed for the architectural properties that will be used by the S.R. 108 project.

4.2.2 Least Overall Harm Analysis

This section discusses and compares the Minimize 4(f) Impacts and West Alternatives for each of the listed conditions in 23 CFR 774.3(2)(c). This regulation states, "If the analysis in paragraph (a)(1) of this section concludes that there is no feasible or prudent avoidance alternative, then the [FHWA] may approve only the alternative that causes the least overall harm in light of the statute's preservation purpose. The least overall harm is determined by balancing the factors described in the headings below.

Ability to Mitigate Adverse Impacts to Each Section 4(f) Property.

For adverse impacts to historic properties, mitigation would be the same for both of the alternatives. Mitigation measures have been developed for the adversely affected historic resources in a Memorandum of Agreement with the SHPO.

A Memorandum of Agreement has been executed between FHWA, UDOT, and the SHPO. The Memorandum of Agreement stipulates that the adversely affected historic resources will be mitigated through the completion of an Intensive-Level Survey. The Minimize 4(f) Impacts and West Alternatives are similar in terms of their ability to mitigate the impacts to historic properties.

The Intensive-Level Survey includes the following elements:

- Photographs that show such attributes as the interior, exterior, and streetscape. This will include an adequate number of professional-quality, black-and-white photographs.
- Research material including a copy and a negative of the legal historic tax card (if available).
- All materials will be placed on file with the Division of State History, Historic Preservation Office.

The certified local government and historical societies and organizations in Roy and Syracuse did not identify any properties of particular importance to their communities. No similar organizations exist for Clinton, West Point, or West Haven, the three other communities along S.R. 108.

Severity of Remaining Harm after Mitigation to the Protected Activities, Attributes, or Features That Qualify Each Property for Section 4(f) Protection

The historic resources used (not *de minimis*) by both alternatives would be completely removed.

Significance of Each Section 4(f) Property

The official with jurisdiction over the historic properties is the Utah SHPO. The S.R. 108 team has met with the SHPO on numerous occasions throughout this project. FHWA and UDOT have prepared a DOE/FOE, which documented historic resources in the S.R. 108 study area. The DOE/FOE establishes the eligibility rating for each historic resource and the type of effect that each will receive from the alternatives. The SHPO has agreed to the DOE/FOE. The SHPO ratings for each historic resource are found in the DOE/FOE. As shown, the Minimize 4(f) Impacts Alternative would use two SHPO A-rated buildings and 12 SHPO B-rated buildings. The West Alternative would use four SHPO A-rated buildings and 18 SHPO B-rated buildings. Overall, the Minimize 4(f) Impacts Alternative would use two fewer historic A-rated resources considered by the SHPO to be of more importance.

In addition, the certified local government of Syracuse and the Roy Historical Museum did not identify any properties along S.R. 108 of particular importance.

Views of Officials with Jurisdiction over Each Section 4(f) Property

The official with jurisdiction over the historic properties is the Utah SHPO. The S.R. 108 team has met with the SHPO on numerous occasions throughout this project. FHWA and UDOT have prepared a DOE/FOE, which documented historic resources. The DOE/FOE establishes the eligibility rating for each historic resource and the type of effect that each will receive from the alternatives. The SHPO has agreed to the DOE/FOE.

In addition, the certified local government of Syracuse and the Roy Historical Museum did not identify any properties along S.R. 108 of particular importance.

Degree to Which Alternatives Meet the Project Purpose

The Minimize 4(f) Impacts Alternative and the West Alternative would meet the project purpose equally.

Magnitude of Adverse Impacts on Other Resources after Reasonable Mitigation

This section discusses other environmental resources that would be affected by the Minimize 4(f) Impacts Alternative and the West Alternative. For most resources, the impacts of the alternatives would be similar except for farmland, residential and business relocations, noise, and historic resources. The Minimize 4(f) Impacts Alternative would have slightly less impacts to farmland (1.8 acres) and fewer impacts to historic resources (8). The main difference between the

alternatives is the number of residential and business relocations. The West Alternative would cause 41 more residential relocations and six more business relocations. The greater number of residential relocations under the West Alternative would cause a greater disruption to the community by removing more families that have close connections to the community. Because the Minimize 4(f) Impacts Alternative would have fewer residential relocations it would have higher noise impacts than the West Alternative.

Substantial Differences in Costs among Alternatives

The Minimize 4(f) Impacts Alternative ($178,100,000) would cost slightly less than the West Alternative ($201,700,000).

Conclusion

Of the two action alternative considered (the Minimize 4(f) Impacts Alternative [Selected Alternative] and the West Alternative), the Selected Alternative will have eight fewer Section 4(f) uses, substantially fewer residential and business relocations, and a lower cost. The impacts to other resources would be similar between the alternatives. Given these greater impacts to Section 4(f) resources, the West Alternative was considered not a prudent alternative for avoiding or minimizing harm to the Section 4(f) resources used by the Selected Alternative. The Minimize 4(f) Impacts Alternative is the alternative that causes the least net overall harm.

4.2.3 Measures To Minimize Harm to Section 4(f) Properties

During the design process, design staff worked with the environmental resource specialist to initially avoid 4(f) properties by implementing alignment shifts, installing walls, and minimizing the construction limits.

A Memorandum of Agreement was executed among FHWA, UDOT, and the Utah SHPO. The Memorandum of Agreement stipulates that historic resources adversely affected will be mitigated through the completion of an Intensive-Level Survey. The Minimize 4(f) Impacts and West Alternatives are similar in terms of their ability to mitigate the impacts to historic properties. A copy of this Memorandum of Agreement is included in Appendix B, Determination of Eligibility and Finding of Effect and Native American Consultation, of the Final EIS.

The Intensive-Level Survey includes the following elements:

- Photographs that show such attributes as the interior, exterior, and streetscape. This will include an adequate number of professional-quality, black-and-white photographs.

- Research material including a copy and a negative of the legal historic tax card (if available).
- All materials will be placed on file with the Division of State History, Historic Preservation Office.

5.0 Measures To Minimize Harm from the Selected Alternative (Chapter 4 of the Final EIS)

As the Selected Alternative for this project was developed and reviewed through the NEPA process, the alignment underwent numerous changes to minimize adverse environmental impacts. Many potential impacts were eliminated or reduced by adjusting the alternative and/or avoiding sensitive resources. The remaining impacts associated with project construction and operation will be minimized by following the current UDOT standard specifications for road and bridge construction and implementing a variety of project-specific mitigation measures. The environmental impacts of the Selected Alternative were evaluated in a qualitative as well as a quantitative manner in Chapter 4, Environmental Consequences, of the Final EIS. Both beneficial and adverse impacts were evaluated and, where necessary, mitigation measures were developed.

FHWA will work closely with UDOT to ensure that all practical measures to avoid or minimize adverse impacts related to the Selected Alternative will be implemented. The following measures, which are described in detail in the referenced sections of the Final EIS, have been identified and are summarized in Appendix A, S.R. 108 Mitigation Commitments, of this Record of Decision.

Implementing the Selected Alternative will result in construction period (short-term) impacts and impacts associated with long-term operation of the project. FHWA has determined that the measures described below are appropriate to mitigate for the Selected Alternative and will be implemented. UDOT will administer implementation of all the mitigation measures described in the Final EIS, and FHWA will ensure that they are properly implemented via the monitoring and enforcement program discussed in this Record of Decision (see Section 6.0, Monitoring and Enforcement Program).

5.1 Farmland Impacts

The Selected Alternative will directly affect cropland as well as farmland that is under Agriculture Protection Area status. Some farmland is within the proposed right-of-way and will be directly taken out of production (direct impacts). No farmland outside the right-of-way will be affected (indirect impacts). It is expected that all farmland in the impact analysis area will be developed by the end of the study period (2035), even under the No-Action Alternative, due to the rapid development occurring in the area.

Mitigation Measures for Farmland Impacts. UDOT will work with each farm owner on a case-by-case basis to determine the farm's eligibility for benefits

under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (URAA). Generally, UDOT will provide compensation for the expense of re-establishing farm enterprises and for fair market value of the buildings and land.

5.2 Community Impacts

Overall, the Selected Alternative will have no substantial direct or indirect effects on neighborhood and community cohesion, quality of life, recreation resources, or community facilities. The addition of raised medians could affect emergency vehicle response in some areas and will be coordinated with local emergency response providers. Three schools (Syracuse Elementary, Syracuse Junior High, and Syracuse High Schools) are located on S.R. 108. The Selected Alternative will add sidewalks and bicycle lanes to S.R. 108, so the safety of children who walk to school on S.R. 108 will be improved in those areas that currently have narrow sidewalks or no sidewalks. The final design could incorporate raised medians, which could serve as a place of refuge for pedestrians who cross a street mid-block or at an intersection. The safety of students will be considered during final design with additional coordination with the schools and will also be addressed during the construction period. The Selected Alternative will require the relocation of about 55 residential properties and the relocation of utilities that line the existing roadway.

Mitigation Measures for Public Health and Safety Impacts. If raised medians are incorporated into the final design, the sponsoring agencies will ensure that the locations of the medians will not interfere with emergency service providers' ability to respond to emergencies. Raised medians will also be placed near schools and busy commercial centers so that pedestrians have a relatively safe place to stop when crossing the road.

During the final design of the project, UDOT will coordinate modifications to the existing school crossing zones for Syracuse Elementary School, Syracuse Junior High School, and Syracuse High School with those schools to ensure that roadway improvements maintain student safety at those crossing locations.

During construction, equipment and excavations could pose a safety hazard for students who walk to school on S.R. 108. Before construction begins, the contractor will coordinate with the schools so that appropriate safety measures can be implemented. These measures could include avoiding construction during the morning and afternoon while students are walking to school and providing a safety monitor to watch students as they walk to school near the construction areas.

Mitigation Measures for Relocation Impacts. The loss of residences or businesses due to the Selected Alternative will be mitigated according to federal,

state, and local relocation policies. Assistance and re-establishment expenses will be provided to the displaced property owners and lease holders according to eligibility requirements and other requirements of the Uniform Relocation Assistance Act of 1970, as amended. Relocation resources will be available to each relocated resident and business without discrimination.

Mitigation Measures for Utility Impacts. The UDOT document Accommodation of Utilities and the Control and Protection of State Highway Rights-of-Way, Utah Administrative Code Rule 930-6, will be followed. The construction contractor will contact local businesses and residents if any loss of service is required during construction.

5.3 Economic Impacts

The Selected Alternative will result in the relocation of six businesses. Potential business impacts during construction are addressed in Section 5.11, Construction Impacts.

Mitigation Measures for Economic Impacts. Acquired businesses will be relocated by UDOT according to the Uniform Relocation Assistance Act, as amended; Title VI of the Civil Rights Act of 1964; and 49 CFR 24, Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs.

5.4 Air Quality Impacts and Transportation Conformity

The Selected Alternative will not result in any federal or state air quality standard being exceeded and will comply with the carbon monoxide (CO) and particulate matter (PM_{10}) emission budgets in the State Implementation Plan. However, several mitigation measures will be implemented to minimize PM_{10}-related emissions.

With the exception of ozone (O_3), the S.R. 108 project corridor meets the National Ambient Air Quality Standards (NAAQS) for all priority pollutants. The Wasatch Front region is currently in attainment for the new 8-hour ozone standard. Davis and Weber Counties have always conformed to past state requirements for ozone-related emissions. Projections indicate a steady decrease in mobile-source ozone-related emissions.

In accordance with Section 176(c) of the Clean Air Act (42 United States Code [U.S.C.] 7506[c]), transportation projects in non-attainment and maintenance areas must conform to the state air quality implementation plan. Conformance is demonstrated by meeting the criteria of the transportation conformity regulations (43 CFR 93). Project-level conformity determinations must be based on the latest

planning assumptions (40 CFR 93.112), the latest emission model (43 CFR 93.111), and consultation (40 CFR 93.112). The Final EIS has met these requirements.

The transportation conformity rule (40 CFR 93.114 and 93.115) requires that a currently conforming regional transportation plan and the transportation improvement program (TIP) must be in place at the time of project approval, and the project must come from the conforming plan and TIP. The WFRC 2007 Regional Transportation Plan and the 2007 TIP have been adopted and include the Selected Alternative.

The S.R. 108 project is in an attainment area for PM_{10}, so a project-level determination of whether the Selected Alternative will conform to the provisions of the Clean Air Act is not required. However, an analysis of CO and PM_{10} was conducted in the Final EIS. The results of the CO and PM_{10} analysis demonstrated that the Selected Alternative will not result in a violation of the NAAQS. Therefore, the project will not contribute to any new localized violations of the NAAQS nor will it increase the frequency or severity of any existing violations. Overall, the project has met all of the requirements of 40 CFR 93 and is found to conform.

Mitigation Measures for Air Quality Impacts. For PM_{10}, several mitigation measures will be implemented as part of the proposed project. These measures will include minimizing construction emissions through best management practices (BMPs) and maintaining construction equipment engines (see Section 5.11, Construction Impacts).

5.5 Noise Impacts

The Selected Alternative will increase existing noise levels by about 1 dBA (A-weighted decibels) to 2 dBA at most sensitive receptor locations throughout the corridor. A noise analysis was conducted according to UDOT's January 2008 noise policy (08A2-1) as part of the EIS process to determine if noise mitigation was reasonable and feasible at any sensitive receptor locations. Based on this analysis, it was determined that noise walls would be both reasonable and feasible at six locations as described below.

Mitigation Measures for Noise Impacts. Noise walls were considered for two mobile-home parks in Segment 8 of the project corridor and for townhomes adjacent to the alignment in Segment 9. Four noise walls were considered adjacent to Karol's Mobile Estates and the Country Meadows Estates, and two noise walls were considered adjacent to the townhomes in Segment 9. The results of the evaluation are summarized below.

Four noise walls were considered in Segment 8, and all four were considered feasible and reasonable. Residents who are adjacent to the proposed noise walls will be able to vote on whether they want the noise walls to be built. If residents are in favor of noise walls, they will be constructed.

- **Wall 1** (about 550 feet long) was located on the southeast side of Karol's Mobile Estates. A noise wall 16 feet high at this location would reduce noise by 4 dBA to 12 dBA at the majority of first-row residences and would be feasible and reasonable according to UDOT's noise-abatement criteria.
- **Wall 2** (about 300 feet long) was located on the northeast side of Karol's Mobile Estates. A noise wall between 12 feet and 18 feet high would reduce noise by up to 6 dBA at the majority of first-row residences. A noise wall in this location would be feasible and reasonable according to UDOT's noise-abatement criteria.
- **Wall 3** (about 400 feet long) was located on the south end of the Country Meadows Estates. A noise wall between 12 feet and 18 feet high would reduce noise by 9 dBA to 12 dBA at first-row residences and would be feasible and reasonable according to UDOT's noise-abatement criteria.
- **Wall 4** (about 425 feet long) was located on the north end of the Country Meadows Estates. A noise wall between 12 feet and 18 feet high would reduce noise by 7 dBA to 13 dBA at first-row residences and would be feasible and reasonable according to UDOT's noise-abatement criteria.

Two noise walls were considered in Segment 9, and both were considered feasible and reasonable. Residents who are adjacent to the proposed noise walls will be able to vote on whether they want the noise walls to be built. If residents are in favor of noise walls, they will be constructed.

- **Wall 5** (about 360 feet long) was located adjacent to the relatively new townhome development on the south side of the alignment. A noise wall 8 feet high at this location would reduce noise by about 5 dBA to 9 dBA at the majority of first-row residences and would be feasible and reasonable according to UDOT's noise-abatement criteria.
- **Wall 6** (about 950 feet long) was located on the south side of the alignment adjacent to the townhome development. Similar to Wall 5 described above, a noise wall 8 feet high would reduce noise by 6 dBA to 10 dBA at the majority of first-row residences. A noise wall in this location would be feasible and reasonable according to UDOT's noise-abatement criteria.

5.6 Water Quality Impacts

5.6.1 Surface Water

The Selected Alternative will not affect the beneficial use of any waters near or adjacent to S.R. 108 with the implementation of the water quality features identified below. The Selected Alternative could increase the amount of total dissolved solids (TDS) in receiving waters during project construction. However, the required Utah Pollutant Discharge Elimination System (UPDES) permit will include erosion-control measures such as silt fences that will reduce TDS impacts.

Mitigation Measures for Surface Water. Detention features will be provided where the capacity of the existing stormwater system is inadequate to convey the additional runoff flows or where the expected impact to the water quality of receiving waters requires flows to be detained and water treated. In addition to reducing peak levels and velocities in streams, detention ponds have the added benefit of reducing contaminant levels of total suspended solids (TSS), TDS, and the metals present in road runoff.

5.6.2 Groundwater Rights and Wells

The Selected Alternative will directly affect 34 water rights points of diversion.

Mitigation Measures for Impacts to Wells or Points of Diversion. During the final design of the project, UDOT will work with the property owner to determine the appropriate mitigation measure if a well head or other water right point of diversion is affected. Mitigation could include (1) relocating a well head or surface water diversion to continue to provide irrigation water to any land that is not acquired, or (2) abandoning the well and compensating the owner for the value of the associated water right.

5.7 Ecosystem Impacts

The Selected Alternative will affect only marginal wildlife habitat. These impacts will include the loss of some agricultural land (pasture and crops) and urbanized/disturbed land (roadways, residential, commercial, and landscaping). No threatened or endangered species are present along S.R. 108; therefore, no impacts will occur.

Under the Selected Alternative, 0.025 acre of the 0.36-acre wetland on the southwest corner of the S.R. 108/1900 West intersection will be affected. There will be no impact to the 0.05-acre wetland northeast of the Midland Drive/4800 South intersection along S.R. 108. Given that both wetlands are small and

isolated, their value to wildlife is likely minor. Some small agricultural-related ditches are adjacent to S.R. 108 and might drain to the Layton Canal and eventually to the Great Salt Lake, which is a water of the U.S., and therefore might be considered waters of the U.S. under the guidance of the U.S. Army Corps of Engineers (USACE). About 1 acre of these potentially jurisdictional ditches will be removed to accommodate the Selected Alternative.

Mitigation Measures for Ecosystem Impacts. A jurisdictional wetland determination report has been completed for the S.R. 108 project and submitted to USACE for review (Delineation of Waters of the U.S., S.R. 108 from S.R. 127 to S.R. 126, October 25, 2007, and Supplemental Delineation of Wetlands and Other Waters, S.R. 108 from S.R. 127 to S.R. 126, May 1, 2008). Prior to construction, USACE will determine the jurisdictional status of the drainage canals and isolated wetlands adjacent to S.R. 108. If the drainages are considered waters of the U.S. and the isolated wetlands are jurisdictional, then the appropriate Section 404 permit under the Clean Water Act will be obtained.

To mitigate any construction impacts to the small, isolated wetland, appropriate BMPs will be incorporated into the construction plan. Environmental fencing will be installed to prevent construction equipment impacts, and silt fencing will be installed to control sedimentation of the wetland. Any mitigation to the 0.025 acre of wetlands and the ditches parallel to the alignment will depend on the jurisdictional status and the type of permit requested as determined by USACE. However, no mitigation is anticipated for impacts to the ditches. Prior to construction, UDOT will coordinate with USACE and obtain all necessary permits and implement any required mitigation. No mitigation will be required for impacts to disturbed or urbanized land.

5.8 Historic, Archaeological, and Paleontological Impacts

The Selected Alternative will have a long-term adverse effect on 14 of the 61 architectural properties along S.R. 108 that are eligible for the National Register of Historic Places. This alternative will have no adverse effect on 40 of the 61 architectural resources.

Mitigation Measures for Historic Resources. Mitigation measures for adverse effects to historic buildings will be necessary for the Selected Alternative. The exact mitigation measures have been negotiated among FHWA, UDOT, the Utah SHPO, and interested parties through the Section 106 process of the National Historic Preservation Act. A Memorandum of Agreement has been executed between FHWA and the Utah SHPO (UDOT is an invited signatory) outlining the specific mitigation measures to be implemented for the Selected Alternative. The Memorandum of Agreement (see Chapter 14, Impacts to Historic,

Archaeological, and Paleontological Resources, and Appendix B, Determination of Eligibility and Finding of Effect and Native American Consultation, in the Final EIS) states that adverse impacts to historic properties will include a Utah State Intensive-Level Survey (ILS) in advance of construction activities. Submittals will include ILS forms and photographs according to SHPO standards.

In accordance with 36 CFR 800.13(b), UDOT and FHWA are providing for the protection, evaluation, and treatment of any historic property discovered prior to or during construction. UDOT Standard Specifications Section 01355, Part 1.13, Discovery of Historical, Archaeological, or Paleontological Objects, Features, Sites, Human Remains, or Migratory Avian Species, will be enforced during this project. This specification stipulates procedures to be followed if any archaeological, historic, or paleontological resources and/or human remains are discovered during construction of the project.

5.9 Hazardous Waste Sites Impacts

The Selected Alternative could affect about 10 potentially hazardous waste sites during construction. In addition, given the industrial and commercial land uses along parts of the existing road, there is the potential to encounter unknown hazardous waste sites.

Mitigation Measures for Hazardous Waste Sites. Measures will be implemented to prevent the spread of contamination and to limit worker exposure. Site investigations will determine the chemical hazard, if any, and the appropriate protective measures. In the case of an identified chemical hazard, the site remedy will be negotiated with the property owner prior to property acquisition and through the possible coordination with the Utah Division of Environmental Response and Remediation (DERR).

Previously unidentified sites or contamination could be encountered during construction. In such a case, all work will stop in the area of the contamination according to UDOT Standard Specifications, and the contractor will consult with UDOT and DERR to determine the appropriate remedial measures. Hazardous wastes will be handled according to UDOT Standard Specifications and the requirements and regulations of DERR.

At the time of construction, coordination will take place between UDOT and DERR, the construction contractor, and the appropriate property owners. This coordination will involve determining the status of the sites of concern, identifying newly created sites, identifying the nature and extent of remaining contamination (if any), and minimizing the risk to all parties involved. Environmental site assessments will be conducted at the sites of concern to

further evaluate the nature and extent of contamination and to better identify the potential risks of encountering hazardous waste when constructing the Selected Alternative.

5.10 Visual Impacts

The Selected Alternative will not substantially alter the general visual conditions along S.R. 108. Most changes will be due to the increased pavement width as the existing two-lane road is widened to five lanes. This change requires a larger right-of-way footprint (110 feet), which will bring S.R. 108 closer to buildings that currently line the roadway. It will also increase the visual dominance and scale of S.R. 108 as viewed from nearby locations, particularly residences, churches, businesses, and schools.

Mitigation Measures for Visual Resources. During the preliminary design of the project, several mitigation measures were considered to reduce the visual impacts of the alternatives. Additional aesthetic measures such as lighting, vegetation and plantings, and other architectural features will be considered during the final design of the Selected Alternative. Landscape plans for the roadway will include replacement landscaping to reduce impacts from the loss of vegetation.

5.11 Construction Impacts

Construction of the Selected Alternative will cause temporary construction-related impacts due to ground disturbance and the operation of construction equipment. Construction could also cause impacts to air quality, water quality, noise and vibration levels, light levels, visual resources, cultural resources, wildlife, vehicle flow (business operations), utility service, and hazardous material sites.

The nature and timing of these impacts will be related to the project's construction methods and phasing. As proposed, the improvements will be made as funding becomes available. Most construction-related impacts to the public will be associated with travel delays on local surface streets.

5.11.1 Mitigation Measures for Public Impacts due to Construction

A thorough public information program will be implemented to inform the public about construction activities and to minimize impacts. Information will include work hours and alternate routes. Construction signs will be used along the corridor to notify motorists about work activities and changes in traffic patterns.

Impacts from lights used during nighttime construction will be minimized by aiming construction lights directly at the work area and/or shielding the lights. Utility agreements will be completed to coordinate utility relocations.

5.11.2 Mitigation Measures for Air Quality Impacts due to Construction

The contractor will be required to provide the following mitigation measures to preserve air quality during construction:

- **Fugitive-Dust Control.** The contractor will maintain a fugitive-dust-control program. This program will include wetting excavation areas, unpaved parking and staging areas, and onsite stockpiles of debris, dirt, or dusty material to reduce windblown dust.
- **Street Sweeping.** The contractor will use street-sweeping equipment where needed.
- **Equipment Emissions.** The contractor will shut off construction equipment when it is not in direct use to reduce emissions from idling.

Other mitigation measures that could be implemented to minimize air quality impacts include the following:

- Use newer, cleaner-emitting construction equipment and properly maintain the equipment.
- Install control equipment on diesel construction equipment (such as particulate filters or traps, oxidizing soot filters, and oxidation catalysts) to the extent that is feasible.
- Reroute truck traffic away from schools and communities when reasonably practical.
- Consider the use of alternate engines and diesel fuels such as electric engines, engines that use liquefied or compressed natural gas, diesel engines that meet EPA 2007 regulations, diesel engines fueled with low-sulfur fuel, and diesel engines outfitted with catalyzed diesel particulate filters and fueled with low-sulfur fuel (less than 15 ppm sulfur).

5.11.3 Mitigation Measures for Water Quality Impacts due to Construction

To minimize the temporary impacts to water quality, a UPDES General Storm Water Discharge Permit will be required. As part of the requirements of the permit, the contractor will be required to develop and implement a Storm Water Pollution Prevention Plan. The plan will contain provisions for controlling the stormwater in the project area to reduce erosion and siltation.

5.11.4 Mitigation Measures for Noise Impacts due to Construction

To reduce temporary noise impacts associated with construction, the contractor will comply with all state and local regulations relating to construction noise. Measures for reducing construction noise include limiting construction in residential areas during nighttime hours, locating rock-crushing activities away from residential areas, and placing temporary barriers. Each construction area will be evaluated for the appropriate measures to use.

5.11.5 Mitigation Measures for Visual Impacts due to Construction

The contractor will prepare and implement an appropriate seeding vegetation and/or landscaping plan to restore or enhance aesthetics at the completion of the project. The contractor will also be required to maintain and keep the storage area for equipment, materials, and other accessories in a reasonable condition of cleanliness and orderly placement to avoid an unpleasant appearance. The contractor will promptly remove unused or unnecessary traffic-control equipment.

5.11.6 Mitigation Measures for Utility Service Impacts due to Construction

The project specifications will require the contractor to coordinate with the utility companies to plan work activities so that utility disruptions to a business occur when the business is closed or during off-peak times. Before beginning work, the contractor is required to contact Blue Stakes to identify the location of all utilities. The contractor will be required to use care when excavating to avoid unplanned utility disruptions. If utilities are unintentionally disrupted, UDOT will work with the contractor and the utility companies to restore service as quickly as possible.

5.11.7 Mitigation Measures for Traffic Impacts due to Construction

The contractor will be required to develop a maintenance of traffic plan that defines measures to minimize construction impacts on traffic. A general requirement of this plan is that, to the extent reasonably practical, safe access to businesses and residences must be maintained and existing roads must be kept open to traffic unless alternate routes are provided. However, prior to construction of each phase, the project team will coordinate with business and property owners to identify where temporary access can be shared and to define timeframes (such as night, for example) when access might not be needed. Signs will be placed to notify motorists where business access is provided. Finally, information will be made available to the public detailing construction activities and providing alternate transportation routes.

Even with the implementation of the maintenance of traffic plan, short-term increases in traffic congestion will occur in the vicinity of S.R. 108 construction. Street closures will be limited to what is specified in the maintenance of traffic plan as approved by UDOT before the start of construction.

5.11.8 Mitigation Measures for Economic Impacts due to Construction

Access to businesses will be maintained during the construction and post-construction phases of this project, as this is UDOT's policy with respect to access issues on all UDOT roadway improvement projects. For each phase of the project, the project team will coordinate with property owners and businesses to evaluate ways to maintain access while still allowing efficient construction operations. This could entail sharing temporary access or identifying acceptable timeframes when access might not be needed. Adequate signage will be placed in construction areas to direct motorists to businesses and industrial areas. Other potential mitigation measures for construction impacts include:

- Provide a frequent newsletter to all businesses along S.R. 108 describing the progress of the construction and upcoming construction events.
- Provide business access signs along S.R. 108 that identify business access points within the construction limits.
- Hold a monthly meeting with business owners to inform them of upcoming construction activities and to provide a forum for the businesses to express their concerns with the project.
- To minimize noise and light impacts at night, conduct major construction activities in residential areas during the day.

5.11.9 Mitigation Measures for Hazardous Materials Impacts due to Construction

To minimize the risk of exposure to hazardous materials, the UDOT project team will coordinate with DERR, the construction contractor, and the appropriate property owners. This coordination will involve determining the status of the sites of concern, identifying newly created sites, identifying the nature and extent of remaining contamination (if any), and minimizing the risk to all parties involved.

Measures will be implemented to prevent the spread of contamination and to limit worker exposure. Site investigations will determine the chemical hazard, if any, and the appropriate protection measures. In the case of an identified chemical hazard, the site remedy will be negotiated through coordination with DERR.

Previously unidentified sites or contamination could be encountered during construction. In such a case, all work will stop in the area of the contamination according to UDOT Standard Specifications, and the contractor will consult with UDOT and DERR to determine the appropriate remedial measures. Hazardous wastes will be handled according to UDOT Standard Specifications and the requirements and regulations of the Utah Department of Environmental Quality.

5.11.10 Mitigation Measures for Construction Staging and Material Borrow Areas

Earth-disturbing activities are generally confined to the limits of cut and fill, although staging areas and some construction activity might be located outside the limits of cut and fill. Any staging areas or construction fill material areas will need to be coordinated with UDOT to ensure that no sensitive environmental resources are affected. The contractor will limit impacts and restore any disturbed vegetation or other improvements within the selected staging areas. The contractor will need to comply with UDOT Standard Specification 01355 Section 1.12 (Environmental Protection, Environmental Clearances by the Contractor) regarding construction staging areas.

5.11.11 Mitigation Measures for Invasive Species Impacts due to Construction

To mitigate the possible introduction of invasive weeds due to construction activities, the invasive weed BMPs in UDOT's current Standard Specifications for Road and Bridge Construction will be implemented and monitored and included in the plans and specifications for the project.

- The contractor will be required to follow the noxious weed mitigation and control measures identified in UDOT Standard Specifications for Invasive Weed Control.
- Strictly following BMPs will also reduce the potential for weed infestations.
- Reseeding with native plants, followed by monitoring seedlings and invasive species until the vegetation has re-established, will mitigate direct-disturbance impacts and reduce the potential for weed invasions. UDOT will be responsible for monitoring and determining when vegetation becomes re-established.

5.12 Permits, Certifications, and Approvals (Chapter 4 of the Final EIS)

The permits and certifications required for the Selected Alternative include a Section 404 permit granted by USACE, a Section 401 Certification granted by the Utah Division of Water Quality, a Section 402 Permit (UPDES) granted by the Utah Division of Water Quality, an Air Quality Approval Order granted by the Utah Division of Air Quality, and a Water Rights Permit from the Utah Division of Water Resources. Additional permit requirements are discussed in Section 4.23, Permits and Clearances, of the Final EIS.

6.0 Monitoring and Enforcement Program

This Record of Decision represents a commitment to monitor and enforce the measures described above to minimize harm to the surrounding environment. All of the mitigation measures listed above and identified in the Final EIS will be incorporated into the contract(s), plan(s), and specifications and will be monitored according to the construction/post-construction monitoring plans. Enforcement of the contract provisions and monitoring of the project is the responsibility of the selected UDOT Project Manager.

7.0 Statute of Limitations

FHWA will publish a notice in the Federal Register, pursuant to 23 U.S.C. 139(1), indicating that one or more federal agencies have taken final action on permits, licenses, or approvals for this transportation project. After the notice is published, claims seeking judicial review of those federal agency actions will be barred unless such claims are filed within 180 days after the publication date of the notice, or within such shorter time period as is specified in the federal laws pursuant to which judicial review of the federal action is allowed.

8.0 Final EIS Comments and Responses

Notice of release of the Final EIS was published in the Federal Register on September 5, 2008, and the end of the wait period was October 6, 2008. The Final EIS was distributed to federal, state, regional, and local agencies as well as the public. In addition, copies were placed in local libraries for review by the general public. A notice of availability of the Final EIS was placed in local and regional newspapers and on the project's Web site.

Exhibit 8-1 below lists the agency and public comments provided on the Final EIS during the 31-day wait period along with FHWA's responses.

Exhibit 8-1: S.R. 108 Final EIS Response to Comments

Commenter	Comment	Response
Kate Johnson, Environmental Program Manager, Utah Division of Drinking Water	I appreciate the opportunity to review the EIS for the S.R. 108 project. As you can see from the attached map, there are numerous public drinking water sources and associated protection zones in the area of this project, and we would ask that due consideration be given to coordinating any activities that could be to the detriment of these water supplies with the adjacent cities. Thank you.	Section 3.11.3.2, Groundwater Rights, of the Final EIS describes and shows proposed wells along S.R. 108. The project team reviewed the map that was provided with the comment against the data in the Final EIS, and all of the water sources and associated protection zones along the project were included in the analysis. The Selected Alternative is located about 478 feet east of and up-gradient of the Hooper Water Improvement District's Well #1 and outside of drinking water protection Zone 1 for this well (a 150-foot radius around the well head). No other drinking water wells are within about 0.25 mile of the Selected Alternative or are down-gradient of the alternative. In addition, the source of drinking water in these wells is the deep aquifer, which would not be affected by runoff from the Selected Alternative. UDOT has coordinated on the location of the roadway with the cities along S.R. 108 regarding potential impacts to drinking water infrastructure and will continue the dialogue as the project moves forward.
Russell Kofoed	One question: with the reduced scope will you still need to buy any houses in the Syracuse area? I don't live on 2000 [West] but will be asked by those that do.	This Record of Decision approves the full build-out of the Selected Alternative as evaluated in the Final EIS. However, because funding is not yet available to construct the complete project, UDOT will make interim improvements within the scope of the Final EIS to improve safety and reduce congestion as current funding allows. Currently, UDOT anticipates that the interim improvements will include widening the existing two-lane road to three lanes and making intersection improvements such as adding right-turn lanes. UDOT anticipates that the full project will be completed as described in this Record of Decision well before 2035. Under the interim improvements, UDOT does not plan to take homes along the roadway, although narrow strips of property could be purchased.
Jan M. Zogmaister, Weber County Commissioner	I appreciate the update. With the funding reduction, I am not in support of continuing the five-lane plan and going to 800 North due to the fact that this will not provide any relief for the Weber County section of S.R. 108 for many years. The congestion does not stop in Davis County. I strongly support UDOT in the plan for the continuous center left lane and right-turn lanes for the entire length of the S.R. 108 project. This is the only way Weber County will receive any relief within an acceptable amount of time.	Thank your for your comment. UDOT's interim project will look at providing three lanes for the entire project length and making intersection improvements.

Commenter	Comment	Response
James Brinkerhoff	So where will the three lanes be? Will they follow the existing road or will they be in the center area of the contemplated road? It looks like the reduction in scope will be the best for everybody except those that live on the road. When this three lanes with left-turn lanes has been around for 8 to 10 years, you can be sure that the property will be worth a whole lot less than it is now. So I say take it from where Clinton left it, make it the same size as the Clinton addition, and go both ways until you run out of money. Like do it right the first time. If UDOT changes its mind now, when can we ever be sure what they will do next? Do we get to go over their decision in a meeting now?	UDOT anticipates the initial build to be three lanes consisting of two travel lanes and a center turn lane. UDOT will try to keep the project impacts within the existing right-of-way to limit property impacts. Therefore, the improvements will be in the center of the existing road for most of the project. At this time, UDOT does not plan to have another meeting as part of the environmental process.
Greg Moffitt	I hope this reaches the right person or people for the widening of S.R. 108. As a man in his fifties, I would like to see sidewalks utilized on both sides of the street as well the installation of bike lanes as I'm now enjoying the habit of riding. Thanks for listening.	This Record of Decision approves the full build-out of the Selected Alternative as evaluated in the Final EIS. However, because funding is not yet available to construct the complete project, UDOT will make interim improvements within the scope of the Final EIS to improve safety and reduce congestion as current funding allows. Currently, UDOT anticipates that the interim improvements will include widening the existing two-lane road to three lanes and making intersection improvements such as adding right-turn lanes. UDOT anticipates that the full project, which will include sidewalks and bicycle lanes, will be completed as described in this Record of Decision well before 2035. Under the interim improvements, no sidewalk improvements would be made. However, in some locations, the shoulders would be slightly wider to better accommodate bicyclists.
Michael Andreasen	I live adjacent to S.R. 108 in Syracuse on 1175 South. I was told yesterday (Sunday) that a decision has been made that the homes on the west side through the Syracuse corridor would not be taken out to widen the road. I was also informed the road would only be widened to accommodate a left-hand turn lane in each direction, a right-hand turn lane in each direction along with the regular traffic lane in each direction. Can you comment on these new developments? It would be greatly appreciated.	This Record of Decision approves the full build-out of the Selected Alternative as evaluated in the Final EIS. However, because funding is not yet available to construct the complete project, UDOT will make interim improvements within the scope of the Final EIS to improve safety and reduce congestion as current funding allows. Currently, UDOT anticipates that the interim improvements will include widening the existing two-lane road to three lanes and making intersection improvements such as adding right-turn lanes. UDOT anticipates that the full project will be completed as described in this Record of Decision well before 2035.
Robert Freeman	Does a three-lane road include parking, gutter, and sidewalk similar to the new Clinton improvements? And, if so, how can this be done without additional right-of-way acquisition?	The interim build of three lanes does not include sidewalks, curb, and gutter, although short, isolated sections of sidewalk or curb and gutter might be replaced. The roadway widening will focus on providing a center turn lane for the entire corridor, and right-turn lanes will also be

Commenter	Comment	Response
		added where needed. To accommodate these improvements, narrow strips of property might need to be purchased.

Commenter	Comment	Response
Brody Crosson	So does that mean they are going to go ahead with the Antelope [Drive] to 800 North thing and the remaining 6.5 miles just add a turn lane, or just add a turn lane the whole way?	This Record of Decision approves the full build-out of the Selected Alternative as evaluated in the Final EIS. However, because funding is not yet available to construct the complete project, UDOT will make interim improvements within the scope of the Final EIS to improve safety and reduce congestion as current funding allows. The interim plan is for three lanes for the entire corridor (one travel lane in each direction and a center turn lane where one does not currently exist). Right-turn lanes will also be added where needed. The full build-out between Antelope Drive and 800 North will be done in the future when funding becomes available.
Lee Stone	I have reviewed the proposed routing of S.R. 108 through my area of Syracuse and find it to be very distressing. First off, there is not room for the proposed five lanes + bicycle lanes + park strips and maintain[ing] the lifestyle of the community. Second, the vast majority of the area to be taken is from the west-side properties (of which I'm one) and leaves no room to even park in my driveway. Parking problems aside, you are destroying any value my property may have and any possibility of selling it in the future. Third, you have overestimated the growth that will occur in the area. I have been here for 20 years and have seen tremendous growth but am unconvinced that the level of growth will continue even if the economy improves. The alternative of TSM, Transit Only, and Three Lanes should suffice for this thoroughfare. Making it larger encourages higher use by individuals who could well use alternative routes to distribute the congestion. Fourth, by making the 2000 West road so large you encourage speeding through that area, making it less safe (not more) for pedestrians and students at the elementary and high schools in that area. You are turning it into a highway. My preference then would be the Three Lane, TSM, Transit Only alternative out of the choices you've outlined.	This Record of Decision approves the full build-out of the Selected Alternative as evaluated in the Final EIS. Section 4.3.2.2, Quality of Life, in the EIS analyzed changes to the community from the proposed project. Based on public input and community surveys, the majority of residents felt that the project would not substantially alter the quality of life in the area. If your property is affected by the project, UDOT must follow a step-by-step process. Property acquisitions, both partial and total, will be made according to federal guidelines and UDOT policies that include fair compensation measures for property owners. The growth numbers used in the EIS process were developed by the Governor's Office of Planning and Budget and are the official population and household projections used in planning efforts. These growth numbers are reviewed by the cities before being approved. The alternative of TSM, Transit Only, and Three Lanes was considered in the EIS. However, the alternative was eliminated from detailed consideration because it would not meet the project screening criterion of providing a level of service of LOS D on S.R. 108 in 2035.
Wade Draper	My warranty deed does not have any road or easements of right-of-way on it. I understand there is a document from way back in 1894 which did say the road would be opened to 4 rods wide and maintained. This roadway was never opened to 4 rods wide or maintained to 4 rods wide. The road right-of-way is only as wide as the road is today. None of your impact statements have addressed this that I am aware of. Please address this for me. How many more people['s] warranty deeds are like mine? When can I expect to have someone contact me to buy enough ground so UDOT can widen the road to three lanes wide in front of my place?	The existing right-of-way width near your home is 66 feet, or 4 rods. As you have pointed out, this width was established long ago in anticipation of needing a wider road in the future. This is very common throughout the state and was done to minimize impacts to homes when future expansion was needed. The EIS has determined that there is a need to widen the road to a five-lane cross-section. However, due to lack of funding, this expansion is presently limited to a three-lane cross-section, meaning one travel lane in each direction with a center turn lane. By providing the center turn lane now, UDOT can significantly reduce congestion and increase safety until enough

Commenter	Comment	Response
		funding is provided for the full build-out, which could be several years. UDOT does not anticipate needing to purchase right-of-way to add this center turn lane. However, as the design progresses over the next few months, if UDOT finds that some strips of right-of-way are needed, they will contact the property owners at that time.

Commenter	Comment	Response
John Wallace	My name is John D. Wallace, and I own the home at 4552 Midland Dr. Personal circumstances require that we sell the home at this time, and we put the home on the market Aug 1. We have had two offers, both of which backed out because I was unable to tell them exactly what is going to happen in front of our home. The problem is that Midland Dr. is some 2 feet higher in elevation than my garage floor, and I don't understand how you can widen Midland Dr. towards my house (south) without lowering the elevation of Midland; otherwise, the grade drop onto my driveway would be extreme. I have attended two of your public meetings during the last year or so, and your engineers were unable to answer my question. Can you help me out here?? We have already moved and I must sell our very desirable home. You can e-mail me at johnw@networld.com, or call at (801) 731-6265, or of course mail 4552 Midland Dr., Roy, UT 84067-9506. I hope to hear from you soon. Thank you.	After the Record of Decision is approved, UDOT will start the final design process. During this process, UDOT will determine how the proposed improvements will tie into existing access points along S.R. 108. The preliminary design at this location shows that the driveway could be graded to a 5% slope, which meets applicable standards. During the final design process, this profile of the road will be optimized to best fit the surrounding development.
Greg Moffitt	I live at 3750 Midland Dr. in County Meadows mobile-home park. It is difficult to turn into the park coming from the north and I'm sure that a continuous left-turn lane will help greatly. My question is this: will there be a middle or merging lane turning out of Country Meadows heading south on S.R. 108 in the three-lane configuration?	The project includes a center turn lane that can be used for left turns into the mobile home park or for merging into traffic when turning out of the mobile-home park.
Lorraine Barber	I reside at 734 North 2000 West in West Point... I have been patient as all of the road studies have been completed and we have been pleased with the results even though we will lose our home of 25 years. However I am very frustrated that now that the road plans and study have finally been completed and approved, you are hesitating to follow through. We have put off so many upgrades to our home or put them on hold knowing that the house would be torn down, and then out of concern of money for the whole project, you are considering the center lane option. I wait in my driveway for up to 8 minutes in the afternoon as traffic rolls north to Clinton. I wait in the morning for 5–8 minutes to go south from my house. Yet few are turning off the road, and they are all heading somewhere. We feel that it is time to move forward with the plan. Purchase our houses so we can move forward in our lives and the traffic can flow as needed. If you can only complete to 800 North, then do that much and begin the money requests for the next section. The work on the roads in Clinton could help to make it through until more funding is found. We realize times are changing and improvement is needed.	The EIS was based on an S.R. 108 transportation solution for the year 2035. Based on expected travel demand, the road will need to be five lanes as identified in the EIS. Unfortunately, the funding approved by the Utah Transportation Commission ($70 million) for the project isn't enough to widen the corridor to five lanes (about $178 million). Due to the lack of funding, the initial improvement will likely be limited to a three-lane cross-section for the entire project length, meaning one travel lane in each direction with a center turn lane. By providing the center turn lane now, UDOT can significantly reduce congestion and increase safety until enough funding is provided for the full build-out, which could be several years. This approach uses the current funding to provide immediate congestion relief and safety improvements to the entire corridor. UDOT did consider making the five-lane improvement one section at a time but determined that this could increase congestion on the sections that are not yet improved. Based on an evaluation of traffic, UDOT determined that an initial three-lane road for the entire project length would acceptably reduce congestion. UDOT will try to keep the impacts of the initial three-lane project within the existing right-of-

Commenter	Comment	Response
	We have already gotten over that. We are ready to move on and ask that you please consider moving forward section by section to complete this project and make things better for the residents and the traffic.	way in order to limit property impacts.

Commenter	Comment	Response
Nancy Gehring	We are interested in an early acquisition of our property and would appreciate notification or information to achieve this. Concerning the four-lane approach, when will a map or information be available on specific impacts on our property?	This Record of Decision approves the full build-out of the Selected Alternative as evaluated in the Final EIS. However, because funding is not yet available to construct the complete project, UDOT will make interim improvements within the scope of the Final EIS to improve safety and reduce congestion as current funding allows. Currently, UDOT anticipates that the interim improvements will include widening the existing two-lane road to three lanes and making intersection improvements such as adding right-turn lanes. UDOT anticipates that the full project will be completed as described in this Record of Decision well before 2035. Under the interim improvements, UDOT does not plan to take homes along the roadway, although narrow strips of property could be purchased. As the design progresses over the next few months, if UDOT finds that some strips of right-of-way are needed, they will contact the property owners at that time.
Clysta Day	One question I have: is the latest that they are going to put in the turn lanes then?	This Record of Decision approves the full build-out of the Selected Alternative as evaluated in the Final EIS. However, because funding is not yet available to construct the complete project, UDOT will make interim improvements within the scope of the Final EIS to improve safety and reduce congestion as current funding allows. Currently, UDOT anticipates that the interim improvements will include widening the existing two-lane road to three lanes and making intersection improvements such as adding right-turn lanes. UDOT anticipates that the full project will be completed as described in this Record of Decision well before 2035.
Larry G. Moore, Ray Quinney & Nebeker	As I indicated in my telephone message, our firm represents the related owners (Crouch Family Investments LC, Bruce A. Crouch, Triple Stop) of the 13 contiguous parcels of commercial property on the northwest corner of 3500 West and 4800 South in Roy, Utah. The property closest to the intersection is operated as an integrated and compl[e]mentary convenience store with gasoline pumps and related automatic and self-serve car washes. The proposed widening of the subject road would take away not only critical access points for these properties but the ability to sell gas, which in turn makes the convenience store and related car washes successful. By taking the property used for gasoline sales and access, the severance damages will be very substantial in that very few convenience stores can operate successfully without the ability to sell gas. In addition, a substantial portion of the car wash business derives from customers	UDOT has reviewed your comments and concerns regarding the Crouch Family Investments and the impacts the proposed S.R. 108 Selected Alternative would have on the property. Please note that, since funding is not yet available to construct the complete five-lane project, UDOT will make interim improvements, a process that is within the scope of the Final EIS. These improvements are designed to enhance safety and reduce congestion as current funding allows. The interim plan includes widening the existing two-lane road to three lanes (one travel lane in each direction with a continuous center turn lane) and making intersection improvements such as adding right-turn lanes. The interim improvements should have minor impacts to the property, and most of the improvements are expected to be constructed within UDOT's existing right-of-way. UDOT does not plan to purchase any parcels as part of the interim project.

Commenter	Comment	Response
	who have purchased gasoline. Both alternatives of the proposed widening and realignment of State Road 108 (Midland Drive) will severely impact our client's properties. In particular, they eliminate the east fueling canopies, drive-thru access, and access curb cuts for the convenience store as well as taking much of the car lot property and related access points. Not only will our client be damaged by the loss of the value of the specific property taken and the loss of access points, because of the loss of the fueling canopies and access drives for the Triple Stop, it is doubtful that property could continue to function in a profitable manner, since the sale of gasoline is critical to the success of the convenience store business and to the car wash. In other words, our client will suffer substantial "severance" damages and lost revenues from its businesses if UDOT proceeds with either of the planned alternatives. Our client has received written offers to purchase just the convenience store property for amounts in excess of $1,400,000. With regard to the first offer, as soon as the prospective buyer discovered the potential widening of this road and the attendant loss of property, the offer was withdrawn. Our client is reluctant to pursue the second or any other offers until we are able to definitively ascertain the impact of realignment on this property. We hereby request a meeting with you at UDOT to discuss the road widening at this critical intersection and to consider other avenues for the widening of this road. We are available to meet almost any day at any time. Please call me at your earliest convenience to set a meeting time. We also want to make sure that UDOT is fully aware of the substantial direct, consequential, and severance damages that our clients will suffer from the taking by UDOT. As indicated previously, our client has spent a lifetime building successful businesses at this intersection which have a synergy with each other. UDOT's proposed plans will severely damage those business interests, far beyond the value of the property actually taken.	FHWA has approved the five-lane cross-section evaluated in the Final EIS. This five-lane cross-section could be built sometime in the future when or if funds become available, and the five-lane cross-section ultimately would require right-of-way acquisition as shown in the Selected Alternative preliminary drawings. As part of the overall EIS process, UDOT presented and discussed the impacts of the Selected Alternative with property owners during several public meetings and explained the design for the proposed alignment through the 3500 West and 4800 South intersection in Roy. Provided below are more details about why a five-lane alternative was selected and how the design was developed through the intersection. A range of alternatives to consider in the EIS was developed through the National Environmental Policy Act (NEPA) public and agency involvement process. Eight initial alternatives were developed during the scoping phase of the project. These alternatives included taking no action as well as various action alternatives including transit only; transportation system management; three lanes; a combination of transit only, transportation system management, and three lanes; five lanes; seven lanes; and improving other roads. These initial alternatives were put through a two-step screening process to determine which alternatives would be carried forward for detailed study. Level 1 screening was performed on the eight initial alternatives. If an alternative did not meet all three elements of the project's purpose, it was not carried forward for detailed analysis. Alternatives that were considered and eliminated are described in Section 2.1, Alternative Development Process, of the Final EIS. There was no initial alternative or combination of the initial alternatives, other than the Five-Lane Alternative, that would meet all of the project's purpose while avoiding the excessive impacts of the Seven-Lane Alternative. Therefore, only the Five-Lane Alternative was carried forward for detailed study. UDOT will continue to coordinate with property owners during the final design phase regarding impacts to their property and will look at potential design changes to reduce impacts within the scope of analysis in the Final EIS.
Reed Grundy	I live very near Hwy 108 and have the following comments: I was on the citizen advisory group. My complaints are these: it took forever to complete, seems there are too many projects going on at one time and not enough people and $ to go around. UDOT should consider less going on at one time and devote more to each project to	The recent improvements mentioned in the comment are part of an S.R. 108 project implemented by the City of Clinton and not the S.R. 108 project being considered by UDOT and FHWA and evaluated in the EIS. This project would consist of widening S.R. 108 to five lanes and would include sidewalks, curb, and gutter. However, because

Commenter	Comment	Response
	complete them in a timely manner. From the initial meeting with all of the photos of the entire highway, I assumed there was to be [a] wider, curbed and guttered roadway from one end to the other. That has not happened. It is also left too narrow in several places. Also the curb and gutter ends [at] approximately 1100 North and leaves an area on the east side that you continue to patch when it is dry but no one sees it when it rains or snows. It becomes a large puddle that everyone tries to dodge and causes a traffic hazard. This needs to be fixed before you can consider the project complete. It is on the east side about halfway between the corner of 800 North. The dirt to the east of it is much higher so the water flows to the low spot and accumulates there. I would be happy to point this area of problem out to one of your people at any time you have someone in the area.	funding is not yet available to construct the complete project, UDOT will make interim improvements within the scope of the Final EIS to improve safety and reduce congestion as current funding allows. Currently, UDOT anticipates that the interim improvements will include widening the existing two-lane road to three lanes and making intersection improvements such as adding right-turn lanes.
Steve and Belinda Nebeker	This is about the S.R. 108 [project] and we are one of them who will be losing our home. We have been dealing with this for the past four or five years, and now you are telling us that we have to wait another eight to ten years. In addition, you are going to put us through making this a three lane. I feel that when it goes to three lanes we will lose part of our front yard and that will destroy our property value. You cannot say it will not hurt the value of our house. Then we will have to suffer through all of the construction and have to deal with all of that. You say 70 million dollars will not make it to 800 North but you have 90 million dollars (20 million dollars left from the Antelope [Drive] project) and you could go to at least 800 North if not all the way to 1300 North. All I want you to do is buy my house so I can move on with my life. I tried for the early buy-out but I did not qualify because I do not have a health problem or a child that has a health problem or handicapped and we don't have a job that requires a relocation. All I have is mental stress from being in limbo, that you may not consider as a major health problem but it is affecting my family and me. What I really hate the most is that when I first heard about the S.R. 108 project I was extremely mad, saying I will never let them take my house. Then I was okay with it and excited about moving on with my life. Now that you are saying I will have to wait another eight or ten years I am back to being mad. When I don't want you to take my house you say you're going to take it, and now that I want out you are saying I am stuck here for another eight to ten years. I think you should buy out all the houses that you planned on taking and then rent them out to make more money for future projects or	The EIS was based on an S.R. 108 transportation solution for the year 2035. Based on expected travel demand, the road will need to be five lanes as identified in the EIS. Unfortunately, the funding approved by the Utah Transportation Commission ($70 million) for the project isn't enough to widen the corridor to five lanes (about $178 million). Due to the lack of funding, the initial improvement will likely be limited to a three-lane cross-section for the entire project length, meaning one travel lane in each direction with a center turn lane. By providing the center turn lane now, UDOT can significantly reduce congestion and increase safety until enough funding is provided for the full build-out, which could be several years. An important change to be aware of is that UDOT does not plan to buy any houses for the three-lane plan. UDOT expects that most of the work can be done within the existing right-of-way. However, as the design progresses over the next few months, if UDOT finds that some strips of right-of-way are needed, they will contact the property owners at that time. We do not anticipate that UDOT will need to do early acquisition of homes for the interim (three-lane) improvements.

Commenter	Comment	Response
	rent them to lower-income families that are struggling financially or families that face the risk of foreclosure. On the other hand, you could take our house off the books so we can put it up for sale and move if we choose to. However, if you plan on leaving us in limbo for the next decade, that is just wrong. I would also like to know how it is cost-effective to have the power company move all the power poles to make S.R. 108 a three-lane road and then move them again to make it a five-lane highway? That is just a waste of time and money to make them do it twice. Why did I receive an e-mail from Darla's office that said they are still on track to obtain properties and start the road construction in the fall of 2009? Going to a three-lane highway is not going to help with the traffic on this road; there are more and more people using this road to commute. This area is growing rapidly, and a three-lane highway will not be suitable for traffic that S.R. 108 has received in the past three years. There are several places that you have already wasted money. The new Syracuse High School is going to move the sidewalk and grass patch to make room for the five-lane road. Then there is the area by the Clinton Wal-Mart where they widened the road but they could have taken it to the full five lanes from the beginning and saved millions of our tax dollars. Twenty years ago, I had to get approval from the State to put gravel in the front of my house. Why can't you make these people do the job right the first time? After all, you are the STATE! If you say they are the City and you don't control them, then how is it that you can say let's make it a three-lane road, when West Point City has a law on the books that says if you live on a main road you must have 40 feet from the front of your house to the start of the road? If you go to a three-lane road, I will not have 40 feet between my house and the road. I would like to know, if it does go to a three-lane road, what side of the road would you obtain property from, the east or west? I would like to know what I could do to have the State of Utah buy me out of my house. Therefore, I can move along with my life and not have to deal with this mental stress from being in limbo.	
Larry Svoboda, U.S. Environmental Protection Agency	EPA has reviewed your responses to our DEIS comments and we are generally satisfied that our concerns regarding impacts from construction emissions on sensitive receptors such as schools and nursing homes in the area have been addressed. The responses also adequately address comments regarding air and water quality impacts. However, please note that EPA and FHWA have been	Thank you for the comment. FHWA will continue to work with EPA regarding language for Mobile Source Air Toxic risks, impacts , and mitigation measures to include in future EISs.

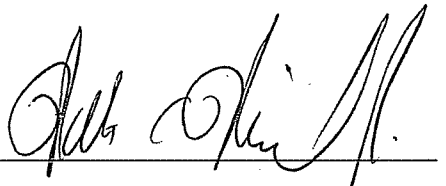
Commenter	Comment	Response
	negotiating language for Mobile Source Air Toxic risks, impacts, and mitigation measures for some time and there is not yet agreed-upon language for inclusion in this FEIS.	

9.0 Conclusion

FHWA has determined that the Selected Alternative (the Minimize 4(f) Impacts Alternative) best meets the transportation needs for the traveling public while effectively considering environmental, safety, and socioeconomic factors. This decision is based on the Final EIS and the entire project record.

In reaching our decision, FHWA has considered all of the issues raised in the record including the information contained in (and comments to) the Draft and Final EISs. The Selected Alternative was developed through a public process that included project adjustments to avoid and minimize environmental impacts. FHWA consulted with other federal and state agencies including the U.S. Fish and Wildlife Service, the U.S. Environmental Protection Agency, the U.S. Army Corps of Engineers, the Utah Department of Environmental Quality, the Utah Department of Natural Resources, the Utah Division of Wildlife Resources, the Utah State Historic Preservation Office, the Advisory Council on Historic Preservation, and Native American tribes. A full list of interagency coordination is included in the Final EIS.

Based on the analysis and evaluation in the Final EIS and after careful consideration of the social, economic, and environmental factors and input from the public involvement process, FHWA approves the selection of the Minimize 4(f) Impacts Alternative for the project.

Date: 10/29/08 Signed by: 

Division Administrator

Federal Highway Administration

Appendix A – S.R. 108 Mitigation Commitments

Exhibit A-1 provides a summary of the mitigation commitments for the construction and operation of S.R. 108.

Exhibit A-1: Summary of Mitigation Measures

Environmental Component	Mitigation Location	Mitigation Measures
Farmland	All project areas	Acquire farmland right-of-way in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (URAA), as amended.
Community	All project areas	**Public Health and Safety:** Ensure that the locations of any raised medians will (1) not interfere with emergency service providers' ability to respond to emergencies and (2) allow for safe pedestrian crossing(s) near schools and busy commercial centers. Coordinate modifications with schools to ensure that roadway improvements maintain student safety at crossings. Take appropriate measures to maintain student safety near construction sites. **Relocation:** Acquire right-of-way in accordance with the URAA, as amended. **Utility:** Notify businesses and residents of any necessary loss of service and follow the Accommodation of Utilities and the Control and Protection of State Highway Rights-of-Way, Utah Administrative Code Rule 930-6 (UDOT).
Economic	All project areas	Relocate acquired businesses according to the URAA, as amended; Title VI of the Civil Rights Act of 1964; and 49 CFR 24, Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs.
Air Quality and Transportation Conformity	All project areas	For PM_{10} mitigation, minimize construction emissions and non-tailpipe operational emissions through a variety of best management practices (BMPs).
Noise	Segment 8	**Wall 1:** Located on the southeast side of Karol's Mobile Estates, 550 feet long and 16 feet high; would reduce noise by 4 dBA to 12 dBA. **Wall 2:** Located on the northeast side of Karol's Mobile Estates, 300 feet long and 12 to 18 feet high; would reduce noise by up to 6 dBA. **Wall 3:** Located on the south end of the Country Meadows Estates, 400 feet long and 12 to 18 feet high; would

Environmental Component	Mitigation Location	Mitigation Measures
	Segment 9	reduce noise by 9 dBA to 12 dBA. **Wall 4:** Located on the north end of the Country Meadows Estates, 425 feet long and 12 to 18 feet high; would reduce noise by 7 dBA to 13 dBA. **Wall 5:** Located adjacent to the new townhome development on the south side of the alignment, 360 feet long and 8 feet high; would reduce noise by 5 dBA to 9 dBA. **Wall 6:** Located on the south side of the alignment adjacent to the new townhome development, 950 feet long and 8 feet high; would reduce noise by 6 dBA to 10 dBA.
Water Quality	All project areas	**Surface Water:** Provide detention features where the capacity of the existing stormwater system is inadequate to convey the additional runoff flows or where the expected impact to the receiving water quality requires detention and treatment. **Groundwater Rights and Wells:** Work with property owner(s) to determine appropriate mitigation for any affected well head(s) or water right point(s) of diversion. Mitigation could include relocating well heads, diverting surface water, abandoning wells, or compensating the owner for the value of the water right.
Ecosystem	All project areas	Determine jurisdictional status of the drainage canals and isolated wetlands adjacent to S.R. 108; obtain Section 404 permit if appropriate under the Clean Water Act. Incorporate appropriate BMPs into the construction plan if there are impacts to the wetland; install environmental and silt fencing. Obtain all necessary permits and implement any required mitigation prior to construction. Wetland mitigation depends on jurisdictional status. No mitigation planned for ditches.
Historic, Archaeological, and Paleontological Resources	All project areas	A Memorandum of Agreement has been executed between FHWA and the Utah SHPO which specific mitigation measures to be implemented; it states that adverse impacts to historic properties will include a Utah State Intensive-Level Survey (ILS) before construction activities. In accordance with 36 CFR 800.13(b), provide for the protection, evaluation, and treatment of any historic property discovered prior to or during construction. Enforce Standard Specifications Section 01355, Part 1.13, Discovery of Historical, Archaeological, or Paleontological Objects, Features, Sites, Human Remains, or Migratory Avian Species.
Hazardous Waste	All project areas	Take measures to prevent the spread of contamination and limit worker exposure. Determine chemical hazard, if any, and take appropriate protective measures on site. If there is an identified chemical hazard, negotiate with the property owner prior to property acquisition and through the possible coordination with the Utah Division of Environmental Response and Remediation (DERR). If a previously unidentified site or contamination is encountered, stop all work in the contamination area. Contractor to consult with UDOT and DERR to determine appropriate remedial measures. Handle hazardous

Environmental Component	Mitigation Location	Mitigation Measures
		wastes in accordance with UDOT Standard Specifications and the regulations of DERR. During construction, coordinate between UDOT, DERR, construction contractor and property owners. Determine status of sites of concern, identify new sites, identify nature and extent of remaining contamination, and minimize risk to all parties. Identify potential risks through environmental site assessments.
Visual Resources	All project areas	Reduce visual impacts of the alternative. Consider aesthetic measures such as lighting, vegetation and plantings, and other architectural features during the final design. Include replacement landscaping in plans.
Construction	All project areas	**Public Impacts:** Implement thorough public information program to inform the public about construction activities and to minimize impacts. Mitigation measures will include information about work hours and alternate routes, construction signs to notify motorists of conditions, aiming lights directly at construction site during nighttime, and agreements to coordinate utility relocations. **Air Quality:** Require contractor to provide mitigation measures associated with maintaining a fugitive-dust-control program, street sweeping, and reducing equipment emissions. Other measures to consider include using newer, cleaner-emitting equipment; installing control equipment on diesel construction equipment; rerouting truck traffic away from schools and communities when reasonably practical; and considering the use of alternate engines and diesel fuels. **Water Quality:** Require a UPDES General Storm Water Discharge Permit. **Noise:** Comply with all state and local regulations relating to construction noise. Evaluate each construction area for the most appropriate measures to be taken. **Visual:** Prepare and implement an appropriate seeding vegetation and/or landscaping plan; maintain and keep a storage area in a reasonable condition of cleanliness and orderliness; and promptly remove unused or unnecessary equipment. **Utility Service:** Coordinate with utility companies to plan work activities so that utility disruptions to a business occur during closed or off-peak operational hours. Require contractor to contact Blue Stakes before beginning work to identify utility locations. Use care when excavating to avoid utility disruptions. Restore any disrupted utilities as quickly as possible. **Traffic:** Require contractor to develop a traffic plan that defines measures to minimize construction impacts on traffic with the general requirement that safe access to residences and businesses remains intact and existing roads are kept open to the extent practicable. Construction information will be communicated to the public. **Economic:** Maintain access to businesses during construction and post-construction phases of the project, coordinate with property owners to maintain access, place adequate signage to direct motorists, and consider further mitigation measures (provide a newsletter, place signs to identify business access, hold monthly meetings with business owners, and minimize noise and light impacts at night). **Hazardous Materials:** Take measures to prevent the spread of contamination and limit worker exposure. Determine chemical hazard, if any, and take appropriate protective measures on site. If there is an identified

Environmental Component	Mitigation Location	Mitigation Measures
		chemical hazard, negotiate with the property owner prior to property acquisition and through possible coordination with DERR. If a previously unidentified site or contamination is encountered, stop all work in the contamination area. Require contractor to consult with UDOT and DERR to determine appropriate remedial measures. Handle hazardous wastes in accordance with UDOT Standard Specifications and the regulations of DERR. During construction, coordinate between UDOT, DERR, construction contractor and property owners. Determine status of sites of concern, identify new sites, identify nature and extent of remaining contamination, and minimize risk to all parties. Identify potential risks through environmental site assessments. **Construction Staging:** Coordinate any necessary staging areas with UDOT to ensure that no sensitive environmental resources are affected. Require contractor to limit impacts and restore any disturbed vegetation or environment. **Invasive Species:** Implement and monitor UDOT's current Standard Specifications for Road and Bridge Construction.

Chapter S: Summary

S.1 Description of Proposed Action

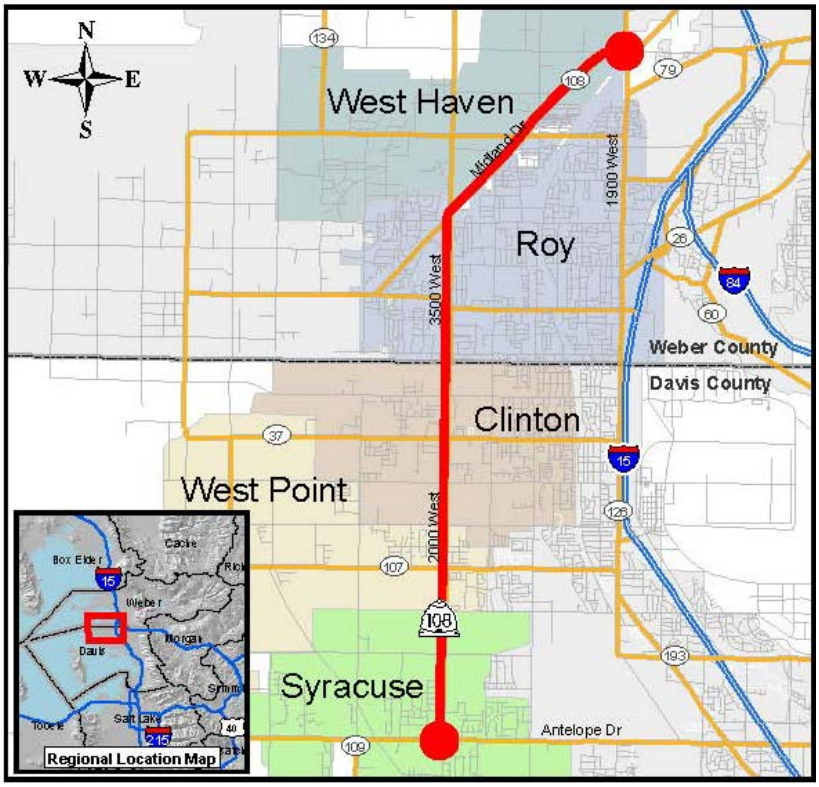
State Route 108 (S.R. 108) is a two-lane road from Antelope Drive (S.R. 127) in Syracuse to 1900 West (S.R. 126) in West Haven, a distance of 9.5 miles (see Exhibit S.1-1). S.R. 108 provides important access between the cities of Syracuse, West Point, Clinton, Roy, and West Haven. S.R. 108 also provides city residents with access to Interstate 15 (I-15), the only major interstate in the study area, via Antelope Drive to the southeast and access to employment and commercial areas in Ogden to the northeast.

S.R. 108 is the only continuous north-south connector west of I-15 in the study area. In addition, S.R. 108 provides connectivity to major east-west roads such as Antelope Drive (S.R. 127) in Syracuse, S.R. 107 in West Point, and S.R. 37 in Clinton.

Why is S.R. 108 being evaluated?

The communities around the S.R. 108 corridor are growing, which is leading to heavy congestion on S.R. 108. Congestion will continue to worsen if no improvements are made to the transportation system. In addition, the existing roadway has insufficient shoulders and sidewalks and lacks transit and bicycle facilities.

Exhibit S.1-1: S.R. 108 Study Area



There are several roadway deficiencies on S.R. 108. In addition, traffic congestion levels are increasing on the roadway due to the growth of the cities along S.R. 108. The roadway needs to be improved to meet current design and safety standards and to maintain local and regional mobility. The purpose of the alternatives developed and evaluated in this Environmental Impact Statement (EIS) is to provide a solution to meet the long-term transportation needs in the project study area through the year 2035. Specifically, the purpose of the project is to:

- Reduce roadway congestion on S.R. 108.
- Eliminate the roadway deficiencies associated with a lack of shoulders and turn lanes in order to reduce accident rates on S.R. 108.
- Enhance the opportunities for multi-modal use of S.R. 108 by providing improved bicycle, pedestrian, and transit facilities consistent with local and regional land use and transportation plans.

What is the purpose of the S.R. 108 project?

The purpose of the S.R. 108 project is to reduce roadway congestion; improve safety; and enhance transit, pedestrian, and bicycle facilities.

S.2 Other Major Actions

Several other proposed actions would involve connecting to a portion of S.R. 108 and are described in more detail in Section 1.3.4, Related Projects, in Chapter 1, Purpose of and Need for Action. These actions and the completed associated environmental documents include the following:

- **Syracuse Road; 1000 West to 2000 West, Syracuse, Final Environmental Impact Statement and Section 4(f) Evaluation (UDOT 2006b).** Widen Syracuse Road from two to four travel lanes from 1000 West to 2000 West in Syracuse. Funding for constructing this project has been identified, and construction is expected to start in 2008. The project is currently in the final design phase.
- **S.R. 79; Hinckley Drive Extension to S.R. 108 Ogden, Environmental Assessment (UDOT 2002a).** Provides a new five-lane road between S.R. 108 and Hinckley Drive. Hinckley Drive connects to I-15. Funding for designing and constructing this project has been identified, and the project is currently in the final design phase. Construction could start in 2010.
- **2000 West (S.R. 108) Road Project, Clinton, Utah Categorical Exclusion (CatEX) (UDOT 2005).** This project was identified by the City of Clinton to reduce congestion and improve safety on S.R. 108 by adding a bikeway, shoulders, and center turn lane along S.R. 108 from 1300 North to 2300 North. The project is currently under construction.
- **S.R. 108: Syracuse Road; Clearfield Main Street to 1000 West, Clearfield, Final Environmental Study (UDOT 2002b).** Widen the east-west portion of S.R. 108 (known locally as Syracuse Road/Antelope Drive) from two to four travel lanes with a center turn lane, shoulders, curb, gutter, and sidewalk from Main Street to 1000 West in Clearfield. A traffic signal at 300 West is also included in the project. Construction of this project has been completed.

S.3 Alternatives Considered

A range of alternatives to consider in this EIS was developed through the National Environmental Policy Act (NEPA) public and agency involvement process.

S.3.1 Development of the Initial Alternatives

Eight initial alternatives were developed during the scoping phase of the project (see Exhibit S.3-1). These initial alternatives were put through a two-step screening process to determine which alternatives would be carried forward for detailed study.

Exhibit S.3-1: Initial Alternatives

Alternative	Description
No-Action	No improvements to S.R. 108 would be made under this alternative except for routine maintenance.
TSM (Transportation System Management)	This alternative consists of timing and coordinating traffic signals along S.R. 108 and adding left-turn and right-turn lanes at key intersections.
Transit Only	This alternative includes the TSM Alternative plus more-frequent bus service. The current bus service (Route 626) operates hourly and would be increased to high-frequency bus service that would operate every 15 minutes. Other modes of transit, such as commuter rail and light rail, were not considered prudent for S.R. 108 because they would not connect to other local or regional fixed-guideway transit such as the proposed commuter rail along I-15 about 3 miles east of S.R. 108. In addition, fixed-guideway transit on S.R. 108 is not compatible with the Utah Transit Authority's (UTA) or the Wasatch Front Regional Council's (WFRC) long-range plans for transit in the area. Bus service on S.R. 108 would connect to UTA's proposed commuter rail line along I-15 into Salt Lake City and would provide the necessary regional connectivity.
Three Lanes	This alternative consists of two travel lanes with a raised center median and dedicated turn lanes. The alternative includes left-turn and right-turn lanes at intersections, appropriate shoulders for local access, and pedestrian, bicycle, and transit facilities.
TSM, Transit Only, and Three Lanes	This alternative is a combination of the TSM, Transit Only, and Three-Lane Alternatives.
Five Lanes	This alternative consists of four travel lanes with a raised center median and dedicated turn lanes at intersections. The alternative includes left-turn and right-turn lanes at intersections, appropriate shoulders for local access, and pedestrian, bicycle, and transit facilities.
Seven Lanes	This alternative consists of six travel lanes with a raised center median and dedicated turn lanes at intersections. The alternative includes left-turn and right-turn lanes at intersections, appropriate shoulders for local access, and pedestrian, bicycle, and transit facilities.
Improve Other Area Roads	This alternative consists of widening 1000 West or 3000 West to five lanes and building the proposed North Legacy Parkway. No improvements to S.R. 108 would be made under this alternative.

S.3.2 Level 1 Screening

Level 1 screening was performed on the eight initial alternatives (see Exhibit S.3-1: Initial Alternatives above). If an alternative did not meet all three elements of the project's purpose, it was not carried forward for detailed analysis. Alternatives that were considered and eliminated are described in Section 2.1, Alternative Development Process.

As shown in Exhibit S.3-2, there is no initial alternative or combination of the initial alternatives, other than the Five-Lane Alternative, that would meet all of the project's purpose while avoiding the excessive impacts of the Seven-Lane Alternative. Therefore, only the Five-Lane Alternative was carried forward for level 2 screening.

Exhibit S.3-2: Evaluation of Alternatives Considered

	Alternative							
Purpose Element	No-Action	TSM	Transit Only	Three Lanes	TSM, Transit Only, and Three Lanes	Five Lanes	Seven Lanes[a]	Improve Other Area Roads
Reduce roadway congestion on S.R. 108.	No	No	No	No	No	Yes	Yes	NA
Eliminate the roadway deficiencies associated with a lack of shoulders and turn lanes in order to reduce accident rates on S.R. 108.	No	No	No	Yes	Yes	Yes	Yes	No
Enhance the opportunities for multi-modal use of S.R. 108 by providing improved bicycle, pedestrian, and transit facilities consistent with local and regional land use and transportation plans.	No	No	Yes	Yes	Yes	Yes	Yes	No

NA = not applicable

[a] The Seven-Lane Alternative was determined to be unreasonable because it would have substantially more impacts to homes (due to relocations) and environmental resources.

S.3.3 Level 2 Screening

The purpose of level 2 screening was to further refine and develop the alternatives that met all of the project purpose elements in level 1 screening. For this project, the only alternative that passed the level 1 screening was the Five-Lane Alternative. The level 2 screening was conducted to ensure that the alternatives with the least amount of impacts to the communities and the natural environment would be carried forward for detailed study in this EIS and that the alternatives with the greatest impacts would be eliminated.

Five different alignment alternatives were developed and evaluated in more detail to develop a range of reasonable alternatives to be considered in this EIS. The five alignment alternatives represent the different alignment variations that could be implemented under the Five-Lane Alternative. Exhibit S.3-3 describes the five alternatives that were evaluated during level 2 screening.

Why must Section 4(f) properties be avoided?

Section 4(f) is part of an FHWA regulation that requires a project to avoid the use of eligible or potentially eligible historic properties and recreation and wildlife areas unless there is no feasible and prudent alternative to such use. Even then, all measures must be taken to minimize harm to these properties.

Exhibit S.3-3: Preliminary Five-Lane Alternatives

Alternative	Cross-Section Width	Description
Center Alignment	110 feet	Widen the roadway equally to the west and east.
Minimize 4(f) Impacts Alignment	110 feet	Widen the roadway both west and east to minimize Section 4(f) impacts.
Center Meander Alignment	110 feet	Widen the roadway both west and east to minimize overall property impacts, regardless of Section 4(f) status.
East Alignment	110 feet	Widen the roadway primarily to the east.
West Alignment	110 feet	Widen the roadway primarily to the west.

The five preliminary alternatives were evaluated against the screening criteria in Section 2.1.3.2, Evaluation of the Preliminary Five-Lane Alternatives. The screening criteria included relocations, potential relocations, total property impacts, and impacts to Section 4(f) properties, farmland, and wetlands. Exhibit S.3-4 provides a summary of the impacts from the preliminary five-lane alternatives.

Exhibit S.3-4: Summary of Impacts from the Preliminary Five-Lane Alternatives

Alternative	Number of Relocations[a]	Number of Potential Relocations[a]	Number of Strip Takes	Total Property Impacts[b]	Number of 4(f) Uses (Adverse)	Number of APAs Affected[c]	Acres of Wetlands Lost
Center Alignment	31	133	299	463	27	4	0.025
Minimize 4(f) Impacts Alignment	61	47	246	354	14	4	0.025
Center Meander Alignment	42	93	244	379	25	4	0.025
East Alignment	147	42	87	276	33	2	0.039
West Alignment	108	57	167	332	22	2	0.025

[a] Includes residential and commercial.

[b] Includes relocations, potential relocations, and strip takes.

[c] Agriculture Protection Areas (APAs) are geographic areas where agricultural activities are given special protections.

Based on the screening criteria, the Center, Center Meander, and East Alignments were eliminated from further study based on relocations, property impacts, and Section 4(f) impacts. Because the Minimize 4(f) Impacts and West Alignments had the fewest relocations, property impacts, and Section 4(f) impacts, they were carried forward for detailed study. The alternatives that were carried forward are described below and in Section 2.2, Alternatives Considered for Detailed Study.

S.3.4 Alternatives Evaluated in Detail

The EIS evaluates three alternatives in detail: the No-Action Alternative, the Minimize 4(f) Impacts Alternative, and the West Alternative.

Which alternatives were carried forward for detailed study in this EIS?

The three alternatives carried forward for detailed study in this EIS are the No-Action Alternative, the Minimize 4(f) Impacts Alternative, and the West Alternative. The Minimize 4(f) Impacts Alternative and the West Alternative would both widen S.R. 108 to five lanes (four travel lanes with either a two-way left-turn lane or a raised center median).

The Draft EIS assumed the connection from S.R. 108 to Hinckley Drive to be an extension of S.R. 108 without traffic signals and assumed that the segment of S.R. 108 from 3600 South to 1900 West would be blocked off. Under this scenario, the segment of S.R. 108 north of 3600 South in West Haven would operate at a level of service of LOS B, so no roadway improvements would be needed to meet the projected traffic in 2035. (For a description of level of service, see Section 1.4.3, Current and Future Traffic Congestion.)

After the Draft EIS was released, UDOT modified this connection to become a traffic signal with an intersection design that would allow access to S.R. 108 north of 3600 South. As a result, further travel demand modeling showed that the segment of S.R. 108 from 3600 South to 1900 West would need to be improved from a two-lane road to a five-lane road and would have a level of service of LOS B. The improvements to S.R. 108 from 3600 South to 1900 West (a distance of about 1.5 miles) have been included in this Final EIS under the action alternatives.

S.3.4.1 No-Action Alternative

NEPA requires an analysis of the No-Action Alternative. This alternative serves as a baseline so that decision-makers can compare the environmental effects of the action alternatives.

If the No-Action Alternative is selected, no improvements to S.R. 108 or adjacent transportation facilities would be made other than those improvements already identified in the WFRC long-range

plan to enhance mobility in the area. These activities, which might have some environmental impacts, would be evaluated in a separate document.

If no action is taken on S.R. 108, the Utah Department of Transportation (UDOT) and the cities would likely continue to make minor maintenance improvements such as rehabilitating pavement and improving shoulders, turn lanes, sidewalks, and curb and gutter. The cities might require developers to provide some of these improvements as part of any new development along S.R. 108. Overall, the basic two-lane configuration of S.R. 108 would not change under the No-Action Alternative.

S.3.4.2 Minimize 4(f) Impacts Alternative (Preferred Alternative)

The Minimize 4(f) Impacts Alternative involves widening S.R. 108 to a 110-foot, five-lane cross-section. In order to minimize the use of Section 4(f) properties, the alignment varies between the center alignment, west alignment, and east alignment. The main features of this alternative are four 12-foot travel lanes, a 14-foot median (either a two-way left-turn lane or a raised center median), 8-foot shoulders, 4-foot bicycle lanes, 2.5-foot curb and gutter, 4.5-foot park strips, 4-foot sidewalks, and 1 foot between the back of the sidewalk and the edge of the right-of-way.

Although the exact location of raised medians would be determined during the final design of the project, raised medians would be considered in high-traffic areas such as commercial districts to improve safety. Appropriate stormwater detention basins and utility relocations would be included with this alternative.

S.3.4.3 West Alternative

The West Alternative also involves widening S.R. 108 to a 110-foot, five-lane cross-section. The centerline of this alignment is located such that the proposed right-of-way line along the east side of S.R. 108 matches the existing right-of-way line along the east side of S.R. 108. Due to this design, the alignment misses all properties on the east side of S.R. 108. Other design features would be the same as those described above for the Minimize 4(f) Impacts Alternative.

S.4 Summary of Environmental Impacts

Exhibit S.4-1 lists the major advantages and disadvantages of each alternative that was evaluated in detail. Exhibit S.4-2 below summarizes the specific environmental impacts for each alternative. For detailed information about the environmental impacts of the alternatives, see Chapter 4, Environmental Consequences.

Exhibit S.4-1: Primary Advantages and Disadvantages of the Alternatives

Alternative	Primary Advantages	Primary Disadvantages
No-Action Alternative	• Few environmental impacts because no major improvements would be made to S.R. 108 to reduce congestion, eliminate roadway deficiencies, or improve safety.	• Would not be consistent with local or regional land use and transportation plans. • Loss of business from continued heavy congestion on S.R. 108. • Greatest number of residences with noise levels above the noise-abatement criterion (347). • Does not provide bicycle lanes, sidewalks, or transit facilities. • S.R. 108 would continue to operate at unacceptable levels of service.
Minimize 4(f) Impacts Alternative (Preferred Alternative)	• Least amount of farmland lost (26.1 acres). • Least amount of land converted to roadway use (33 acres). • Fewest total residential relocations (55). • Fewest business relocations (6). • Fewest potentially eligible architectural historic properties that would be adversely affected (14). • Fewest Section 4(f) properties used (14). • Lowest cost of the action alternatives.	• Greatest number of Agriculture Protection Areas (APAs) affected (4). • Second-greatest number of residences with noise levels above the noise-abatement criterion (300).
West Alternative	• Fewest number of APAs affected (2). • Fewest number of residences with noise levels above the noise-abatement criterion (250).	• Greatest amount of farmland lost (27.9 acres). • Greatest amount of land converted to roadway use (38 acres). • Greatest number of residential relocations (96). • Greatest number of business relocations (12). • Greatest number of potentially eligible architectural historic properties that would be adversely affected (22). • Greatest number of Section 4(f) properties used (22). • Highest cost of the action alternatives.

Exhibit S.4-2: Comparison of Environmental Impacts

Resource Category	No-Action Alternative	Minimize 4(f) Impacts Alternative	West Alternative
Land Use	The area would continue to develop from more rural uses to urban in accordance with local and regional land use and transportation plans. The alternative would not be consistent with local land use and transportation plans that recommend widening S.R. 108.	About 33 acres of land converted to roadway use. The alternative would be consistent with local and regional land use and transportation plans.	About 38 acres of land converted to roadway use. The alternative would be consistent with local and regional land use and transportation plans.
Farmland	No impacts from roadway improvements. Continued commercial and residential development would result in the loss of farmland along S.R. 108.	About 26.1 acres of farmland lost. 4 APAs affected. Total APA loss would be 3 acres.	About 27.9 acres of farmland lost. 2 APAs affected. Total APA loss would be less than 2 acres.
Social Environment	Increases in roadway congestion would continue to concern area residents. No other impacts to the social environment would occur.	No adverse impacts to community cohesion or quality of life. No impacts to recreation facilities. Minor right-of-way impacts to 4 community facilities. Reduced congestion would improve local and regional emergency response. No adverse impacts to pedestrian safety. 55 residential and 6 business relocations. 38 potential residential and 9 potential business relocations.	Same as the Minimize 4(f) Impacts Alternative except there would be minor right-of-way impacts to 3 community facilities, 96 residential and 12 business relocations, and 47 potential residential and 10 potential business relocations.
Environmental Justice Populations	No disproportionately high and adverse impacts on any environmental justice populations.	No disproportionately high and adverse impacts on any environmental justice populations.	Same as the Minimize 4(f) Impacts Alternative.
Transportation	S.R. 108 would continue to operate at unacceptable congestion levels (a level of service of LOS F).	S.R. 108 would operate at acceptable levels of service (LOS D or better). Improvements to S.R. 108 would have similar impacts to other adjoining roads as the No-Action Alternative.	Same as the Minimize 4(f) Impacts Alternative.
Economics	Businesses could lose some revenue as shoppers use alternate, less-congested commercial districts in the region.	Improvements would benefit the local economy by reducing congestion, improving safety, and making businesses more accessible. 6 businesses would be relocated and 9 businesses would be potentially relocated due to proximity impacts.	Improvements would benefit the local economy by reducing congestion, improving safety, and making businesses more accessible. 12 businesses would be relocated and 10 businesses would be potentially relocated due to proximity impacts.
Joint Development	No opportunity to improve S.R. 108 in conjunction with the City of Clinton plans to build a pedestrian underpass across S.R. 108.	Potential for joint development of proposed City of Clinton underpass across S.R. 108.	Same as the Minimize 4(f) Impacts Alternative.

Resource Category	No-Action Alternative	Minimize 4(f) Impacts Alternative	West Alternative
Pedestrian and Bicyclist Resources	S.R. 108 would continue to operate without bicycle lanes, complete sidewalks, and bus pullouts.	Improvements would include bicycle lanes, sidewalks, and transit facilities. No impact to existing or proposed trails that intersect S.R. 108.	Same as the Minimize 4(f) Impacts Alternative.
Air Quality	The 1-hour and 8-hour carbon monoxide (CO) standards would not be exceeded. No impacts to the particulate matter (PM_{10}) non-attainment area in Ogden.	The 1-hour and 8-hour CO standards would not be exceeded. No impacts to the PM_{10} non-attainment area in Ogden.	Same as the Minimize 4(f) Impacts Alternative.
Noise	Residential noise-abatement criterion would be exceeded at 347 residences.	Residential noise-abatement criterion would be exceeded at 300 residences.	Residential noise-abatement criterion would be exceeded at 250 residences.
Water Quality	Stormwater runoff would flow directly into adjacent sloughs and canals without detention basins. Water quality standards would not be exceeded.	Stormwater runoff would be controlled through use of detention basins. No impacts to surface or groundwater quality beneficial uses or standards.	Same as the Minimize 4(f) Impacts Alternative.
Ecosystems (Wildlife, Threatened and Endangered Species, Wetlands)	No impacts to threatened and endangered species or wetlands. Continued urban development would result in loss of agriculture-related wildlife habitat.	Minor impact to agriculture-related wildlife habitat. No impact to threatened and endangered species or wetlands. Loss of 1 acre of drainage ditches and 0.025 acre of wetlands.	Same as the Minimize 4(f) Impacts Alternative.
Floodplains	No impact.	No impact.	No impact.
Historic, Archaeological, and Paleontological Resources	No impacts to historic, archaeological, or paleontological resources.	Adverse impact to 14 architectural properties that are eligible for the National Register of Historic Places (NRHP). No impacts to archaeological or paleontological resources.	Adverse impact to 22 architectural properties that are eligible for the NRHP. No impacts to archaeological or paleontological resources.
Hazardous Waste Sites	No hazardous waste sites affected.	Could affect 7 sites that might contain hazardous materials or waste.	Same as the Minimize 4(f) Impacts Alternative.
Visual Resources	No impact. Continued change from more rural to urban environment.	No substantial changes to the urban nature of the visual environment.	Same as the Minimize 4(f) Impacts Alternative.
Section 4(f) Properties	No impact.	14 Section 4(f) properties used.	22 Section 4(f) properties used.

S.5 Basis for Identifying the Preferred Alternative

The Minimize 4(f) Impacts Alternative was identified by FHWA and UDOT as the Preferred Alternative based on public input during the scoping process, based on the alternative's ability to meet the elements of the project's purpose, and because the alternative minimizes impacts to Section 4(f) properties as well as overall residential and business relocations.

During the EIS scoping process, the public and the resource agencies were asked to provide input on potential issues and alternatives to be considered in the EIS. Most people who provided comments noted that something needed to be done to improve S.R. 108. Of those comments, most stated that widening S.R. 108 was an appropriate solution.

As part of the process for identifying the Preferred Alternative, UDOT met with planners, managers, and engineers from all five cities along S.R. 108, presented the Minimize 4(f) Impacts and West Alternatives to them, and explained how the alternatives would affect their cities. City officials from all five cities said that the Minimize 4(f) Impacts Alternative met their city's plans and objectives.

Both the Minimize 4(f) Impacts and West Alternatives meet the three elements of the project's purpose described in Section 1.2.1, Purpose of the Project. However, as noted above in Exhibit S.4-1: Primary Advantages and Disadvantages of the Alternatives, this alternative would meet those objectives while requiring the least amount of land to be converted to roadway use. This alternative also meets the project's purpose with fewer residential and business relocations and fewer impacts to Section 4(f) properties.

The environmental impacts of the two action alternatives were compared according to the resource categories analyzed in this EIS. The comparison of alternatives in Exhibit S.4-2: Comparison of Environmental Impacts above shows that the impacts from the action alternatives would be the same or very similar for most resources. The action alternatives differ primarily in terms of their right-of-way, relocations, and Section 4(f) impacts.

Based on this information, the Minimize 4(f) Impacts Alternative was identified as the Preferred Alternative for the following reasons:

- It requires less land to be converted to roadway use.
- It has fewer uses of Section 4(f) properties.
- It requires fewer residential and business relocations.
- It has the lowest cost.
- It has the least impact to farmland.

S.6 Areas of Controversy

No areas of controversy for implementing the S.R. 108 improvements have been identified.

S.7 Major Unresolved Issues

There are no major unresolved issues with government agencies.

S.8 Required Federal Actions

The following federal actions would be required for the proposed S.R. 108 project:

- Section 106 Agreement/Concurrence (Federal Highway Administration consultation with Utah State Historic Preservation Officer)
- Section 309 Review (U.S. Environmental Protection Agency)

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Chapter 1: Purpose of and Need for Action

1.1 Introduction

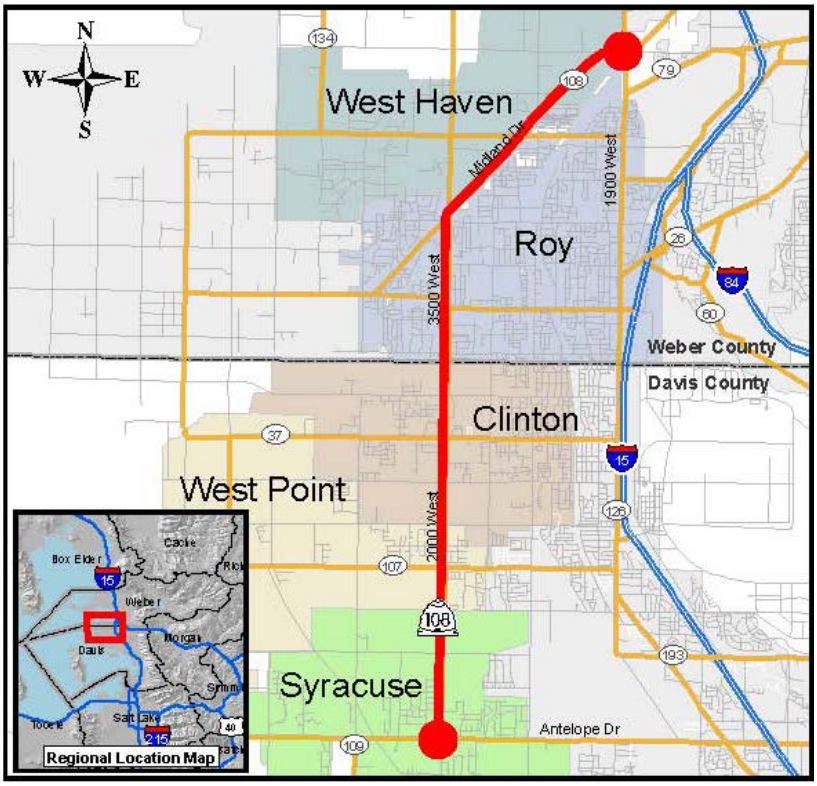
This Final Environmental Impact Statement (EIS) has been prepared to evaluate existing and future transportation conditions on State Route 108 (S.R. 108) between Antelope Drive (S.R. 127) in Syracuse and 1900 West (S.R. 126) in West Haven, a distance of about 9.5 miles. The project study area includes the cities of Syracuse, West Point, and Clinton in Davis County and Roy and West Haven in Weber County, Utah.

Exhibit 1.1-1 shows the project study area and the segment of S.R. 108 under evaluation. S.R. 108 is also known as 2000 West (in Syracuse, West Point, and Clinton) and 3500 West and Midland Drive (in Roy and West Haven). S.R. 108 is a two-lane road through the study area.

Why is S.R. 108 being evaluated?

The communities around the S.R. 108 corridor are growing, which is leading to heavy congestion on S.R. 108. This lack of capacity will continue to worsen if no improvements are made to the transportation system. In addition, the existing roadway has insufficient shoulders and sidewalks and lacks transit and bicycle facilities.

Exhibit 1.1-1: S.R. 108 Study Area



The Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT) share responsibility for developing roadway infrastructure in Utah. These agencies are working together to decide how to improve traffic and safety conditions on S.R. 108 based on the information in this EIS and the community input received during the public and agency involvement process.

1.2 Summary of Project Purpose and Need

1.2.1 Purpose of the Project

There are several roadway deficiencies on S.R. 108. In addition, traffic congestion levels are increasing on the roadway due to the growth of the cities along S.R. 108. The roadway needs to be improved to meet current design and safety standards and to maintain local and regional mobility. The purpose of the alternatives developed and evaluated in this EIS is to provide a solution to meet the long-term transportation needs in the project study area through the year 2035. Specifically, the purpose of the project is to:

- Reduce roadway congestion on S.R. 108.
- Eliminate the roadway deficiencies associated with a lack of shoulders and turn lanes in order to reduce accident rates on S.R. 108.
- Enhance the opportunities for multi-modal use of S.R. 108 by providing improved bicycle, pedestrian, and transit facilities consistent with local and regional land use and transportation plans.

What is the purpose of the S.R. 108 project?

The purpose of the S.R. 108 project is to reduce roadway congestion; improve safety; and enhance transit, pedestrian, and bicycle facilities.

1.2.2 Need for the Project

The need for the S.R. 108 project is a result of the following conditions:

- **Current and Future Lack of Capacity.** Continued growth in the study area has resulted in increased travel on S.R. 108 that will exceed the roadway capacity, resulting in heavy congestion and causing long commutes and poor access for residents and businesses (see Section 1.4.1, Population, Household, and Employment Growth in the Study Area, and Section 1.4.3, Current and Future Traffic Congestion).
- **Reduced Function of S.R. 108.** Increased congestion along S.R. 108 will reduce the overall function of the roadway as an arterial that accommodates through traffic and will decrease the overall local and regional mobility for residents of Syracuse, West Point, Clinton, Roy, and West Haven (see Section 1.4.3, Current and Future Traffic Congestion).
- **Roadway Deficiencies.** Parts of S.R. 108 were built over 40 years ago and do not meet current design standards. These deficiencies include insufficient shoulders and turn lanes, a lack of sidewalks and bicycle lanes, and a lack of pullouts to support bus service (see Section 1.4.4, Safety on and Roadway Condition of S.R. 108, and Section 1.4.5, Transit, Pedestrian, and Bicycle Needs).

Why is the S.R. 108 project needed?

The project is needed because of the current and future lack of capacity on S.R. 108, the anticipated reduced function of S.R. 108 from future congestion, and the current roadway deficiencies of S.R. 108.

1.3 Regional and Local Planning Considerations

This section provides an overview of the regional and local land use and transportation plans that address the current and future condition of S.R. 108. The planning documents consist of the Wasatch Front Regional Council's (WFRC) Regional Transportation Plan (WFRC 2007), land use and transportation plans prepared by the cities along S.R. 108, and the Statewide Transportation Improvement Program.

Why are previous planning studies important in determining the need for a project?

Planning studies, which typically go through a public process, examine where future improvements to transportation infrastructure are needed to support the community's anticipated physical expansion and economic growth.

1.3.1 WFRC Long-Range Transportation Plan

WFRC is the designated metropolitan planning organization that works in partnership with UDOT, the Utah Transit Authority (UTA), city and county governments, and other stakeholders to develop the Regional Transportation Plan. WRFC prepares the Wasatch Front Urban Area Regional Transportation Plan, which is the region's plan for highway, transit, and other transportation-related improvements to meet the area's growing travel demand over the next 30 years (WFRC 2007).

Exhibit 1.3-1 provides an overview of the recommended transportation improvements for S.R. 108 that are identified in the Long-Range Transportation Plan. The plan identifies S.R. 108 as a minor arterial.

Exhibit 1.3-1: Recommended Future Improvements for S.R. 108 Identified in the WFRC Long-Range Transportation Plan

Factor	Future Improvements Identified
Roadway	Identifies S.R. 108 from Antelope Drive to 1900 West as a minor arterial with four travel lanes with either a 100-foot or 106-foot right-of-way. These improvements are proposed in Phase 1 of the plan (2007 through 2015). Identifies upgrading S.R. 108 as one of the important upgrades for arterial streets in Davis and Weber Counties.
Transit	Identifies high-frequency bus service for S.R. 108. High-frequency routes are identical to other routes except that they operate more often (about every 15 minutes). Bus service could include limited stops or local service as well as peak-hour or all-day service.
Bicycle	Identifies a Class III bicycle facility for S.R. 108. A Class III bicycle facility has signs that designate the roadway for bicycle travel in the vehicle travel lanes, but the roadway does not have a separately striped bicycle lane.

Source: WFRC 2007

What is travel demand?

Travel demand refers to the forecasted amount of travel on existing and future roadways. Travel demand can be met by various modes of travel including driving, bicycling, and transit.

S.R. 108 is classified as a minor arterial. What does this mean?

Minor arterials typically have four travel lanes (two in each direction) and a center turn lane. A minor arterial is designed to carry trips of moderate length, yet provide some access to residences and businesses.

1.3.2 Local Land Use and Transportation Plans

Each city along S.R. 108 between Antelope Drive and 1900 West has developed land use and/or transportation plans that identify the need for transportation improvements as well as the future zoning and land use desires of the community. Interviews conducted in June 2006 with representatives from the cities along S.R. 108 demonstrated that the cities are planning for and allowing commercial development on the roadway and would like improved access to these developments (J. Anderson 2006; S. Anderson 2006a; Davis 2006; Larson 2006a; Vinzant 2006; Worthen 2006). Exhibit 1.3-2 summarizes the communities' plans for S.R. 108. Note that some of the cities identify S.R. 108 as different types of arterial, such as major, minor, or principal.

Exhibit 1.3-2: Local Community Plans for S.R. 108

City	Plans for Future Improvements
Syracuse	The city's Recommended Right-of-Way Master Plan identifies S.R. 108 as a major arterial (four travel lanes) with a 110-foot right-of-way. Future land uses along the roadway include commercial, institutional (school), and residential.
West Point	The city's Land Use Plan identifies most of the S.R. 108 corridor as zoned for commercial development. S.R. 108 is currently West Point's only commercial zone. The city's Street Master Plan identifies S.R. 108 as an important arterial. The Street Master Plan also identifies the need for traffic signal and capacity improvements at the intersections with 300 North and 800 North.
Clinton	The city's Transportation Master Plan identifies S.R. 108 as a proposed five-lane road with a proposed signal at 1300 North. Future land uses along S.R. 108 include residential and commercial.
Roy	The city's General Plan identifies S.R. 108 (3500 West and Midland Drive) as an arterial street and notes that the road should be widened to keep up with travel demand. The plan also identifies that S.R. 108 should be designated a Class III bicycle facility. High-accident locations (those with 20 to 100 accidents over a 5-year period) were identified on S.R. 108 at 4800 South, 5600 South, and 6000 South. Future land uses on undeveloped land along S.R. 108 include commercial and residential.
West Haven	The city's General Plan identifies future land uses along S.R. 108 (Midland Drive) as commercial and mixed use (high-, medium-, and low-density residential and light commercial). Although West Haven does not currently have a formal Transportation Plan, the General Plan shows S.R. 108 with a 100-foot right-of-way to accommodate new commercial and residential development.

Sources: City of West Point 2000; City of Roy 2002; City of Clinton 2004a, 2006a; City of Syracuse 2005, 2006a; City of West Haven 2005, 2006

1.3.3 Statewide Transportation Improvement Program

The Statewide Transportation Improvement Program is a 5-year plan of highway and transit projects for the state of Utah that guides the development of projects from conception through construction. The 2007 Statewide Transportation Improvement Program includes preliminary engineering and environmental studies for S.R. 108.

1.3.4 Related Projects

A number of other environmental studies for roadway improvements involving connections to portions of S.R. 108 have been completed. These studies also demonstrate the need for transportation improvements in the study area to meet the growing travel demand (see Exhibit 1.3-3 on page 1-8). Each of these projects has independent utility, was included as part of the No-Action Alternative, and was used to help develop the purpose of the S.R. 108 project and the S.R. 108 alternatives. These studies are described below.

What is independent utility?

Independent utility means that a project would be usable by itself and would represent a reasonable expenditure of funds even if no additional transportation improvements in the area are made.

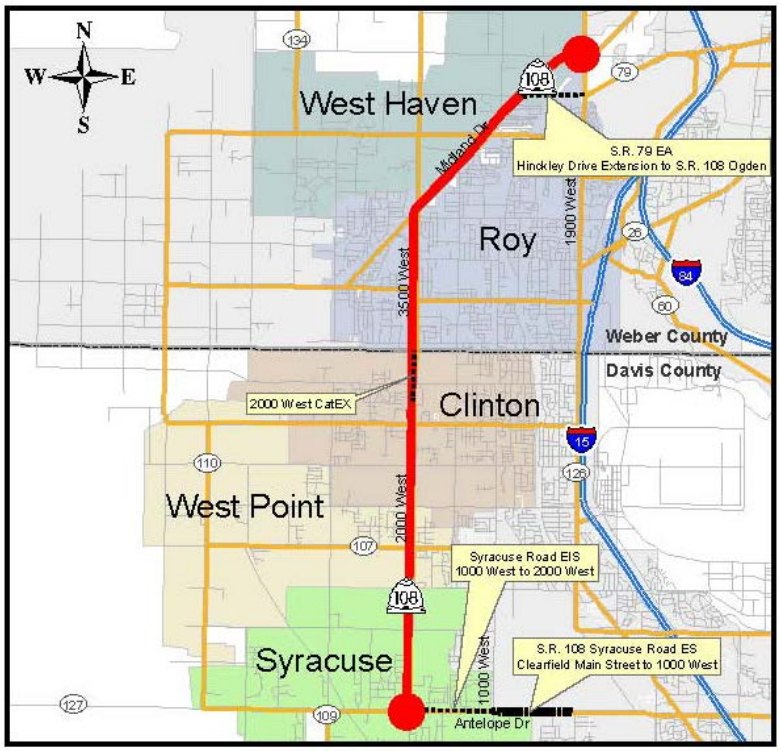
- **Syracuse Road; 1000 West to 2000 West, Syracuse, Final Environmental Impact Statement and Section 4(f) Evaluation (UDOT 2006b).** Widen Syracuse Road from two to four travel lanes from 1000 West to 2000 West in Syracuse. This portion of roadway is about a 1-mile segment of two-lane road between two four-lane segments. The purpose of the project is to accommodate the regional travel demand for east-west travel in northwest Davis County and provide a transportation facility that is consistent with state, regional, and local plans. The project has independent utility from the S.R. 108 project because it addresses east-west travel demand between two major cross streets. Funding for constructing this project has been identified, and construction is expected to start in 2008. The project is currently in the final design phase.
- **S.R. 79; Hinckley Drive Extension to S.R. 108 Ogden, Environmental Assessment (UDOT 2002a).** Provides a new five-lane road between S.R. 108 and S.R. 79 (Hinckley Drive) at 1900 West. Hinckley Drive connects to Interstate 15 (I-15). The purpose of the project is to improve east-west regional traffic circulation and access between western Weber County and the Ogden metropolitan area and to accommodate expected

residential and commercial growth. The project will be an east-west arterial extension of Hinckley Drive that connects 1900 West and Hinckley Drive to S.R. 108. This connector has independent utility from the S.R. 108 project because it completes the final portion of an east-west connection between I-15 and S.R. 108 and can be constructed without influencing the S.R. 108 project. Funding for designing and constructing this project has been identified, and the project is currently in the final design phase. Construction could start in 2010.

- **2000 West (S.R. 108) Road Project, Clinton, Utah Categorical Exclusion (CatEX) (UDOT 2005).** This project was identified by the City of Clinton to reduce congestion and improve safety on S.R. 108 by adding a bikeway, shoulders, and center turn lane along S.R. 108 from 1300 North to 2300 North. The project's environmental and design phases were initiated before the start of the S.R. 108 project. Because the purpose of the project is to provide some immediate safety improvements and congestion relief to the residents of Clinton, the City decided to move forward with construction since funding for the S.R. 108 project had not been identified. The project is under construction and is expected to be completed in the spring of 2008.
- **S.R. 108: Syracuse Road; Clearfield Main Street to 1000 West, Clearfield, Final Environmental Study (UDOT 2002b).** Widen the east-west portion of S.R. 108 (known locally as Syracuse Road/Antelope Drive) from two to four travel lanes with a center turn lane, shoulders, curb, gutter, and sidewalk from Main Street to 1000 West in Clearfield. A traffic signal at 300 West was also included in the project. The purpose of the project was to meet capacity demands, decrease safety hazards, and meet current design standards. Construction of the project was completed in 2003 before the S.R. 108 project was initiated.

The S.R. 79 Hinckley Drive Extension project is funded for construction in 2010. The analysis for the S.R. 108 project assumes that the Hinckley Drive Extension and the projects described above are constructed.

Exhibit 1.3-3: Related Environmental Studies



1.4 Needs Assessment

1.4.1 Population, Household, and Employment Growth in the Study Area

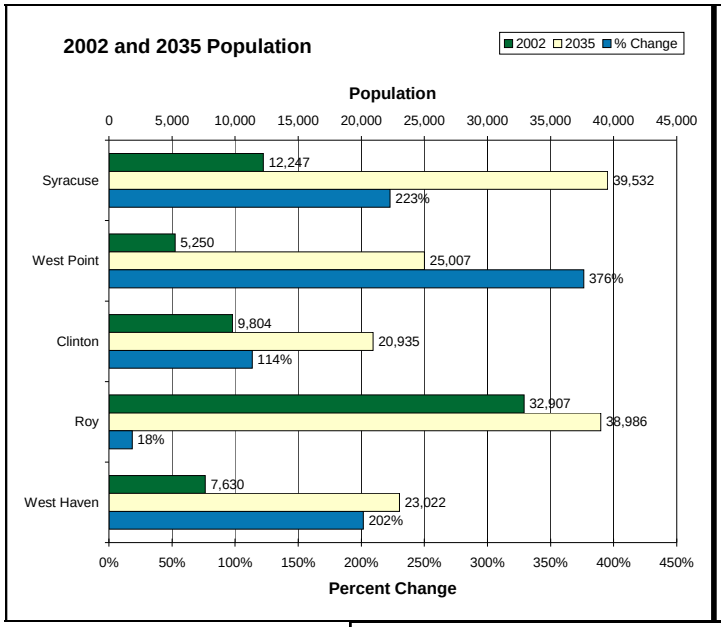
Population, household, and employment growth are all important factors in determining future travel demand. Large increases in any of these factors over an extended period can cause substantial increases in travel demand, which results in congestion on roadways if capacity does not keep up with the demand.

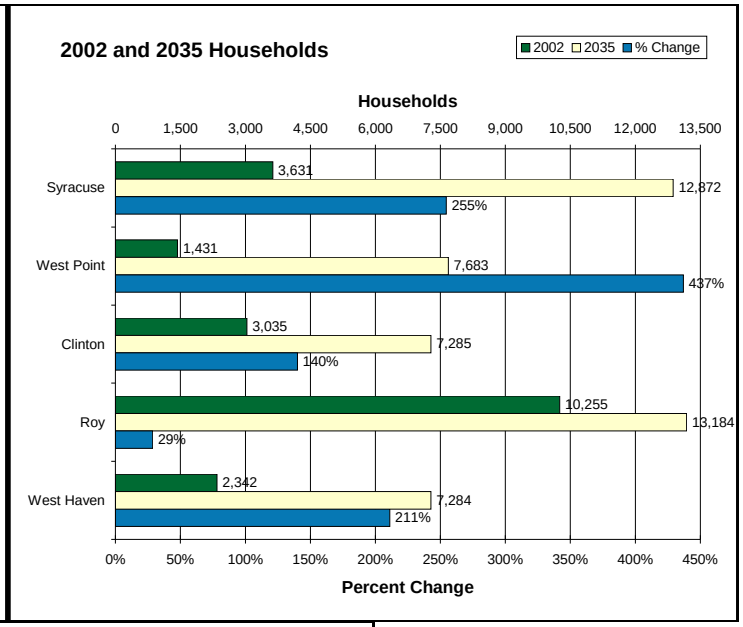
As shown below in Exhibit 1.4-1, all five cities along S.R. 108 are expected to have some growth between 2002 and 2035 with the highest population growth occurring in West Point and the lowest growth in Roy. In Exhibit 1.4-1, the green and yellow bars show the projected increase in population between 2002 and 2035 for each city, while the blue bars show the projected percent growth for each city. The 2002 data shown in Exhibit 1.4-1 were the most complete population, household, and employment data available for all of the cities in the study area for the same period (InterPlan 2006a; WFRC 2006).

How will population and household growth affect S.R. 108?

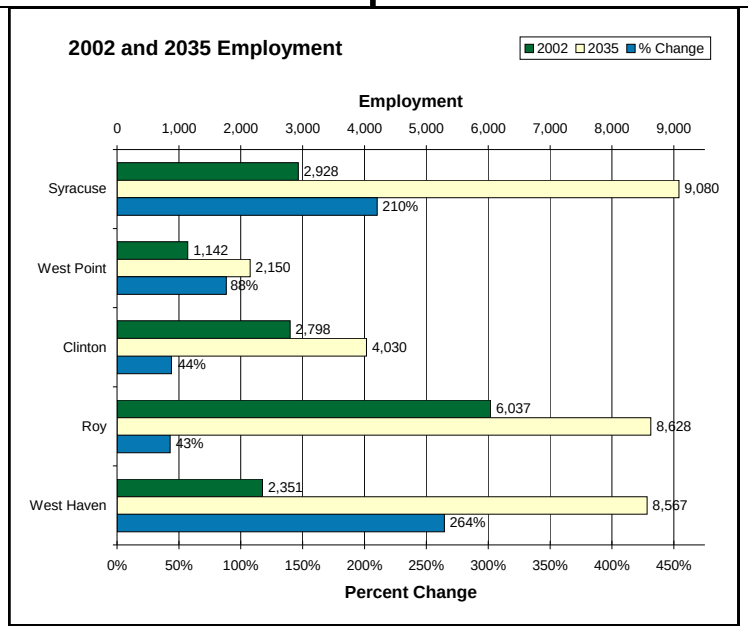
Large increases in population and the number of households will increase travel demand and congestion on S.R. 108 and potentially decrease safety. Without improvements to S.R. 108, this growth will eventually result in poor commute times and long delays along the roadway.

Exhibit 1.4-1: 2002 and 2035 Population, Households, and Employment





Sources: InterPlan 2006a; WFRC 2006



1.4.2 Importance of S.R. 108 to the Local and Regional Transportation System

S.R. 108 has two travel lanes from Antelope Drive to 1900 West and is classified as an arterial roadway because it provides important access between the cities along S.R. 108 and I-15 (the only major interstate in the study area) via Antelope Drive to the southeast and between the cities and the employment and commercial areas in Ogden to the northeast. S.R. 108 is also the only continuous north-south connector west of I-15 in the area. In addition, S.R. 108 provides connectivity to major east-west roads such as Antelope Drive (S.R. 127) in Syracuse, S.R. 107 in West Point, and S.R. 37 in Clinton (see Exhibit 1.1-1: S.R. 108 Study Area above).

Meetings were held with representatives from the cities along S.R. 108 in June and July 2006. All of the cities (Syracuse, West Point, Clinton, Roy, and West Haven) noted the importance of S.R. 108 as a local and regional roadway that provides connectivity to both I-15 and the employment and commercial centers in Ogden. The cities stated that their plans include widening S.R. 108 to help improve both local and regional connectivity. The cities also referred to S.R. 108 as either the primary or secondary commercial corridor within the city and noted the importance of reducing congestion to current and future businesses.

1.4.3 Current and Future Traffic Congestion

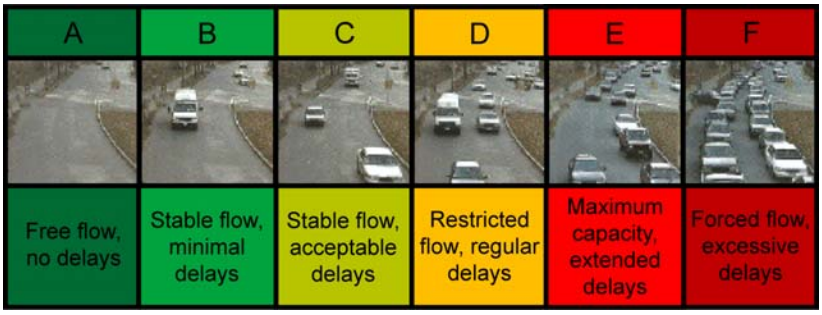
This section provides a summary of the current and anticipated future traffic congestion on S.R. 108. Congestion levels are evaluated using a measure called level of service (LOS). Level of service is a method of describing the congestion level of a street or freeway. When the capacity of a roadway is exceeded, the result is congestion and a poor level of service.

How is traffic congestion measured?

Traffic congestion is measured by a rating called level of service (LOS) that covers the range of congestion levels from free-flowing traffic (LOS A) to excessive delays (LOS F).

Level of service is represented by a letter "grade" ranging from LOS A for excellent conditions (free-flowing traffic) to LOS F for failure conditions (extremely congested, stop-and-go traffic). LOS B through LOS E describe progressively worse traffic conditions (see Exhibit 1.4-2 below). Typically, in urban areas, LOS E and F are considered unacceptable congestion levels and LOS D and above are considered acceptable congestion levels.

Exhibit 1.4-2: Level of Service Categories



Studies have shown that congestion translates into increased travel times and fuel consumption (Connecticut General Assembly 2000). As these factors increase, workers' productivity declines and costs associated with labor and fuel increase. In addition, in areas with heavy congestion, the traveling public tends to avoid this traffic, which results in a decreased use of commercial services in those areas. This is an important issue for S.R. 108 because it is an important commercial corridor for the five cities in the study area.

The following two sections analyze the levels of service at intersections along S.R. 108 and on the S.R. 108 roadway itself under current (2006) and future (2035) traffic conditions. This analysis looks at the afternoon peak travel time (3 PM to 6 PM), which is typically the busiest travel time of the day. The traffic projections for 2035 were determined using the WFRC regional transportation model. For the 2035 projections, all proposed projects in the WFRC Long-Range Transportation Plan were assumed to have been implemented except for improvements to S.R. 108. (The 2035 conditions for this analysis are the same as the No-Action Alternative; see Section 2.2.1, No-Action Alternative.)

What is afternoon peak travel time and why is it studied?

The afternoon peak travel time, or PM peak period for this study, is between 3 PM and 6 PM. This time period is evaluated because it is typically the time of day when roads are the most congested. Proposed future roadway improvements are based on the most congested conditions expected on the roadway.

As shown in Exhibit 1.4-3, the number of intersections operating at unacceptable levels of congestion (LOS E or F) is expected to increase substantially between 2006 and 2035.

Exhibit 1.4-3: Summary of Level of Service on S.R. 108

S.R. 108 Component	2006	2035 (Projected)
Major intersections at LOS E or F[a]	2	7
Roadway segments at LOS E or F[b]	18	18

[a] 14 intersections were evaluated on S.R. 108.

[b] 18 roadway segments were evaluated on S.R. 108.

As shown in Exhibit 1.4-4 and Exhibit 1.4-5 below, one roadway segment currently operates at LOS E, while the other segments operate at LOS F. In 2035, all roadway segments are expected to operate at LOS F.

1.4.3.1 Current and 2035 Level of Service at Intersections along S.R. 108

The 14 intersections that are expected to have the highest amount of traffic by 2035 were evaluated to determine their current and future levels of service. Because 200 South and 3600 South currently do not have substantial traffic volumes, no current level of service is available for these intersections. However, the 2035 level of service was calculated for these intersections (using data extrapolated from S.R. 108 traffic counts) because the WFRC Long-Range Plan identifies major improvements at these locations as being completed by 2030.

Currently, 10 of the 14 major intersections in the S.R. 108 study area have traffic signals. Under existing conditions during the afternoon peak travel time, nine of the 14 intersections on S.R. 108 currently operate at LOS C or better. The two non-signalized intersections at 700 South and 1300 North operate at LOS E and LOS F, respectively.

How will congestion affect intersections along S.R. 108 in the future?

Increased congestion on S.R. 108 will lead to increased delay at intersections resulting in unacceptable operating conditions at seven of the 14 major intersections along the roadway.

Exhibit 1.4-4: Levels of Service on the Roadway under Existing (2006) Conditions

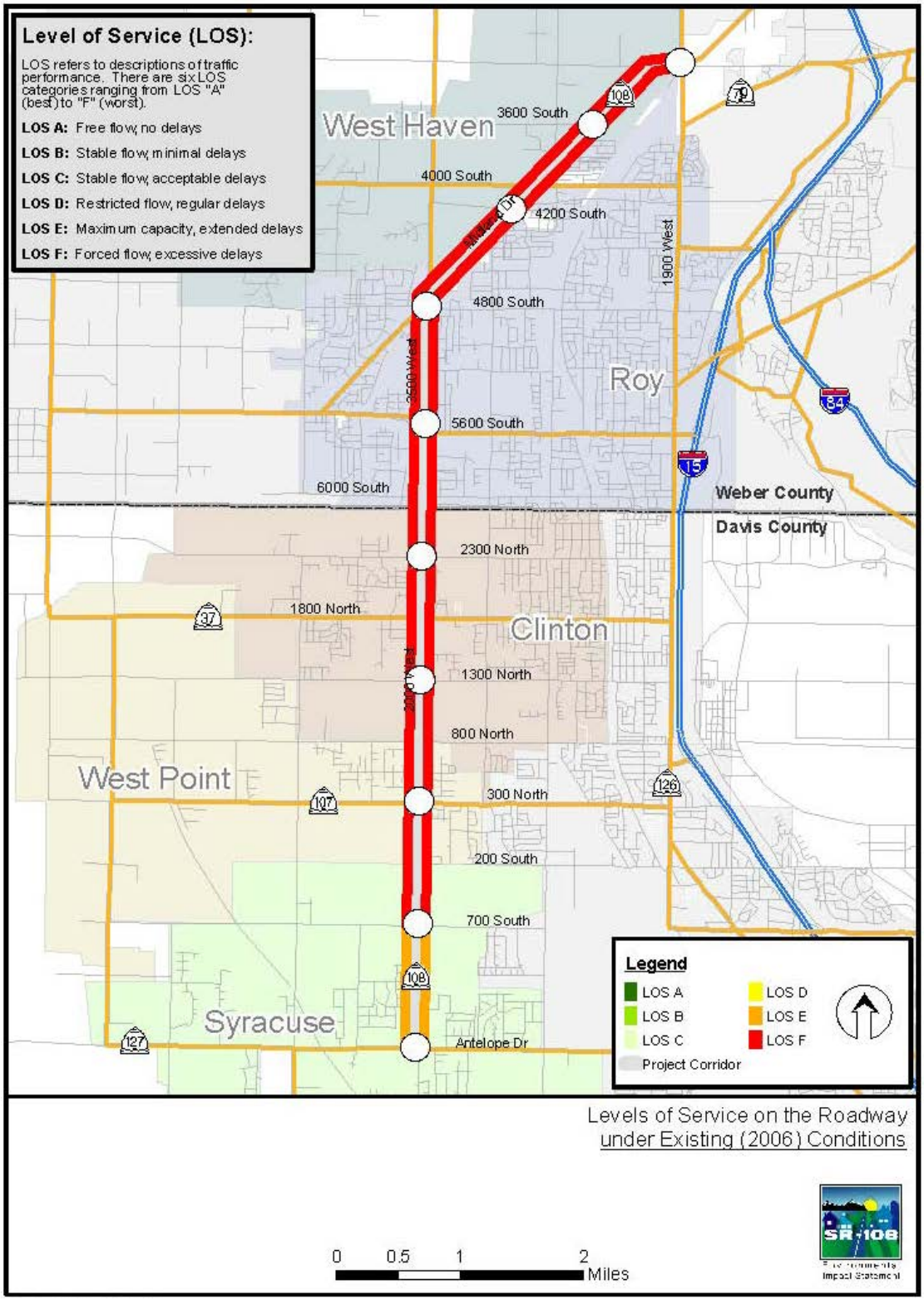
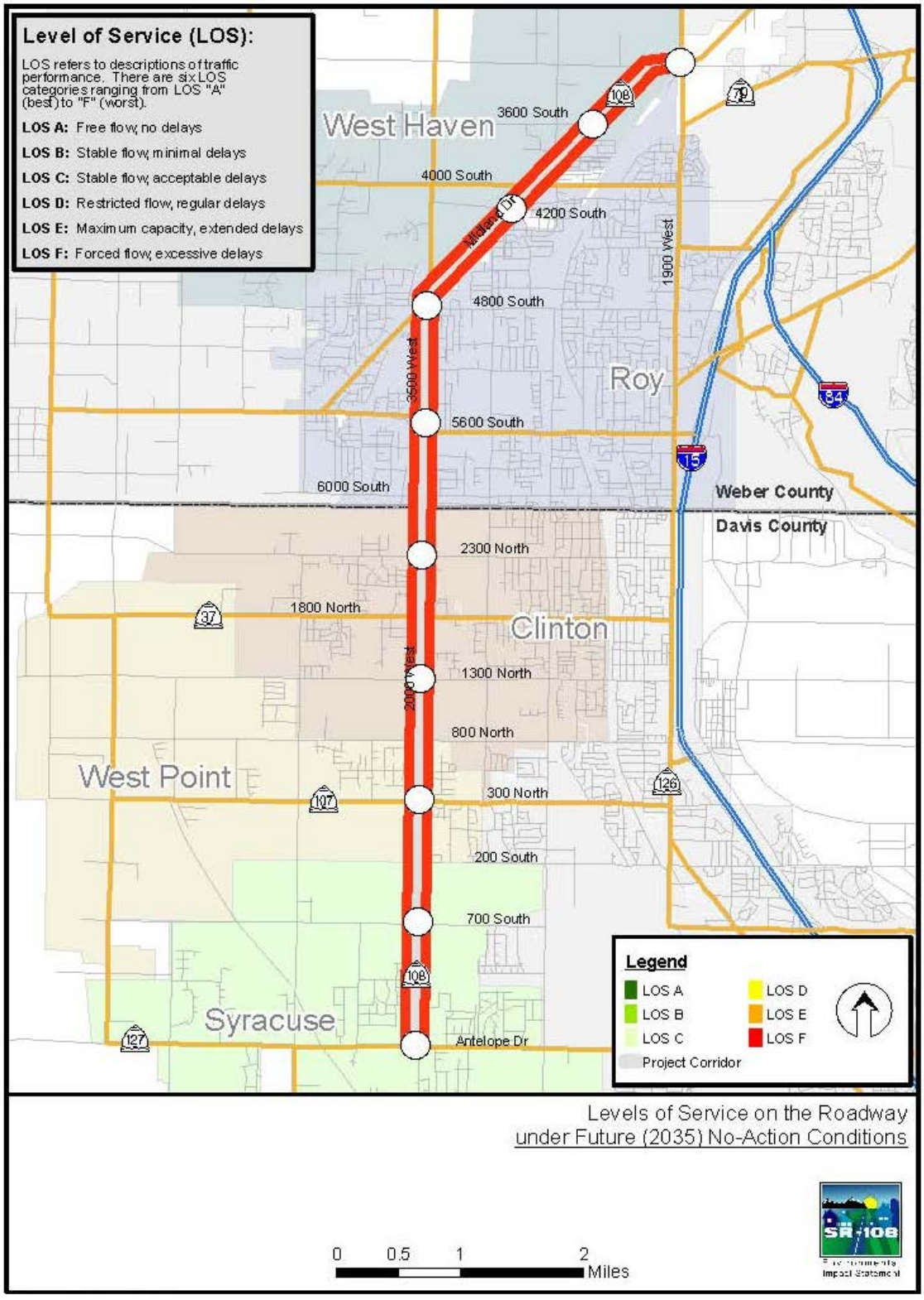


Exhibit 1.4-5: Levels of Service on the Roadway under Future (2035) No-Action Conditions



These levels of service indicate that drivers on S.R. 108 are experiencing some congestion at the intersections as traffic volumes exceed the roadway's capacity to handle this traffic (see Exhibit 1.4-6 below). Most of the signalized intersections along S.R. 108 have been upgraded to include left-turn and right-turn lanes. These improvements likely help the signalized intersections operate at LOS C or better, while the non-signalized intersections are more susceptible to congestion.

In addition, the signalized intersections discussed above were analyzed for future (2035) level of service during the afternoon peak travel time. Although the 2035 conditions assume that capacity improvements will be made to many streets adjacent to S.R. 108, the analysis found that the future intersection level of service along S.R. 108 would still get worse. As shown below in Exhibit 1.4-6, the intersection analysis shows that, by 2035, seven of the 14 intersections are expected to operate at LOS E or F, which are considered unacceptable operating conditions.

1.4.3.2 Current and 2035 Level of Service on the S.R. 108 Roadway

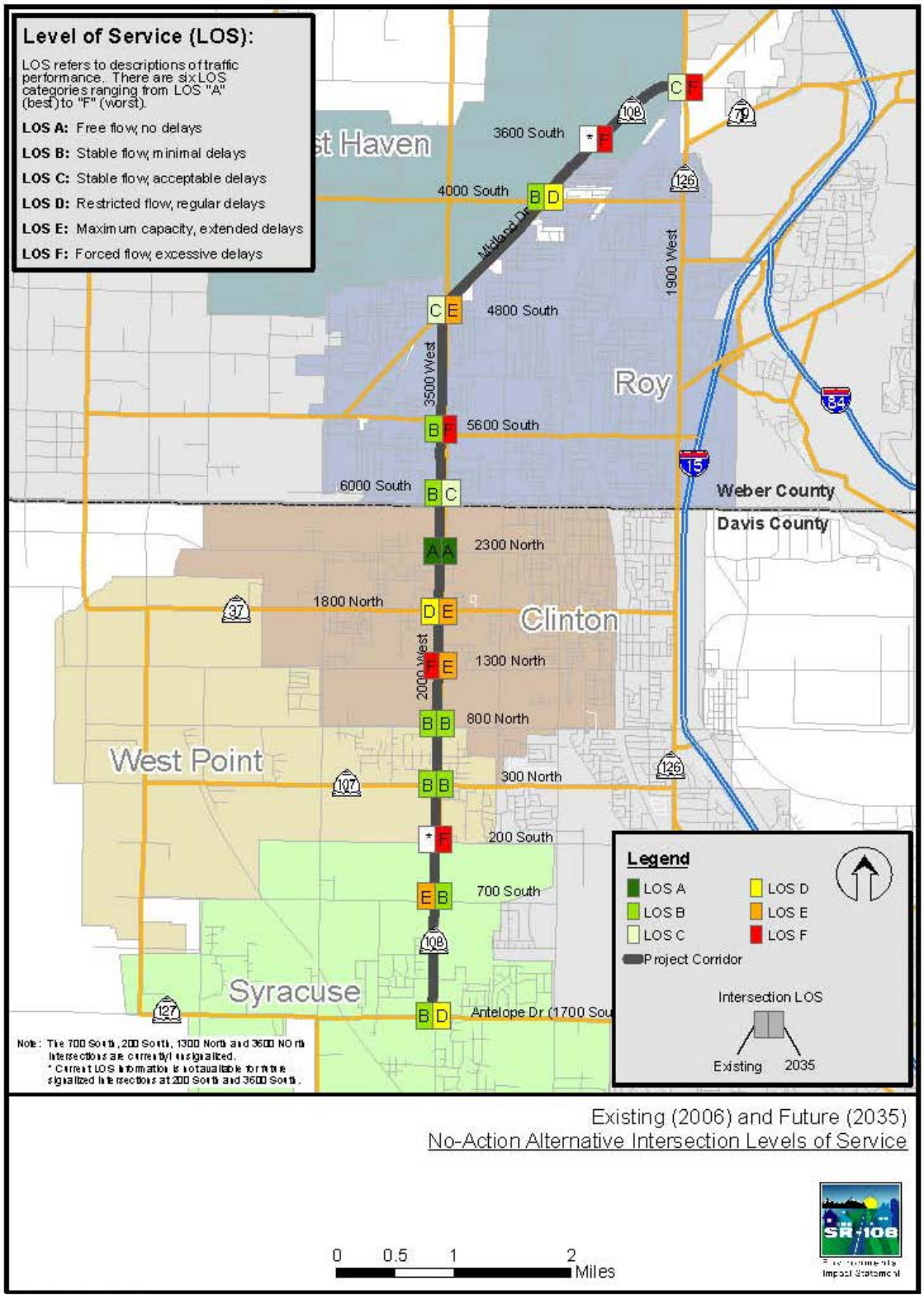
In addition to the intersection analysis, an evaluation was conducted for the level of service on the S.R. 108 roadway. To evaluate the existing conditions, S.R. 108 was divided into nine segments. Each segment was evaluated for northbound and southbound travel during the afternoon peak travel time for a total of 18 segments. Exhibit 1.4-4: Levels of Service on the Roadway under Existing (2006) Conditions above shows the level of service on each S.R. 108 roadway segment. Under existing conditions, all S.R. 108 roadway segments operate at LOS E or F.

As population increases in the study area, travel demand will grow and congestion on S.R. 108 will increase. To evaluate the 2035 conditions, S.R. 108 was divided into the same nine segments. Each segment was again evaluated for northbound and southbound travel during the afternoon peak travel time for a total of 18 segments. As shown above in Exhibit 1.4-5: Levels of Service on the Roadway under Future (2035) No-Action Conditions, by 2035, all 18 segments would operate at LOS F, which is considered unacceptable operating conditions.

How will congestion affect the S.R. 108 roadway in the future?

Current congestion on S.R. 108 has led to unacceptable operating conditions on all portions of the roadway. As congestion increases, operating conditions will continue to degrade.

Exhibit 1.4-6: Existing (2006) and Future (2035) No-Action Alternative Intersection Levels of Service



1.4.4 Safety on and Roadway Condition of S.R. 108

Parts of S.R. 108 were first paved more than 40 years ago, and the roadway does not meet current design standards. Some of the specific deficiencies identified along S.R. 108 are:

- **Narrow Shoulders.** Much of the existing S.R. 108 roadway has narrow gravel shoulders. Adequate shoulder width is important for maintaining both safety and the efficient operation of the roadway. Wider shoulders provide areas for emergency vehicles to bypass congested traffic and provide space where vehicles with mechanical problems can pull off the road. In addition, a lack of shoulders is a deterrent to future bus service along S.R. 108 because buses would be unable to pull out of traffic when stopping, a situation that would increase congestion and decrease safety.
- **Narrow Setbacks.** The close proximity of S.R. 108 to many of the homes and businesses along S.R. 108 is a safety issue. Representatives from West Point and Syracuse specifically noted that the narrow setback between the roadway and adjacent buildings was a problem in their communities (Davis 2006; Hansen 2006).
- **Access Conflicts.** Three of the 11 signalized intersections along S.R. 108, in addition to minor intersections all along S.R. 108, do not have dedicated turn lanes. Where dedicated turn lanes are lacking, vehicles must slow down in traffic to make turns into residences and businesses, which reduces the travel speed along the roadway and, consequently, the capacity and level of service. With the large number of driveways and the heavy traffic on S.R. 108, the road doesn't adequately serve either through traffic or the adjacent properties. The variation in travel speed between through traffic and access-related traffic has also created safety concerns. As growth in travel occurs along S.R. 108, the conflicts associated with access to property versus through traffic will increase.
- **Skewed Intersections.** Many of the existing intersections on S.R. 108 are skewed, especially where S.R. 108 (Midland Drive) runs northeast at a 45-degree angle, and the configuration of these intersections contributes to safety concerns.

Why must roadways be upgraded to meet current design standards?

Roadways need to be improved to meet current design standards in order to maintain regional mobility and improve safety. Specific design deficiencies on S.R. 108 include narrow shoulders, narrow setbacks, access conflicts, and skewed intersections.

1.4.4.1 Accidents

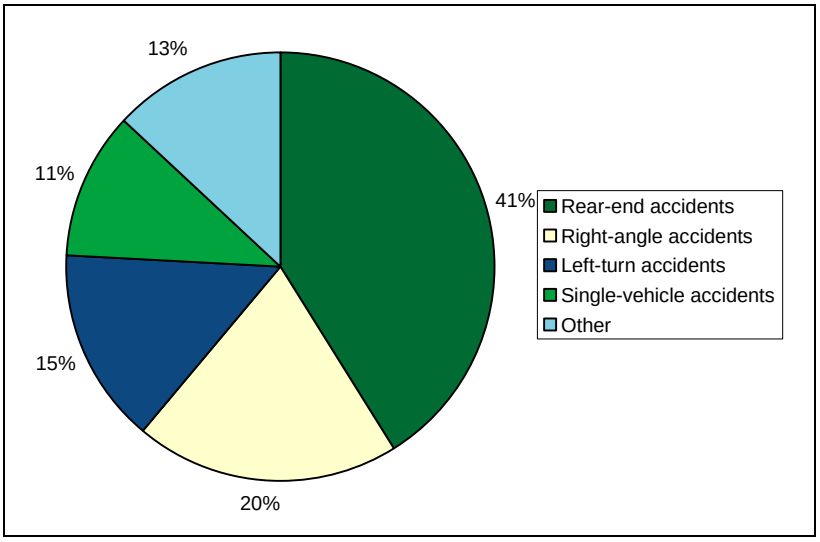
The deficiencies listed in Section 1.4.4, Safety on and Roadway Condition of S.R. 108, contribute to safety problems on S.R. 108. The accident rate on S.R. 108 between Antelope Drive (S.R. 127) and 1900 West (S.R. 126) is 3.46 accidents per million miles traveled, which is lower than the expected rate of 4.83 accidents per million miles traveled for a road of this type. The severity of accidents, at 1.70 fatal accidents plus injury accidents per million miles traveled, is higher than the expected rate of 1.63 fatal accidents plus injury accidents per million miles traveled for a road of this type (UDOT 2006a).

As is typical in urban areas, most of the accidents that occurred on S.R. 108 between 2002 and 2004 were concentrated at intersections (about 70%). Also, rear-end accidents were more common in some segments of S.R. 108. Of the accidents that occurred on S.R. 108, about 41% were categorized as rear-end accidents, 20% were right-angle accidents, 15% were left-turn accidents, and 11% were single-vehicle accidents (see Exhibit 1.4-7).

What are accident rates and accident severity?

Accident rates are based on the number of accidents that occur for every 1,000,000 miles traveled on a road. Accident severity is the number of fatal accidents combined with the number of injury accidents that occur for every 1,000,000 miles traveled on a road. The expected accident rate and accident severity are an average based on similar roadways across Utah.

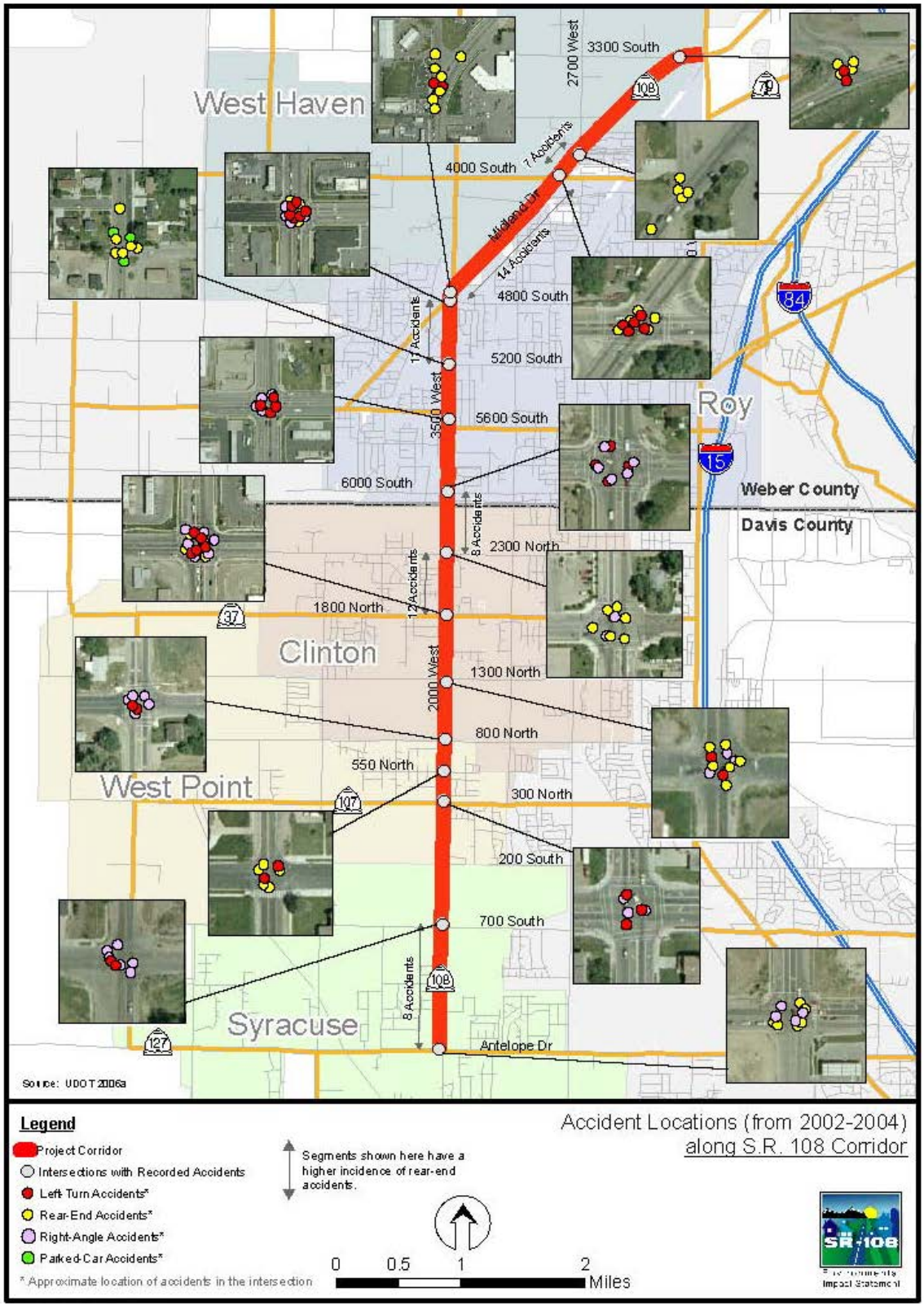
Exhibit 1.4-7: Types of Accidents in the Study Area (2002–2004)



Source: UDOT 2006a

Exhibit 1.4-8 below shows that the majority of accidents on S.R. 108 are clustered around intersections and specific segments of S.R. 108 that lack turn lanes and sufficient shoulders.

Exhibit 1.4-8: Accident Locations (from 2002–2004) along S.R. 108 Corridor



Rear-end accidents are largely attributed to vehicles following other vehicles too closely as well as inattention by drivers. The lack of turn lanes and inadequate shoulders discussed in Section 1.4.4, Safety on and Roadway Condition of S.R. 108, also creates hazards for drivers as they turn into and exit driveways along S.R. 108. Other accidents that occurred along S.R. 108 are attributed to failure to stop at stop signs and traffic signals as well as failure to yield the right-of-way.

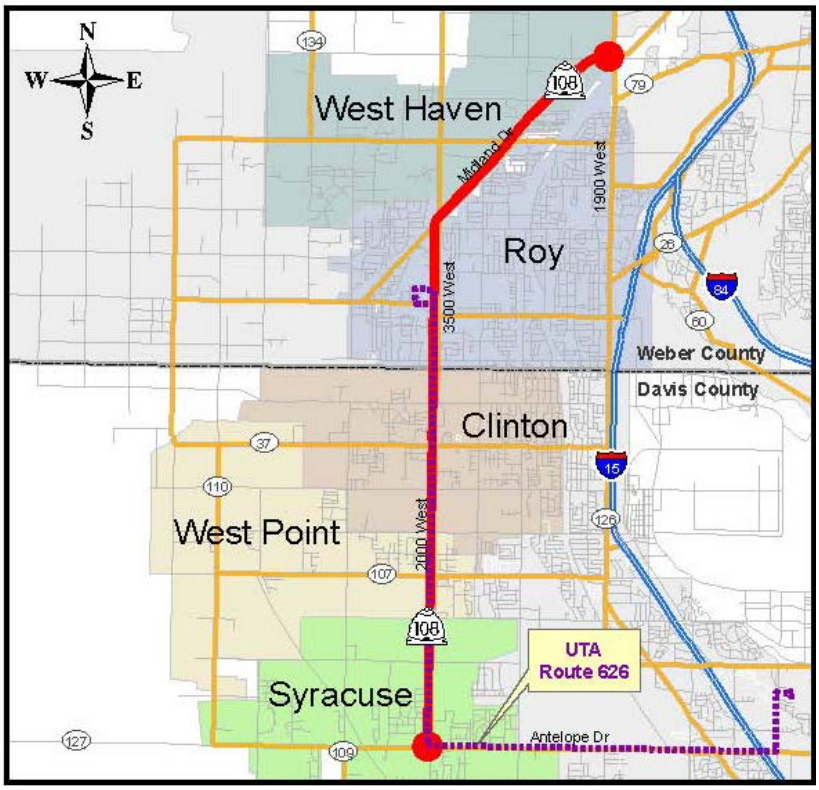
During the public scoping process, many people mentioned that the non-signalized intersection at 700 South is a cause of accidents. Other problems cited by the public included accidents or near-accidents caused by vehicles slowing down to make turns into driveways or exiting driveways directly into traffic. Speed was also frequently cited as a problem, especially in situations where vehicles are trying to get in or out of driveways while other vehicles are moving fast in both directions and there is no turn lane (UDOT 2006c).

1.4.5 Transit, Pedestrian, and Bicycle Needs

1.4.5.1 Transit Needs

UTA bus route 626 operates on S.R. 108 from Antelope Drive in Syracuse to 5350 South in Roy (see Exhibit 1.4-9 below). Buses operate Monday through Saturday and provide access to the Weber State University Davis Campus. Buses operate every hour during service hours, but UTA plans to offer high-frequency bus service in the future. Currently S.R. 108 does not have appropriate bus pullouts or shoulders along the roadway, which leads to traffic backing up behind stopped buses or pulling around the buses into oncoming traffic.

Exhibit 1.4-9: Bus Service on S.R. 108



1.4.5.2 Pedestrian and Bicycle Needs

In general, S.R. 108 has little room for pedestrians and bicyclists except for the gravel shoulder, which is very narrow in most locations. The roadway is not currently signed or striped to accommodate bicycles. If sidewalks exist along S.R. 108, they are discontinuous and have been installed mainly along new developments. In these areas of new development, the sidewalk is properly set back from the roadway. In the remaining sections of S.R. 108, if there is a sidewalk, it is not properly set back from the roadway.

Two cities along S.R. 108, Clinton and Roy, have identified the need for additional pedestrian and bicycle facilities along the roadway (Larson 2006a; Vinzant 2006).

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Chapter 2: Alternatives

This chapter describes the alternatives that were considered for meeting the purpose of the S.R. 108 project as described in Chapter 1, Purpose of and Need for Action. This chapter reviews the alternatives that were eliminated from detailed study through the screening process, describes the No-Action Alternative and the action alternatives that were carried forward for detailed study, and summarizes the advantages and disadvantages of the No-Action and action alternatives.

2.1 Alternative Development Process

A range of alternatives to consider in this EIS was developed through the National Environmental Policy Act (NEPA) public and agency involvement process. Eight initial alternatives were developed during the scoping phase of the project. These initial alternatives were put through a two-step screening process to determine which alternatives would be carried forward for detailed study. The two steps used in the screening process are:

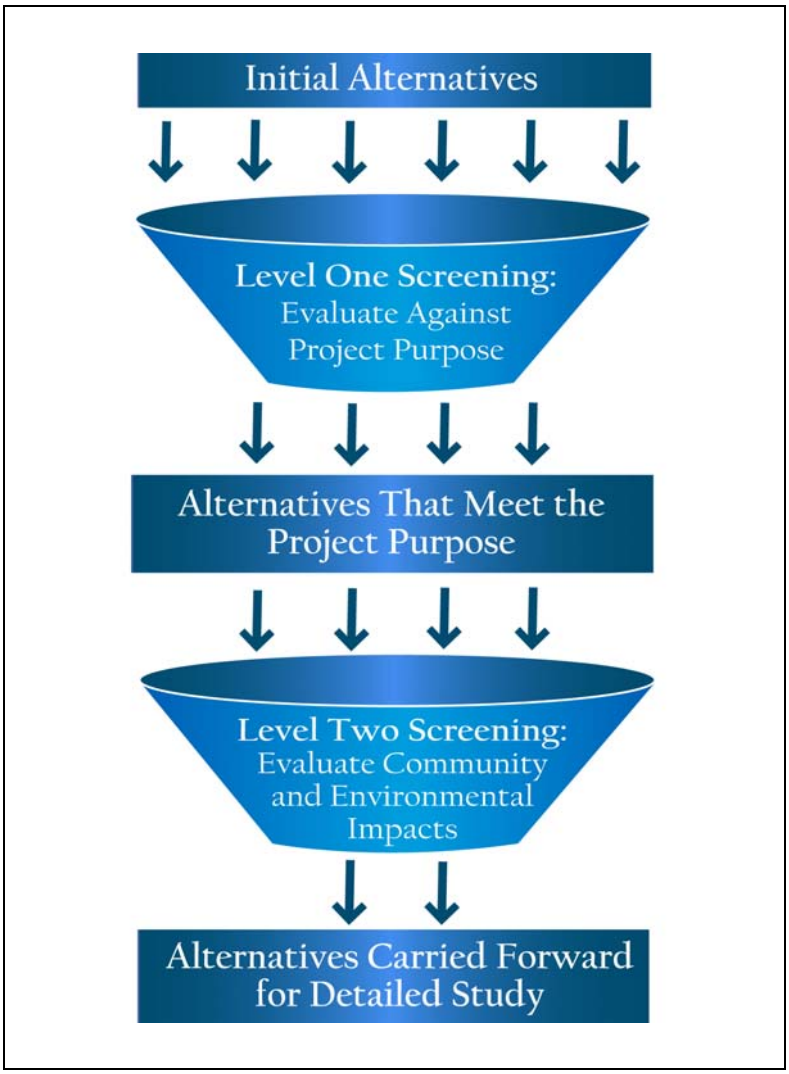
- **Level 1 Screening.** The initial alternatives were evaluated to determine how well they met the three elements of the project's purpose (see Section 1.2.1, Purpose of the Project). Those alternatives that did not meet all of the project's purpose were eliminated from further study. (However, no initial alternative was eliminated solely because it did not meet the purpose of eliminating roadway deficiencies on S.R. 108.) Those alternatives that did meet all of the project's purpose were further evaluated with level 2 screening.
- **Level 2 Screening.** The alternatives that made it through level 1 screening were evaluated to determine their impacts to the community (such as relocations and Section 4(f) impacts) and their impacts to the natural environment (such as wetland impacts) so that the alternatives with the least amount of impacts would be carried forward for detailed study and the alternatives with the greatest impacts would be eliminated.

Any alternative that has been carried forward for detailed study is one that will meet all of the project's purpose while minimizing impacts to the communities and the natural environment.

The action alternatives that were carried forward for detailed study were further refined by developing the preliminary engineering and associated cost estimates and determining right-of-way requirements so that additional evaluation of impacts could be conducted. The detailed information provided by the preliminary engineering and the development of cost estimates was not necessary for conducting level 1 and 2 screening.

Exhibit 2.1-1 illustrates the alternative development process.

Exhibit 2.1-1: S.R. 108 Alternative Development Process



2.1.1 Development of the Initial Alternatives

Eight initial alternatives were developed during the project scoping process. These initial alternatives were developed with input from existing land use and transportation plans, the public, local cities, and resource agencies. The input was collected during public meetings, at alternative development workshops with the public and cities, and from comments that were submitted on the project Web site or mailed in. Exhibit 2.1-2 shows the initial alternatives.

Exhibit 2.1-2: Initial Alternatives

Alternative	Description
No-Action	No improvements to S.R. 108 would be made under this alternative except for routine maintenance.
TSM (Transportation System Management)	This alternative consists of timing and coordinating traffic signals along S.R. 108 and adding left-turn and right-turn lanes at key intersections.
Transit Only	This alternative includes the TSM Alternative plus more-frequent bus service. The current bus service (Route 626) operates hourly and would be increased to high-frequency bus service that would operate every 15 minutes. Other modes of transit, such as commuter rail and light rail, were not considered prudent for S.R. 108 because they would not connect to other local or regional fixed-guideway transit such as the proposed commuter rail along I-15 about 3 miles east of S.R. 108. In addition, fixed-guideway transit on S.R. 108 is not compatible with UTA's or WFRC's long-range plans for transit in the area. Bus service on S.R. 108 would connect to UTA's proposed commuter rail line along I-15 into Salt Lake City and would provide the necessary regional connectivity.
Three Lanes	This alternative consists of two travel lanes with a raised center median and dedicated turn lanes at intersections. The alternative includes left-turn and right-turn lanes at intersections, appropriate shoulders for local access, and pedestrian, bicycle, and transit facilities.
TSM, Transit Only, and Three Lanes	This alternative is a combination of the TSM, Transit Only, and Three-Lane Alternatives.
Five Lanes	This alternative consists of four travel lanes with a raised center median and dedicated turn lanes at intersections. The alternative includes left-turn and right-turn lanes at intersections, appropriate shoulders for local access, and pedestrian, bicycle, and transit facilities.
Seven Lanes	This alternative consists of six travel lanes with a raised center median and dedicated turn lanes at intersections. The alternative includes left-turn and right-turn lanes at intersections, appropriate shoulders for local access, and pedestrian, bicycle, and transit facilities.
Improve Other Area Roads	This alternative consists of widening 1000 West or 3000 West to five lanes and building the proposed North Legacy Parkway. No improvements to S.R. 108 would be made under this alternative.

Land Use Considerations in the Alternative Development Process. During the scoping phase of the S.R. 108 project, a comment was received suggesting that changes to land use should be considered in the alternative development process. A change in land use from typical large-lot residential and commercial developments to mixed-use and compact developments can reduce the amount of necessary vehicle travel, increase transit use, and improve local and regional mobility.

Two types of land use in particular can reduce the amount of vehicle travel: compact developments, where individual properties are built close together to leave more open space, and mixed-use developments, where complimentary land uses such as residential and commercial properties are built in the same area so that residents can make shorter vehicle trips or eliminate them altogether.

The cities along S.R. 108 are planning to reduce the amount of vehicle travel by developing a corridor with a mix of residential and commercial uses. When the corridor is completely developed, it will have an even mix of residential uses and different types of commercial uses. For example, the City of West Haven is promoting a mixed-use district with townhomes, compact development, and commercial uses. The other cities along S.R. 108 are implementing a mix of commercial and residential uses including more compact developments. Section 3.1, Land Use, shows the proposed future land use and zoning along S.R. 108 including the mixed-use developments proposed by the cities (see Exhibit 3.1-2: Land Use and Exhibit 3.1-3: Zoning).

The commercial land uses along S.R. 108 will help reduce overall regional travel by providing local shopping and services for residents along S.R. 108 and west of I-15. Without these businesses along S.R. 108, many residents would need to travel greater distances for shopping and services. These businesses will also provide nearby employment for residents. All of the alternatives evaluated for the S.R. 108 project incorporate the proposed mixed-use developments recommended by the cities, and the regional travel demand model that was used to predict future traffic on S.R. 108 takes into account the trend toward mixed-use development along S.R. 108.

What is the regional travel demand model?

The regional travel demand model is a tool for predicting future traffic and level of service conditions on regional roadways such as major arterials and freeways. The model is maintained by the Wasatch Front Regional Council.

2.1.2 Level 1 Screening

Level 1 screening was performed on the eight initial alternatives that were identified during the project scoping process (see Exhibit 2.1-2: Initial Alternatives above). These alternatives were evaluated against the three elements of the project's purpose as defined in Chapter 1, Purpose of and Need for Action:

- Reduce roadway congestion on S.R. 108.
- Eliminate the roadway deficiencies associated with a lack of shoulders and turn lanes in order to reduce accident rates on S.R. 108. (No alternative was eliminated solely because it did not meet this purpose.)
- Enhance the opportunities for multi-modal use of S.R. 108 by providing improved bicycle, pedestrian, and transit facilities consistent with local and regional land use and transportation plans.

If an alternative met all three elements of the project's purpose, it was carried forward for level 2 screening. Those alternatives that did not meet the project's purpose were eliminated from further study.

2.1.2.1 Evaluation of the Initial Alternatives

This section summarizes the evaluation of the initial alternatives in terms of how well they met the purpose of the project. These initial alternatives are described in Exhibit 2.1-2: Initial Alternatives above.

Methodology for Evaluating the Level of Service. A regional travel demand model was used to calculate the level of service for the initial alternatives and to determine whether each alternative would improve local and regional mobility in Syracuse, West Point, Clinton, Roy, and West Haven by reducing roadway congestion on S.R. 108. Typically, in urban areas, LOS D is considered acceptable and LOS E and LOS F are generally considered unacceptable. In some cases in urban areas, LOS E is considered acceptable if there are constraints that prevent roadway improvements from being made (such as high cost, right-of-way limitations, or high community and environmental impacts).

What is level of service?

Level of service, or LOS, is a method of describing the congestion level of a street or freeway using a letter "grade" from A to F. LOS A represents excellent traffic conditions and LOS F represents heavy congestion. For more information, see Section 1.4.3, Current and Future Traffic Congestion.

Initially, to evaluate the reduction in roadway congestion under the alternatives, a level of service of LOS D was used as a screening criterion since this level of service is typically considered acceptable in urban areas. However, for the S.R. 108 project, LOS E would be considered acceptable along a few segments if improving the road to LOS D by adding more lanes would result in substantial relocations, community impacts, Section 4(f) impacts, or environmental impacts. A level of service of LOS F—forced flow and excessive delays—was not considered an acceptable operating condition for an alternative.

To achieve the best flow of traffic, the level of service analysis in Exhibit 2.1-3 below assumes a raised center median along S.R. 108 except for intersections where left-turn lanes would be provided. Median treatments for roads are one of the most effective ways to regulate access, but they are also the most controversial. The two major median treatments are two-way left-turn lanes and raised medians. Many studies have found substantial safety benefits from median treatments, particularly raised medians. According to an analysis of accident data in seven states, raised medians reduce accidents by over 40% in urban areas (Gluck and others 1999). In addition, raised medians improved the level of service by one full grade in some areas (for example, from LOS D to LOS C) and increased lane capacity by as much as 36% (Iowa Department of Transportation 1997).

Raised medians also provide extra protection for pedestrians. A study of median treatments in Georgia found that raised medians reduced accidents involving pedestrians by 45% and reduced pedestrian fatalities by 78% compared to two-way left-turn lanes (FHWA, no date). Based on the above analysis and the need to maximize safety and roadway capacity, the initial alternatives were evaluated with a raised median.

What is a roadway median?

The *median* is the area between opposing lanes of traffic. Medians can either be open (no barrier or turn lane) or they can have various types of *median treatments*, such as a low concrete barrier (raised median) or a two-way left-turn lane.

Why does a raised median improve traffic flow?

Raised medians prevent vehicles from making left turns across lanes of traffic (either left turns from the roadway into driveways or left turns from driveways onto the roadway). Left turns slow the flow of traffic and increase accidents. Studies show that raised medians can improve traffic flow.

Evaluation of the Level of Service. Exhibit 2.1-3 provides an overview of the level of service expected in 2035 on nine segments of S.R. 108. S.R. 108 was divided into nine segments to help determine what type of improvements based on level of service would be necessary for specific areas along S.R. 108. The roadway segments represent sections of S.R. 108 between the major intersections. The locations of the nine segments are shown in Exhibit 2.1-4 below.

The shaded cells in Exhibit 2.1-3 indicate segments of S.R. 108 that do not meet the level 1 screening criterion of LOS D. Note that the Improve Other Area Roads Alternative (see page 2-13) was not evaluated using the regional travel demand model, so it is discussed qualitatively later in this chapter rather than included in the table.

Exhibit 2.1-3: Comparison of Level of Service for the Initial Alternatives with Raised Medians

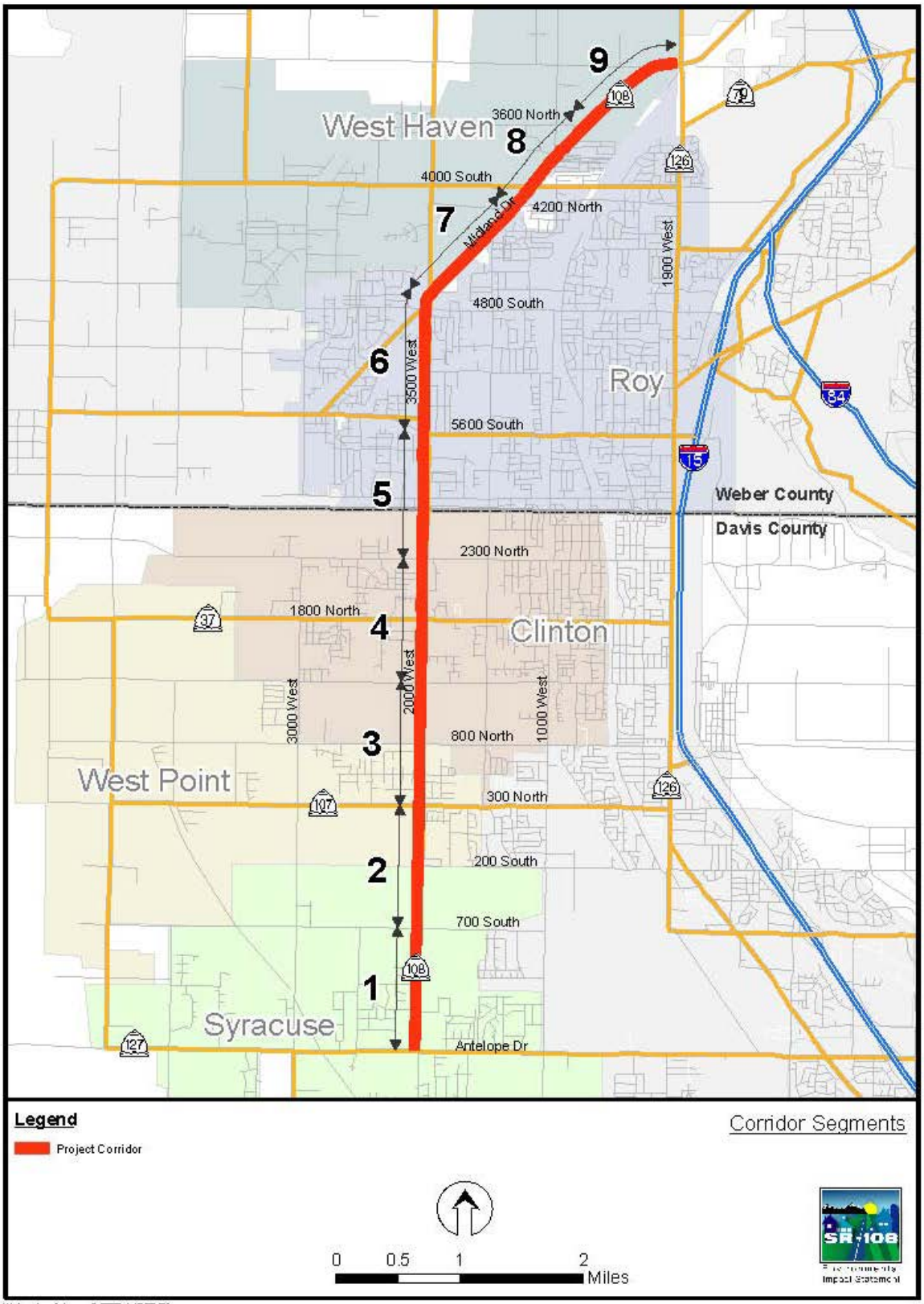
	Level of Service (LOS) on S.R. 108 Segment in 2035								
Alternative	1	2	3	4	5	6	7	8	9
No-Action	F	F	F	F	F	F	F	F	F
TSM	F	F	F	F	F	F	F	F	E
Transit Only	E	F	F	F	F	F	F	F	E
Three Lanes	D	F	F	F	F	F	E	F	D
TSM, Transit Only, and Three Lanes	C	F	F	F	F	F	E	F	C
Five Lanes	B	C	C	D	E	D	C	C	B
Seven Lanes	A	C	C	C	C	C	B	C	B

Source: InterPlan 2006b

Shaded cells indicate segments that do not meet the level 1 screening criterion of LOS D.

LOS A = free flow, no delays; LOS B = stable flow, minimal delays; LOS C = stable flow, acceptable delays; LOS D = restricted flow, regular delays; LOS E = maximum capacity, extended delays; LOS F = forced flow, excessive delays

Exhibit 2.1-4: Corridor Segments



Because many residents and business owners are concerned that a raised center median would reduce access to properties along S.R. 108, a level of service evaluation without a raised center median was also conducted. As shown in Exhibit 2.1-5, the initial alternatives would operate at a reduced level of service without a raised center median compared to having a raised center median.

Exhibit 2.1-5: Comparison of Level of Service for the Initial Alternatives without Raised Medians

	Level of Service (LOS) on S.R. 108 Segment in 2035								
Alternative	1	2	3	4	5	6	7	8	9
No-Action	F	F	F	F	F	F	F	F	F
TSM	F	F	F	F	F	F	F	F	E
Transit Only	F	F	F	F	F	F	F	F	E
Three Lanes	E	F	F	F	F	F	E	F	D
TSM, Transit Only, and Three Lanes	D	F	F	F	F	F	E	F	C
Five Lanes	B	D	D	E	F	E	C	C	B
Seven Lanes	A	C	C	C	C	C	C	C	B

Source: InterPlan 2006b

Shaded cells indicate segments that do not meet the level 1 screening criterion of LOS D.

LOS A = free flow, no delays; LOS B = stable flow, minimal delays; LOS C = stable flow, acceptable delays; LOS D = restricted flow, regular delays; LOS E = maximum capacity, extended delays; LOS F = forced flow, excessive delays

Because none of the alternatives other than the Seven-Lane Alternative would meet the level 1 screening criterion without a raised center median, the evaluation for the action alternatives below was based on a raised center median so that the best level of service could be provided for the initial alternatives.

No-Action and TSM Alternatives

The No-Action and TSM Alternatives would not add any travel lanes to S.R. 108. As shown in Exhibit 2.1-3: Comparison of Level of Service for the Initial Alternatives with Raised Medians above, these alternatives would not meet the purpose of reducing congestion on S.R. 108 as demonstrated by their failure to achieve the screening criterion of LOS D. As shown in Exhibit 2.1-3, if additional travel lanes are not added, the amount of future traffic would exceed the capacity of the road, resulting in LOS F along all segments of S.R. 108. In addition, by making no improvements to S.R. 108, these

Why was the TSM Alternative eliminated from further study?

The TSM Alternative was eliminated because it did not meet any of the three purpose elements.

alternatives would not meet the project purpose of eliminating roadway deficiencies and providing a multi-modal facility.

Based on the above evaluation, the TSM Alternative and the No-Action Alternative do not meet any of the three purpose elements. For this reason, the TSM Alternative was eliminated from further study. However, as required by NEPA, the No-Action Alternative was carried forward for detailed study. The No-Action Alternative serves as a baseline so that decision-makers can compare the environmental effects of the action alternatives. The TSM elements of the No-Action Alternative were carried forward in each of the action alternatives along with Transportation Demand Management, which consists of improving pedestrian-oriented design elements, improving transit infrastructure, and including a bicycle-friendly facility and environment.

Why was the No-Action Alternative carried forward for further study?

The No-Action Alternative was carried forward because NEPA requires an analysis of a No-Action Alternative. This alternative serves as a baseline so that decision-makers can compare the environmental effects of the action alternatives.

Transit-Only Alternative

The Transit-Only Alternative would provide more-frequent bus service along S.R. 108. Other modes of transit, such as commuter rail and light rail, are not identified in UTA's or WFRC's long-range transit plans, but S.R. 108 is being considered for enhanced bus service with a connection to UTA's proposed commuter rail line into Salt Lake City. The Transit-Only Alternative would not meet the purpose of reducing congestion on S.R. 108 as demonstrated by the alternative's failure to achieve the screening criterion of LOS D. As shown above in Exhibit 2.1-3: Comparison of Level of Service for the Initial Alternatives with Raised Medians, this alternative would result in S.R. 108 operating at LOS F along seven of the nine segments because the amount of future traffic would exceed the capacity of the road.

In addition, because it would not make any improvements to S.R. 108, this alternative would not meet the project purpose of eliminating roadway deficiencies. The alternative would meet the purpose of providing a multi-modal facility.

The Transit-Only Alternative was eliminated from further study because it did not meet two of the three purpose elements. However, this alternative was included as part of all of the action alternatives evaluated in this EIS.

Why was the Transit-Only Alternative eliminated from further study?

The Transit-Only Alternative was eliminated because it did not meet two of the three purpose elements (reducing roadway congestion on S.R. 108 and eliminating roadway deficiencies).

Three-Lane Alternative

The Three-Lane Alternative would consist of two travel lanes with a raised center median and would include left-turn and right-turn lanes at intersections, appropriate shoulders, and pedestrian, bicycle, and transit facilities. This alternative would meet the project purposes of providing a multi-modal facility and eliminating roadway deficiencies.

However, the Three-Lane Alternative would not meet the purpose of reducing congestion on S.R. 108, as demonstrated by the alternative's failure to achieve the screening criterion of LOS D. As shown in Exhibit 2.1-3: Comparison of Level of Service for the Initial Alternatives with Raised Medians above, this alternative would result in S.R. 108 operating at LOS F along six of the nine segments and at LOS E along one of the nine segments.

The Three-Lane Alternative was eliminated from further study because it did not meet one of the three purpose elements.

Why was the Three-Lane Alternative eliminated from further study?

The Three-Lane Alternative was eliminated because it did not meet one of the three purpose elements (reducing roadway congestion on S.R. 108).

TSM, Transit Only, and Three-Lane Alternatives

This alternative is a combination of the TSM, Transit-Only, and Three-Lane Alternatives. This alternative would meet the purposes of providing a multi-modal facility and improving roadway deficiencies. However, this alternative would not meet the purpose of reducing congestion on S.R. 108, as demonstrated by the alternative's failure to achieve the screening criterion of LOS D. As shown in Exhibit 2.1-3: Comparison of Level of Service for the Initial Alternatives with Raised Medians above, this alternative would result in S.R. 108 operating at LOS F along six of the nine segments.

This alternative was eliminated from further study because it did not meet one of the three purpose elements.

Why was the combination of the TSM, Transit-Only, and Three-Lane Alternatives eliminated from further study?

This alternative was eliminated because it did not meet one of the three purpose elements (reducing roadway congestion on S.R. 108).

Five-Lane Alternative

The Five-Lane Alternative would consist of four travel lanes with a raised center median and would include left-turn and right-turn lanes at intersections, appropriate shoulders, and pedestrian, bicycle, and transit facilities. As shown in Exhibit 2.1-3: Comparison of Level of Service for the Initial Alternatives with Raised Medians above, the Five-Lane Alternative would meet the LOS D screening criterion except for one segment that would operate at LOS E.

The level of service of LOS E in one segment is acceptable if widening the road beyond five lanes to achieve LOS D would result in substantially more relocations or environmental impacts. Compared to the Seven-Lane Alternative, the Five-Lane Alternative would have substantially fewer relocations, community impacts, Section 4(f) impacts, and environmental impacts. For the reasons stated in Section 2.1.2.1, Evaluation of the Initial Alternatives, the operation of one segment at LOS E is considered to be acceptable, given the substantially fewer relocations, Section 4(f) impacts, and environmental impacts of this alternative. Under this alternative, no segments of the road would operate at LOS F.

In addition, this alternative would meet the project purposes of providing a multi-modal facility and improving roadway deficiencies.

Because the Five-Lane Alternative meets the project's purpose, it was carried forward for level 2 screening.

Note that the Five-Lane Alternative operates at an acceptable level of service without a raised median on all segments except segments 4, 5, and 6 (see Exhibit 2.1-5: Comparison of Level of Service for the Initial Alternatives without Raised Medians above). Therefore, this alternative could be carried forward into level 2 screening without a raised median for most of the alternative and a raised median for only segments 4, 5, and 6. The use of dual left-turn lanes at certain intersections could also improve traffic flow and capacity enough to eliminate the need for raised medians.

Why was the Five-Lane Alternative carried forward for further study?

The Five-Lane Alternative was carried forward because it met all of the three purpose elements.

Seven-Lane Alternative

The Seven-Lane Alternative would consist of six travel lanes with a raised center median and would include left-turn and right-turn lanes at intersections, appropriate shoulders, and pedestrian, bicycle, and transit facilities. Of all the initial alternatives, only the Seven-Lane Alternative would achieve the screening criterion of LOS D or better for every segment of S.R. 108 that was evaluated. Therefore, this alternative would meet the purpose of reducing congestion on S.R. 108. This alternative would also meet the purposes of providing a multi-modal facility and improving roadway deficiencies.

The Seven-Lane Alternative would meet the purpose criteria for level 1 screening. However, the capacity of this alternative would far exceed the projected traffic in 2035, as shown by the projected levels of service of LOS A through LOS C in Exhibit 2.1-3: Comparison of Level of Service for the Initial Alternatives with Raised Medians above. Because the Seven-Lane Alternative would far exceed the need for the project and would result in substantially more relocations and environmental impacts as a result of the 24 feet of additional right-of-way, it was considered unreasonable.

The Seven-Lane Alternative would require a much wider cross-section (134 feet) than the Five-Lane Alternative (110 feet). The narrower Five-Lane Alternative would accommodate most of the projected traffic while causing substantially fewer impacts to existing homes, community cohesion, and Section 4(f) properties. Finally, the local and regional plans recommend a five-lane road because a seven-lane road would result in numerous residential and business relocations. (For a description of Section 4(f) properties, see the section titled Other Considerations on page 2-15.)

Based on the above evaluation, the severity of impacts from a Seven-Lane Alternative was considered unreasonable, and therefore this alternative was eliminated from further study.

Why was the Seven-Lane Alternative eliminated from further study?

The Seven-Lane Alternative was eliminated because it would far exceed the need for the project and would result in substantially more relocations and environmental impacts than the Five-Lane Alternative. For these reasons, the Seven-Lane Alternative was considered unreasonable.

Improve Other Area Roads Alternative

During the S.R. 108 scoping process, several public comments suggested that improvements should be made to other north-south roads adjacent to S.R. 108 to reduce congestion and the need for improvements to S.R. 108. Some comments suggested widening

1000 West or 3000 West, and other comments suggested that building the North Legacy Parkway west of the project area would reduce the need for improvements to S.R. 108. In response to these comments, the Improve Other Area Roads Alternative was developed and evaluated.

Because 1000 West and 3000 West (see Exhibit 2.1-4: Corridor Segments above) are not included in the regional travel demand model, a level of service analysis using the model could not be conducted for this alternative. Instead, a qualitative level of service analysis was conducted. In addition, this alternative was evaluated with regard to the other two elements of the project's purpose.

Why was the Improve Other Area Roads Alternative eliminated from further study?

The Improve Other Area Roads Alternative was eliminated because it did not meet any of the three purpose elements.

Qualitative Level of Service Analysis

UDOT used the principles of travel demand and traffic flow to conduct a qualitative level of service analysis that examines how the Improve Other Area Roads Alternative would affect the level of service on S.R. 108.

1000 West and 3000 West are discontinuous roads that do not extend the full length of the S.R. 108 project area. The travel time on either a widened 1000 West or a widened 3000 West would be longer than the travel time on a similarly sized S.R. 108 for two reasons. First, drivers would need to access 1000 West or 3000 West using smaller east-west roads including residential streets, while drivers on S.R. 108 would not have any east-west travel. Second, drivers would need to make additional left and right turns through the project area compared to traveling through the area on S.R. 108 only.

Because of the out-of-direction travel and additional stops and turns, travel times on 1000 West or 3000 West would not be substantially shorter than travel times on S.R. 108. Given this situation, some drivers would choose the less-congested but longer routes of 1000 West or 3000 West, while other drivers would choose the more-congested but more direct route of S.R. 108.

In addition, many drivers travel on S.R. 108 to access the businesses and residences along S.R. 108. These drivers would probably choose to travel entirely on S.R. 108 regardless of the congestion level rather than use 1000 West or 3000 West for part of their route. For these reasons, the qualitative level of service analysis concluded that the

Improve Other Area Roads Alternative would not substantially improve the level of service on S.R. 108.

Eliminate Roadway Deficiencies Associated with Lack of Shoulders and Turn Lanes To Reduce Accident Rates on S.R. 108

Under this alternative, improvements would be made to either 1000 West or 3000 West and no improvements would be made to S.R. 108. Because none of the roadway deficiencies identified for S.R. 108 would be eliminated, this alternative would not meet this purpose element.

Enhance the Opportunity for Multi-modal Use of S.R. 108

Because this alternative would not involve any improvements to S.R. 108, the alternative would not enhance the opportunity of multi-modal use by providing improved transit facilities for existing bus service or improving bicycle or pedestrian facilities. Therefore, this alternative would not meet this purpose element.

Other Considerations

S.R. 108 offers regional mobility by providing a through street from Antelope Drive to S.R. 126. Within the project area, neither 1000 West nor 3000 West are continuous north-south roads. Both roads would need to be continuous north-south roads to meet the project purpose of improving local and regional mobility. 1000 West ends at 2300 South (Shoestring Park) in Clinton and at 4800 South in Roy at an area planned for industrial development. Making 1000 West a through north-south road would require removing both the park (a Section 4(f) property) and the industrial area, and neither of these changes would be compatible with the City of Roy's long-term development plans. In addition, widening the road would affect both Kiwanis Park and Heritage Park in Clinton, both of which are Section 4(f) properties.

3000 West currently ends at Ponds Park in Clinton at about 2300 North and starts again at 6000 South in Roy. Completing this segment as a through road would affect Ponds Park in Clinton (a Section 4(f) property). The road ends again at 4000 South in West Haven, so it does not provide a complete north-south connection.

Why must Section 4(f) properties be avoided?

Section 4(f) is part of an FHWA regulation that requires a project to avoid the use of historic properties that are eligible or potentially eligible for the National Register of Historic Places and recreation and wildlife areas unless there is no feasible and prudent alternative to such use. Even then, all measures must be taken to minimize harm to these properties.

Building the road north of 4000 South would cause impacts to a housing development.

All of the cities' transportation and land use plans identify the need to improve S.R. 108 by widening the existing road. The cities propose widening the road to meet their goal of establishing S.R. 108 as a primary or secondary commercial corridor. In addition, the WFRC Regional Transportation Plan recommends widening S.R. 108. Not improving S.R. 108 would be inconsistent with local and regional land use plans and would not meet the local growth objectives.

The Syracuse and Clinton zoning and land use plans show 1000 West and 3000 West being developed as primarily residential corridors. There are five parks along these corridors: three in Clinton along 1000 West and one in Clinton and another in Roy along 3000 West. Therefore, widening the roads to five lanes would not be consistent with the land use plans that include residential developments. In addition, both cities' transportation plans show these roads as minor collectors of either two or three lanes that provide service to residential developments, not as five-lane roads.

Proposed North Legacy Parkway

The planned North Legacy Parkway project is proposed as a four-lane, limited-access road about 1 mile west of the project area that would provide a continuous north-south facility. The North Legacy Parkway project is in the WFRC Regional Transportation Plan and was included as part of the No-Action Alternative for the S.R. 108 project. Even if the North Legacy Parkway were built, the level of service on S.R. 108 would be LOS F, so improvements to S.R. 108 would still be needed even with the Legacy Parkway.

Conclusion

In summary, widening 1000 West or 3000 West would not eliminate roadway deficiencies and would not improve multi-modal use of S.R. 108. In addition, widening these roads would not provide regional connectivity or substantially reduce congestion on S.R. 108. For these reasons, the Improve Other Area Roads Alternative was eliminated from further study.

2.1.2.2 Level 1 Screening Results

As shown in Exhibit 2.1-6, there is no initial alternative or combination of the initial alternatives, other than the Five-Lane Alternative, that would meet all of the project's purpose while avoiding the excessive impacts of the Seven-Lane Alternative. Therefore, only the Five-Lane Alternative was carried forward for level 2 screening.

Exhibit 2.1-6: Level 1 Screening Results (Evaluate Alternatives against the Project Purpose)

	Alternative							
Purpose Element	No-Action	TSM	Transit Only	Three Lanes	TSM, Transit Only, and Three lanes	Five Lanes	Seven Lanes[a]	Improve Other Area Roads
Reduce roadway congestion on S.R. 108.	No	No	No	No	No	Yes	Yes	NA
Eliminate the roadway deficiencies associated with a lack of shoulders and turn lanes in order to reduce accident rates on S.R. 108.	No	No	No	Yes	Yes	Yes	Yes	No
Enhance the opportunities for multi-modal use of S.R. 108 by providing improved bicycle, pedestrian, and transit facilities consistent with local and regional land use and transportation plans.	No	No	Yes	Yes	Yes	Yes	Yes	No

NA = not applicable

[a] The Seven-Lane Alternative was determined to be unreasonable because it would have substantially more impacts to homes (due to relocations) and environmental resources.

2.1.3 Level 2 Screening

The purpose of level 2 screening was to further refine and develop the alternatives that met all of the project purpose elements in level 1 screening. For this project, the only alternative that passed the level 1 screening was the Five-Lane Alternative. As noted in Section 2.1.2.1, Evaluation of the Initial Alternatives, the Seven-Lane Alternative passed the level 1 screening but was determined to be unreasonable because it would have substantially more impacts to homes (due to relocations) and environmental resources. The level 2 screening was conducted to ensure that the alternatives with the least amount of impacts to the communities and the natural environment would be carried forward for detailed study in this EIS and that the alternatives with the greatest impacts would be eliminated. To evaluate these impacts, a different set of criteria from the level 1 screening criteria was developed. This evaluation also required the

alternatives' roadway widths and alignments to be refined. The level 2 screening process consisted of two steps:

- Development of the preliminary five-lane alternatives
- Evaluation of these alternatives

If the alternative refinements that were made during the level 2 screening had been done for the initial set of alternatives, this would not have changed how well the initial alternatives met the project's purpose.

2.1.3.1 Development of the Preliminary Five-Lane Alternatives

This section explains how the preliminary five-lane alternatives were developed so that the alternatives' impact to the community and the natural environment could be evaluated. For the Five-Lane Alternative that passed the level 1 screening, five different alignment alternatives were developed and evaluated in more detail to develop a range of reasonable alternatives to be considered in this EIS. The five alignment alternatives represent the different alignment variations that could be implemented under the Five-Lane Alternative. These five alignments are referred to as the preliminary five-lane alternatives.

What are the preliminary five-lane alternatives?

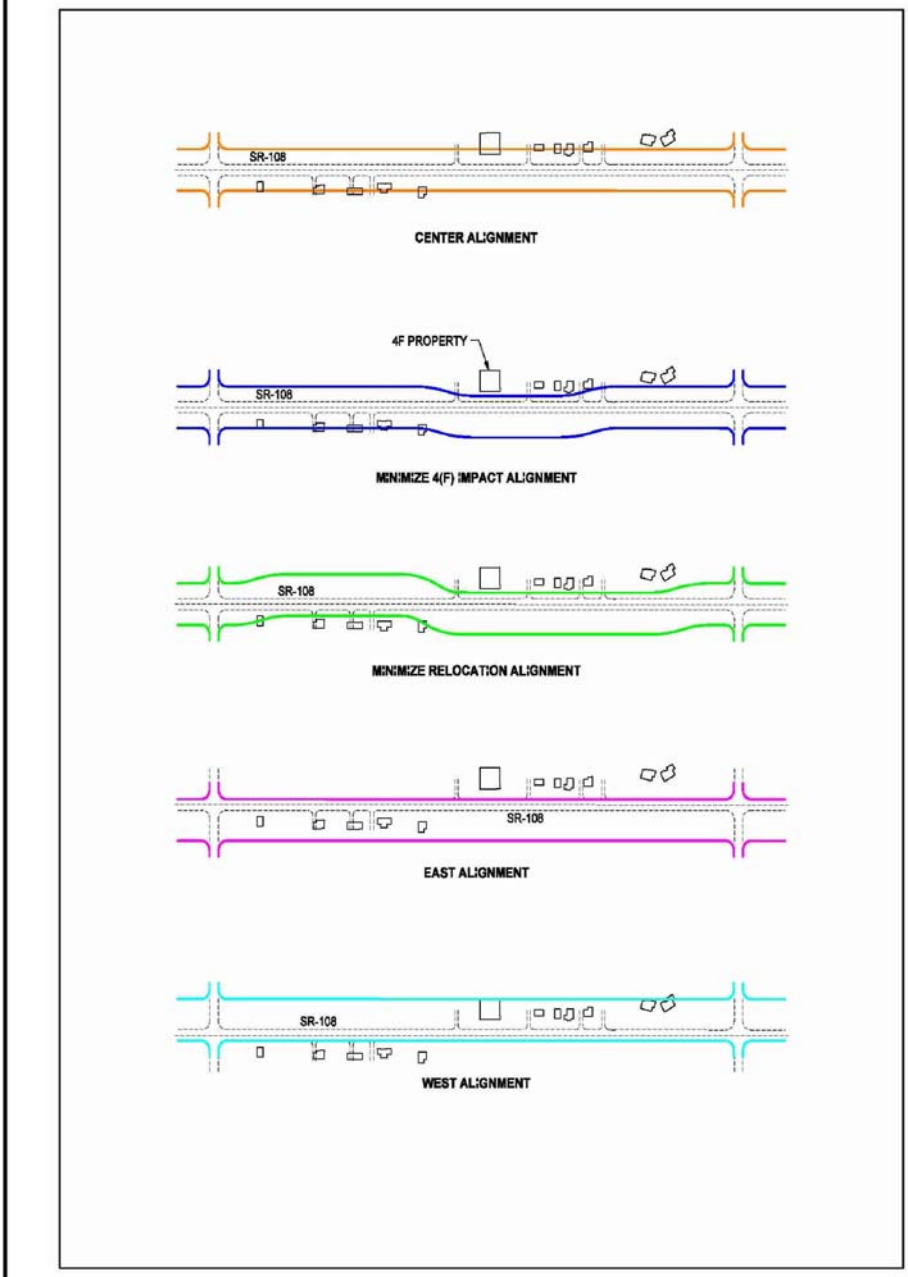
The preliminary five-lane alternatives are the different alignment variations that could be implemented under the Five-Lane Alternative. The preliminary five-lane alternatives were evaluated using level 2 screening.

Exhibit 2.1-7 describes the five alternatives that were evaluated during level 2 screening. These alternatives are shown below in Exhibit 2.1-8.

Exhibit 2.1-7: Preliminary Five-Lane Alternatives

Alternative	Cross-Section Width	Description
Center Alignment	110 feet	Widen the roadway equally to the west and east.
Minimize 4(f) Impacts Alignment	110 feet	Widen the roadway to both the west and east to minimize Section 4(f) impacts.
Center Meander Alignment	110 feet	Widen the roadway to both the west and east to minimize overall property impacts, regardless of Section 4(f) status.
East Alignment	110 feet	Widen the roadway primarily to the east.
West Alignment	110 feet	Widen the roadway primarily to the west.

Exhibit 2.1-8: Preliminary Five-Lane Alternatives for Level 2 Screening



Preliminary Five-Lane Alternatives for Level 2 Screening

SR-108 Environmental Impact Statement

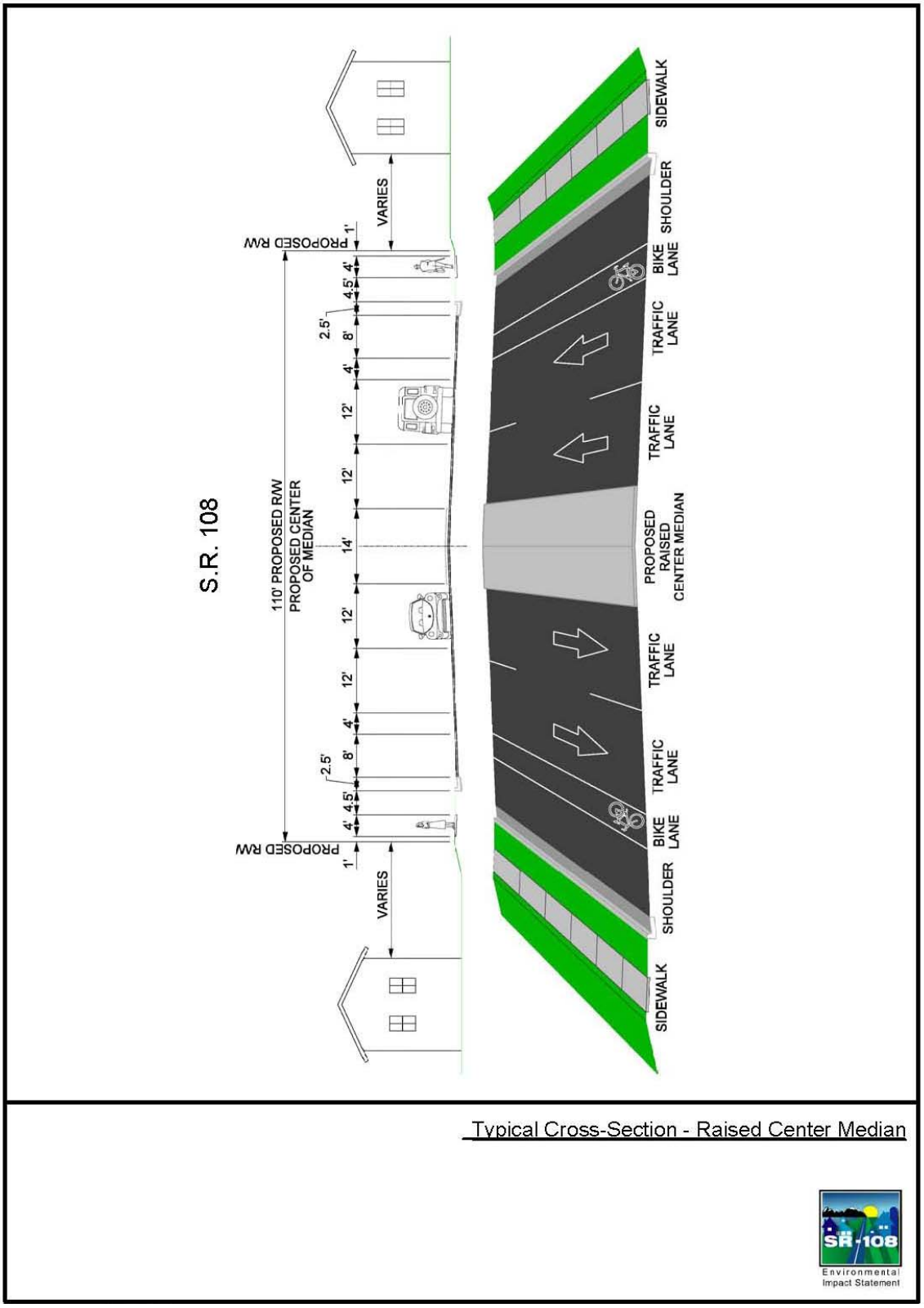
Typical Cross-Sections. All of the preliminary five-lane alternatives would include the following improvements to S.R. 108. These improvements are shown in Exhibit 2.1-9 and Exhibit 2.1-10 below.

- Widen S.R. 108 to a 110-foot, five-lane cross-section consisting of four 12-foot travel lanes, a 14-foot median (either a two-way left-turn lane or a raised center median), 8-foot shoulders, 4-foot bicycle lanes, 2.5-foot curb and gutter, 4.5-foot park strips, 4-foot sidewalks, and 1 foot between the back of the sidewalk and the edge of the right-of-way.
- Improve most intersections with dedicated right-turn and left-turn lanes.
- Include enough shoulder width to accommodate bus service.

Hinckley Drive Extension. For the preliminary five-lane alternatives considered in level 2 screening in the Draft EIS, it was assumed that the Hinckley Drive extension at 3600 South on S.R. 108 would be in place because the project is funded for construction in 2010 (see Section 1.3.4, Related Projects). The screening in the Draft EIS assumed the connection from S.R. 108 to Hinckley Drive to be an extension of S.R. 108 without traffic signals and assumed that the segment of S.R. 108 from 3600 South to 1900 West would be blocked off. Under this scenario, the segment of S.R. 108 north of 3600 South in West Haven would operate at a level of service of LOS B, so no roadway improvements would be needed to meet the projected traffic in 2035.

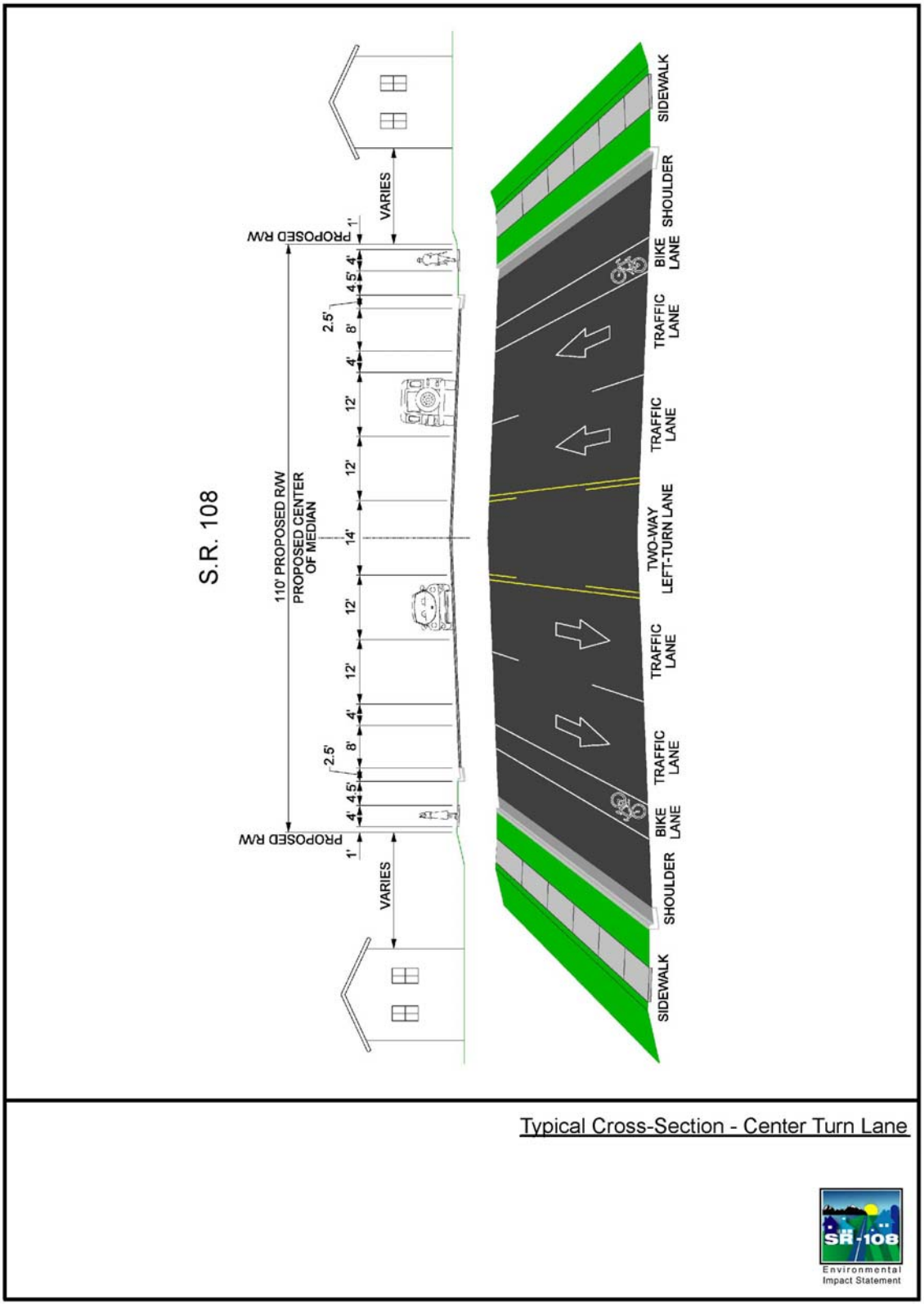
After the Draft EIS was released, UDOT modified this connection to become a traffic signal with an intersection design that would allow access to S.R. 108 north of 3600 South. As a result, further travel demand modeling showed that the segment of S.R. 108 from 3600 South to 1900 West would need to be improved from a two-lane road to a five-lane road and would have a level of service of LOS B. The improvements to S.R. 108 from 3600 South to 1900 West (a distance of about 1.5 miles) are therefore included in this Final EIS under the action alternatives.

Exhibit 2.1-9: Typical Cross-Section – Raised Center Median



Typical Cross-Section - Raised Center Median

Exhibit 2.1-10: Typical Cross-Section – Center Turn Lane



Roadway Width. A 110-foot roadway width was used for the preliminary five-lane alternatives. The key elements of the project purpose are to reduce roadway congestion on S.R. 108, eliminate roadway deficiencies associated with the lack of shoulders and turn lanes in order to reduce accidents, and provide appropriate bicycle, pedestrian, and transit facilities. All of these elements were considered in developing the roadway width.

To determine the roadway width, standards from both UDOT and the American Association of State Highway and Transportation Officials (AASHTO) were considered. UDOT uses AASHTO's standards unless UDOT's standards are more stringent. Exhibit 2.1-11 provides an overview of the elements of the S.R. 108 typical cross-section and the associated standards for each element. The standards shown in Exhibit 2.1-11 for each cross-section element are either the AASHTO standard or UDOT's more stringent standard to provide optimum roadway safety.

How are standards developed?

Roadway standards are based on extensive national historical research and study so that safe and efficient roadways are provided to the public. Standards are developed for specific roadway types and traffic volumes such as arterials similar to S.R. 108.

Exhibit 2.1-11: Roadway Cross-Section Elements and Standards

Cross-Section Element	S.R. 108 with 110-Foot Cross-Section (feet)
Median treatment (two-way left-turn lane or raised median)	14[a]
Travel lane	12[b]
Bicycle lane	4[a]
Shoulder	8[a]
Curb and gutter	2.5[a]
Park strip	4.5[a]
Sidewalk	4[a]
Distance between back of sidewalk and edge of right-of-way	1[a]

See Exhibit 2.1-9: Typical Cross-Section – Raised Center Median and Exhibit 2.1-10: Typical Cross-Section – Center Turn Lane above for the total cross-section width.

[a] UDOT standard

[b] AASHTO standard

The total right-of-way width cannot be less than what is required for all the elements of the design cross-section, which include through-traffic lanes, turn lanes, and the border area for bicycle lanes,

shoulders, park strips, sidewalks, and utilities. Providing the appropriate roadway width for each element is necessary to meet the project purposes of reducing roadway congestion and improving safety on S.R. 108.

In addition, the context of the surrounding area and its uses were also considered when determining what standards to use for the width of the roadway cross-section. For the S.R. 108 roadway, this context includes a corridor with three schools (which students travel to by walking and biking), a bus route, and numerous residential accesses. The list below explains why the widths shown in Exhibit 2.1-11: Roadway Cross-Section Elements and Standards above were selected for each roadway cross-section element.

- **Median Treatment (Two-Way Left-Turn Lane or Raised Median).** Median treatments for roadways are one of the most effective means for regulating access and the locations of left turns. According to an analysis of accident data from seven states, raised medians can reduce accidents by over 40% in urban areas (Gluck and others 1999). Raised medians also provide extra protection for pedestrians by providing a relatively safe place for pedestrians to stop while crossing the road (FHWA 2001). A study of corridors in several cities in Iowa found that painted two-way left-turn lanes reduced accidents by as much as 70%, improved the level of service by one full grade (for example, from LOS D to LOS C) in some areas, and increased lane capacity by as much as 36% (Iowa Department of Transportation 1997). Both painted and raised medians are commonly used on lower-speed urban arterials like S.R. 108. Both of these types of medians are 14 feet wide, which meets UDOT's and AASHTO's criteria. The 14-foot width is necessary to accommodate left-turn lanes; for painted medians, this includes two 1-foot painted stripes and a 12-foot traffic lane, while for raised medians, this includes a 2-foot separation curb and a 12-foot traffic lane.
- **Travel Lanes and Shoulders.** Twelve-foot travel lanes maximize capacity and increase mobility. According to the 2000 Highway Capacity Manual (AASHTO 2000), a reduction of lane width from 12 feet to 10 feet decreases free-flow speed by 6.6 mph (miles per hour). Reducing the lane and shoulder widths

What is free-flow speed?

Free-flow speed is the term used to describe the average speed that a motorist would travel if there were no congestion or adverse conditions.

on S.R. 108 would reduce the capacity of the road. With reduced shoulder and lane widths, the capacity of the preliminary five-lane alternatives would be reduced to 36,000 vehicles per day, which would result in LOS F for three segments (InterPlan 2006b). This would not meet the project purpose of reducing congestion on S.R. 108, as demonstrated by the roadway's failure to achieve the screening criterion of LOS D.

In addition, S.R. 108 has numerous residential and business accesses. As shown in Section 1.4.4.1, Accidents, S.R. 108 has a high percentage of rear-end accidents (41%) that occur when vehicles are not able to pull out of traffic in order to make turns into residential or business driveways. Providing turn lanes and shoulders that are narrower than the desired standard would not be prudent. In addition, UTA operates bus service on this route, and buses need the maximum shoulder width to pull out of traffic when picking up and dropping off passengers.

- **Bicycle Lane.** WFRC's Bicycle Plan shows a proposed Class III bicycle facility on S.R. 108 for the entire project corridor. A Class III bicycle route provides only a sign for designated bicycle travel on a roadway shared with cars. However, this area would have a heavy volume of vehicle traffic and possible residential street parking. If a Class III bicycle facility is used, the slower-moving bicycles would decrease the roadway capacity and the level of service along S.R. 108, and bicyclists could face a greater safety risk from parked cars (due to people opening car doors in the path of bicyclists). In addition, students would ride bicycles to three schools in the corridor. For this reason, the S.R. 108 project includes a Class II bicycle facility along S.R. 108 because it would remove bicyclists from the vehicle traffic lanes and place them in their own separate lane for improved safety. Bicyclists require a space at least 40 inches wide due to the width of the bicycle and the rider (AASHTO 1999). Therefore, standard-width bicycle lanes with an operating space of 4 feet (48 inches) would be used as the minimum width for any bicycle facility designed for S.R. 108.
- **Park Strip.** The park strip is one element of the border area along the side of the street that is provided for the safety of motorists and pedestrians as well as for aesthetic reasons. The

Why does WFRC make recommendations about bicycle facilities?

WFRC provides general recommendations for the type of bicycle facilities to be implemented on major roads in its jurisdiction in order to accommodate people who bike to work, school, or other locations. The Bicycle Plan helps increase the percentage of non-motorized trips by identifying the areas that are most in need of bicycle improvements and focusing improvements on those areas. The recommendations in the Bicycle Plan are considered by UDOT during the development of a project to ensure that UDOT takes the specific context of the project into account when it makes its final determination about the type of bicycle lane that will be implemented.

park strip serves several purposes including providing a buffer space between pedestrians and vehicle traffic, accommodating the sidewalk, accommodating underground and aboveground utilities, providing a space for road signs, and providing an area to pile snow that is removed from the adjacent road and sidewalks. Removing or reducing the proposed 4.5-foot width of the park strip would place the sidewalk next to or closer to parked vehicles and the traffic lanes on S.R. 108, which would decrease safety for pedestrians and motorists. In addition, utility poles line the roadway along S.R. 108, so the 4.5-foot park strip is necessary for relocating utility poles (with a narrower park strip, the utility poles would encroach on the sidewalk).

- **Sidewalk.** Sidewalks are the second element of the border area. Because they allow residents to access locations along S.R. 108, sidewalks should be provided along both sides of the street. There are three schools directly on S.R. 108 and five other schools whose service boundaries cross S.R. 108. Many students either walk along S.R. 108 or cross it to get to school. Providing the desirable safety standard for sidewalks is important for assuring pedestrian safety. Providing less-than-desirable safety would not be prudent. According to AASHTO, the minimum width for a sidewalk is 4 feet, not including any attached curb, and all sidewalks must be constructed with this width.

  During the public scoping period, many residents commented that the existing road was unsafe for pedestrians, including students, because of the lack of shoulders and sidewalks. According to a survey that was provided to Syracuse Elementary School students and parents, 19% of parents who responded would allow their student to walk to school if adequate sidewalks were available (HDR 2006b).

- **Curb and Gutter.** Curb and gutter is necessary in urban areas for controlling access to adjacent properties, draining stormwater runoff, and protecting pedestrians. A 2.5-foot curb and gutter width is required for the S.R. 108 project. The 1-foot curb and 1.5-foot gutter widths are mandated by AASHTO standards in order to accommodate the total flow of stormwater according to drainage requirements.

2.1.3.2 Evaluation of the Preliminary Five-Lane Alternatives

During the second step of level 2 screening, the preliminary five-lane alternatives were screened based on the resource criteria described in Exhibit 2.1-12. These criteria, which are different than those used in level 1 screening, were selected to ensure that the alternatives that would cause the least amount of disruption to the community and the fewest environmental impacts would be carried forward for detailed study in this EIS.

Section 4(f) impacts were given substantial consideration since the FHWA regulations require avoidance of significant public parks, recreation areas, wildlife and waterfowl refuges, and historic sites as part of a project unless there is no feasible and prudent alternative to the use of such land. Impacts to Agriculture Protection Areas (APAs) and wetlands were also weighed strongly because these areas can be used for a roadway project only if there are no practicable alternatives to such impacts. (For a description of Section 4(f) properties, see the section titled Other Considerations on page 2-15.)

Exhibit 2.1-12: Resource Criteria Considered in Level 2 Screening

Criterion	Description
Relocations	The number of residences or businesses that would need to be completely removed because the structure would be within the right-of-way. Relocations would require acquisition of the property.
Potential relocations	The number of residences or businesses where the property would be within the right-of-way and the structure would be within 15 feet of the right-of-way. Potential relocations might require acquisition of the property. During preliminary design, the level of engineering is not detailed enough to determine whether the entire property would need to be acquired. UDOT would make the final determination about whether a property needs to be acquired during the right-of-way negotiation process, which occurs after the final design is completed. By the end of the right-of-way acquisition phase, UDOT will determine whether each potential relocation would be a full relocation or a strip take.
Total property takes	The combined number of relocations, potential relocations, and strip takes. Strip takes are right-of-way impacts to a property that require the acquisition of only a portion of land.
4(f) properties (adverse)	The number of Section 4(f) uses that would be adverse.
Farmland	The number of APAs affected.
Wetlands	The acreage of wetlands that would be filled as a result of the project.

For each alternative, the number of impacts to each of the above resources was determined. Exhibit 2.1-13 provides a summary of the impacts from the preliminary five-lane alternatives.

Exhibit 2.1-13: Summary of Impacts from the Preliminary Five-Lane Alternatives

Alternative	Number of Relocations[a]	Number of Potential Relocations[a]	Number of Strip Takes	Total Property Impacts[b]	Number of 4(f) Uses (Adverse)	Number of APAs Affected	Acres of Wetlands Lost
Center Alignment	31	133	299	463	27	4	0.025
Minimize 4(f) Impacts Alignment	61	47	246	354	14	4	0.025
Center Meander Alignment	42	93	244	379	25	4	0.025
East Alignment	147	42	87	276	33	2	0.039
West Alignment	108	57	167	332	22	2	0.025

[a] Includes residential and commercial.

[b] Includes relocations, potential relocations, and strip takes.

2.1.3.3 Level 2 Screening Results

The five preliminary alternatives were evaluated against the screening criteria shown in Exhibit 2.1-13 above to determine which alternatives should be eliminated and which should be carried forward for detailed study in this EIS. Exhibit 2.1-14 below summarizes the reasons why the Center, Center Meander, and East Alignments were eliminated from further study and why the Minimize 4(f) Impacts and West Alignments were carried forward for detailed study.

Based on the historic evaluation conducted on the homes along S.R. 108, the properties that were considered Section 4(f) properties have similar integrity and were considered to have equal value when determining which alternative to carry forward. As noted in Section 2.1.3.2, Evaluation of the Preliminary Five-Lane Alternatives, Section 4(f) impacts were given the most consideration when determining which alternative to carry forward.

Exhibit 2.1-14: Level 2 Screening Results (Evaluate Community and Environmental Impacts)

Alternative	Level 2 Screening Results	Discussion
Center Alignment	Eliminated	• Third-highest number of combined direct relocations and potential relocations (164). • Highest number of total property impacts (463) when potential relocations and strip takes are included. • Second-highest number of adverse Section 4(f) uses (27). • Highest number of APAs affected (4). • **Screening Result:** Because it had the highest number of total property impacts and the second-highest number of adverse Section 4(f) uses, the Center Alignment was eliminated from further study.
Minimize 4(f) Impacts Alignment	Carried forward	• Fewest number of adverse Section 4(f) uses (14). • Lowest number of relocations and potential relocations (108). • Highest number of APAs affected (4). • **Screening Result:** Because it had the fewest number of adverse Section 4(f) uses along with the lowest number of relocations and potential relocations, the Minimize 4(f) Impacts Alignment was carried forward for detailed study.
Center Meander Alignment	Eliminated	• Second-lowest number of combined direct relocations and potential relocations (135). • Second-highest number of total property impacts (379). • Third-highest number of adverse Section 4(f) uses (25). • Highest number of APAs affected (4). • **Screening Result:** Based on the high number of adverse Section 4(f) uses and total property impacts, the Center Meander Alignment was eliminated from further study.
East Alignment	Eliminated	• Highest number of combined direct relocations and potential relocations (189). • Highest number of adverse Section 4(f) uses (33). • Would require relocation of Syracuse Elementary School, which would result in an impact to the community. • Highest number of wetland impacts (0.039 acre). • Lowest number of APAs affected (2). • **Screening Result:** Based on the high number of relocations and potential relocations, adverse Section 4(f) uses, the relocation of the elementary school, and impacts to wetlands, the East Alignment was eliminated from further study.
West Alignment	Carried forward	• Second-lowest number of adverse Section 4(f) uses (22) and total property impacts (332). • Lowest number of APAs affected (2). • Would improve the level of service and safety by eliminating many access points along one side of S.R. 108, which would improve overall traffic operations and safety. • **Screening Result:** Because it had the second-lowest number of Section 4(f) impacts and total property impacts and because it would improve the level of service and safety, the West Alignment was carried forward for detailed study.

2.2 Alternatives Considered for Detailed Study

The three alternatives carried forward for detailed study in this EIS are the No-Action Alternative (to be used as a baseline), the Minimize 4(f) Impacts Alternative, and the West Alternative. This section provides a detailed description of each alternative. In order to conduct a detailed evaluation of these alternatives, preliminary engineering and cost estimates were developed for both of the action alternatives. In addition, the alternative alignments were further refined from level 2 screening to minimize impacts to the communities and the natural environment. The roadway alignment alternatives for S.R. 108 were based on the need to improve safety and eliminate existing design deficiencies, improve mobility and level of service, and meet the goals in the local community land use plans.

Which alternatives were carried forward for detailed study in this EIS?

The three alternatives carried forward for detailed study in this EIS are the No-Action Alternative, the Minimize 4(f) Impacts Alternative, and the West Alternative. The Minimize 4(f) Impacts Alternative and the West Alternative would both widen S.R. 108 to five lanes (four travel lanes with either a two-way left-turn lane or a center raised median).

2.2.1 No-Action Alternative

NEPA requires an analysis of the No-Action Alternative. This alternative serves as a baseline so that decision-makers can compare the environmental effects of the action alternatives.

If the No-Action Alternative is selected, no improvements to S.R. 108 or adjacent transportation facilities would be made other than those improvements already identified in the WFRC long-range plan to enhance mobility in the area. These activities, which might have some environmental impacts, would be evaluated in a separate document.

If no action is taken on S.R. 108, UDOT and the cities would likely continue to make minor maintenance improvements such as rehabilitating pavement and improving shoulders, turn lanes, sidewalks, and curb and gutter. The cities might require developers to provide some of these improvements as part of any new development along S.R. 108. Overall, the basic two-lane configuration of S.R. 108 would not change under the No-Action Alternative.

2.2.2 Action Alternatives

2.2.2.1 Project Features

In order to evaluate the action alternatives in detail, preliminary engineering was conducted to determine the right-of-way requirements for each alternative. The specific right-of-way for each alternative was then evaluated to determine its impacts to the community and the natural environment (for a detailed discussion of impacts, see Chapter 4, Environmental Consequences). To conduct this evaluation, each alignment considered for the action alternatives was reviewed in a series of steps to determine the final roadway design and alignment.

Environmental and Community Considerations

To further refine the action alternatives to minimize impacts to the communities and the natural environment, various resources were considered including wetlands, threatened and endangered species (including habitat), farmland, water quality, the social setting, cultural resources, and Section 4(f) uses. When creating the alternatives, literature searches as well as input from the public and resource agencies during alternative workshops that were held in October 2006 were considered. The alignments were modified where necessary to minimize impacts, primarily to Section 4(f) resources.

During the development of the action alternatives, local communities were also asked for input regarding project features. The City of Clinton would like to build an underpass across S.R. 108 to use as a school crossing and to connect the western part of the city to a planned park and city buildings. Neither of the action alternatives would prevent an underpass from being built.

Engineering Considerations

Engineering considerations for S.R. 108 included overall roadway safety, typical cross-sections, utility lines and relocations, and Section 4(f) uses. Both action alternatives were designed with a 45-mph design speed. For the most part, all transitions were designed with a maximum horizontal curve radius to eliminate the need for superelevation (that is, a normal crown section was used), using reverse curves with radii of 6,500 feet (AASHTO 2004, 168).

What are superelevation and normal crown section?

Superelevation is a roadway design technique that involves tilting the roadway to help offset the centripetal forces that develop as a vehicle goes around a curve.

Normal crown section is the minimum cross slope required to accommodate drainage of the roadway; usually 2% each direction from centerline.

The alignment for both action alternatives extends north to 1900 West and includes the proposed Hinckley Drive extension (see Section 1.3.4, Related Projects).

Alternative Cost Estimate

To assist in comparing the action alternatives, preliminary cost estimates were developed and are shown in Exhibit 2.2-1. These estimates are based on the preliminary engineering conducted for the action alternatives and include the total project cost for construction, right-of-way acquisition, utility relocation, and design engineering. Estimates were developed for a base cost using unit construction costs prevailing in 2007 and assuming the project would be constructed in 2007 without increases due to inflation over the period until the year of expenditure, when the project would be constructed.

Some federal and state funding sources have been identified for the S.R. 108 project, with $20 million programmed in the 2008 State Transportation Improvement Program.

Exhibit 2.2-1: Preliminary S.R. 108 Cost Estimate

Type of Cost	Minimize 4(f) Impacts Alternative	West Alternative
Segment 1 – S.R. 127 to 1300 North		
Right-of-way[a]	$48,400,000	$53,300,000
Design and construction	$24,900,000	$24,900,000
Segment 2 – 1300 North to 4800 South		
Right-of-way[a]	$31,800,000	$45,200,000
Design and construction	$23,900,000	$24,000,000
Segment 3 – 4800 South to S.R. 126		
Right-of-way[a]	$27,200,000	$32,400,000
Design and construction	$21,900,000	$21,900,000
All Segments		
Total	$178,100,000	$201,700,000

[a] Right-of-way cost includes utility relocations and construction easements.

Construction Phasing

Improvements to S.R. 108 would occur as funding becomes available. Initial construction is expected to start in 2010.

2.2.2.2 Minimize 4(f) Impacts Alternative (Preferred Alternative)

The Minimize 4(f) Impacts Alternative involves widening S.R. 108 to a 110-foot, five-lane cross-section. In order to minimize the use of Section 4(f) properties, the alignment varies between the center alignment, west alignment, and east alignment. The transition from one alignment to the next was made with reverse curves requiring no superelevation based on a design speed of 45 mph.

Construction phasing and maintenance of traffic would be more complex with this alternative due to the transitions and because the alignment shifts from one side of the road to the other. However, the Minimize 4(f) Impacts Alternative would allow more flexibility to refine the alignment in the future to miss important utilities.

Typical Cross-Sections

For the Minimize 4(f) Impacts Alternative, two typical cross-sections were developed: a cross-section with a center two-way left-turn lane and a cross-section with a raised center median. The following elements would be included in both the center turn lane and raised center median typical cross-sections:

- Five-lane (110-foot) cross-section consisting of four 12-foot travel lanes, a 14-foot median (either a two-way left-turn lane or a raised center median), 8-foot shoulders, 4-foot bicycle lanes, 2.5-foot curb and gutter, 4.5-foot park strips, 4-foot sidewalks, and 1 foot between the back of the sidewalk and the edge of the right-of-way.
- Although the exact location of raised medians would be determined during the final design of the project, raised medians would be considered in high-traffic areas such as commercial districts and schools to improve safety. Proposed medians to improve school safety would be at 1700 South mid-block for Syracuse Elementary and Syracuse Junior High Schools, at 700 South in Syracuse adjacent to the new Syracuse High

Where can I find more information about the roadway design evaluated in this EIS?

See Appendix A, Roadway Plans, for more information about the design evaluated in this EIS for the Minimize 4(f) Impacts Alternative.

School, and at 550 North in West Point. A further evaluation showed that the use of dual left-turn lanes without raised medians would improve the level of service to LOS D or better in all segments of S.R. 108.

- Improve most intersections with dedicated right-turn and left-turn lanes. Dual left-turn lanes would be provided at 1700 South (southbound only), 1800 North, 5600 South, and 4800 South.
- Include enough shoulder width to accommodate bus service.
- Support bicycle use along S.R. 108 by providing Class II bicycle lanes.

Detention Basins

As part of the S.R. 108 improvements, a stormwater drainage system would be constructed to control the additional runoff that would result from the increase in impervious (paved) area due to the project. In some cases, the peak flow rate of the runoff would be controlled to match existing conditions in order to use existing storm drain features and prevent downstream flooding. Stormwater detention basins, grassed swales, or a combination of control features would be used to store stormwater runoff and reduce peak flows. These stormwater controls also improve water quality by allowing sediment and other pollutants to settle out of the water before being discharged to receiving waters.

The initial stormwater system and detention features are based on the preliminary design (about 20%) developed for this EIS. The locations of the proposed detention basins are shown in Appendix A, Roadway Plans. The potential impacts of this system were evaluated in the EIS; however, after the EIS is completed and the project goes into final design, the stormwater system would be developed in more detail and the location of storage features might be revised.

Utility Relocations

Several utilities are within the S.R. 108 right-of-way including electric (overhead lines and buried lines), gas, water, telephone/fiber optic, and irrigation. If these utilities need to be relocated as part of a design improvement, they would be relocated within the construction area (cut and fill) required for S.R. 108. There is a Rocky Mountain

Power substation at the northwest corner of S.R. 108 and 5600 South. The design improvements in this area will avoid the substation due to the high cost of relocating it.

2.2.2.3 West Alternative

The West Alternative also involves widening S.R. 108 to a 110-foot, five-lane cross-section. The centerline of this alignment is located such that the proposed right-of-way line along the east side of S.R. 108 matches the existing right-of-way line along the east side of S.R. 108.

The West Alternative would better facilitate construction phasing because the new roadway could be built while existing lanes of traffic are kept open during the initial phase of construction. Additionally, the West Alternative would eliminate existing accesses along the west side of S.R. 108, which would help reduce congestion and improve safety by reducing the number of vehicles making right and left turns onto and off of the roadway. This alternative would avoid impacts to Syracuse Elementary School, minimize impacts to the new Syracuse High School near 700 South in Syracuse, and avoid the one existing wetland along S.R. 108 in Roy.

Typical Cross-Sections

The typical cross-sections for the West Alternative would be the same as those described in Section 2.2.2.2 for the Minimize 4(f) Impacts Alternative.

Where can I find more information about the roadway design evaluated in this EIS?

See Appendix A, Roadway Plans, for more information about the design evaluated in this EIS for the West Alternative.

Detention Basins

The stormwater system and detention basins would be similar to those described for the Minimize 4(f) Impacts Alternative.

Utility Relocations

Several utilities are within the S.R. 108 right-of-way including electric (overhead lines and buried lines), gas, water, telephone/fiber optic, and irrigation. If these utilities need to be relocated as part of a design improvement, they would be relocated within the construction area (cut and fill) required for S.R. 108. There is a Rocky Mountain Power substation at the northwest corner of S.R. 108 and 5600 South. The design improvements in this area will avoid the substation due to the high cost of relocating it.

2.2.3 Comparison of Alternatives

Exhibit 2.2-2 below lists the major advantages and disadvantages of each alternative that was evaluated in detail. Exhibit S.4-2: Comparison of Environmental Impacts in Chapter S, Summary, summarizes the specific environmental impacts for each alternative. Environmental impacts are discussed in detail in Chapter 4, Environmental Consequences. Potential mitigation measures for the impacts are summarized in Section 4.24, Mitigation Summary.

Exhibit 2.2-2: Primary Advantages and Disadvantages of the Alternatives

Alternative	Primary Advantages	Primary Disadvantages
No-Action Alternative	• Few environmental impacts because no major improvements would be made to S.R. 108 to reduce congestion, eliminate roadway deficiencies, or improve safety.	• Would not be consistent with local or regional land use and transportation plans. • Loss of business from continued heavy congestion on S.R. 108. • Greatest number of residences with noise levels above the noise-abatement criterion (347). • Does not provide bicycle lanes, sidewalks, or transit facilities. • S.R. 108 would continue to operate at unacceptable levels of service.
Minimize 4(f) Impacts Alternative (Preferred Alternative)	• Least amount of farmland lost (26.1 acres). • Least amount of land converted to roadway use (34 acres). • Fewest total residential relocations (55). • Fewest business relocations (6). • Fewest potentially eligible architectural historic properties that would be adversely affected (14). • Fewest Section 4(f) properties used (14). • Lowest cost of the action alternatives.	• Greatest number of APAs affected (4). • Second-greatest number of residences with noise levels above the noise-abatement criterion (300).
West Alternative	• Fewest number of APAs affected (2). • Fewest number of residences with noise levels above the noise-abatement criterion (250).	• Greatest amount of land converted to roadway use (38 acres). • Greatest amount of farmland lost (27.9 acres). • Greatest number of residential relocations (96). • Greatest number of business relocations (12). • Greatest number of potentially eligible architectural historic properties that would be adversely affected (22). • Greatest number of Section 4(f) properties used (22). • Highest cost of the action alternatives.

2.2.4 Basis for Identifying the Preferred Alternative

The Minimize 4(f) Impacts Alternative was identified by FHWA and UDOT as the Preferred Alternative based on public input during the scoping process, based on the alternative's ability to meet the elements of the project's purpose, and because the alternative minimizes impacts to Section 4(f) properties as well as overall residential and business relocations.

During the EIS scoping process, the public and the resource agencies were asked to provide input on potential issues and alternatives to be considered in the EIS. Most people who provided comments noted that something needed to be done to improve S.R. 108. Of those comments, most stated that widening S.R. 108 was an appropriate solution.

As part of the process for identifying the Preferred Alternative, UDOT met with planners, managers, and engineers from all five cities along S.R. 108, presented the Minimize 4(f) Impacts and West Alternatives to them, and explained how the alternatives would affect their cities. City officials from all five cities said that the Minimize 4(f) Impacts Alternative met their city's plans and objectives.

Both the Minimize 4(f) Impacts and West Alternatives meet the three elements of the project's purpose described in Section 1.2.1, Purpose of the Project. However, as noted above in Exhibit 2.2-2: Primary Advantages and Disadvantages of the Alternatives, this alternative would meet those objectives while requiring the least amount of land to be converted to roadway use. This alternative also meets the project's purpose with fewer residential and business relocations and fewer impacts to Section 4(f) properties.

The environmental impacts of the two action alternatives were compared according to the resource categories analyzed in this EIS. The comparison of alternatives in Exhibit S.4-2: Comparison of Environmental Impacts shows that the impacts from the action alternatives would be the same or very similar for most resources. The action alternatives differ primarily in terms of their right-of-way, relocations, and Section 4(f) impacts.

Based on this information, the Minimize 4(f) Impacts Alternative was identified as the Preferred Alternative for the following reasons:

- It requires less land to be converted to roadway use.
- It has fewer uses of Section 4(f) properties.
- It requires fewer residential and business relocations.
- It has the lowest cost.
- It has the least impact to farmland.

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Chapter 3: Affected Environment

This chapter describes the existing social, economic, and environmental conditions along S.R. 108. Chapter 4, Environmental Consequences, describes the expected effects of the project alternatives on these resources.

3.1 Land Use

This section describes the existing land use patterns and current land use plans for the jurisdictions along S.R. 108.

The land use impact analysis area includes parts of five incorporated cities that lie along S.R. 108: Syracuse, West Point, Clinton, Roy, and West Haven. The proposed project would occur in two counties—Davis and Weber—though most of the parcels next to S.R. 108 are within the limits of one of the five incorporated cities. There are also scattered parcels along S.R. 108 that are not within the incorporated limits of any city, but are instead under the jurisdiction of Weber County. The land use impact analysis area is the area within one-half mile of S.R. 108.

What is existing land use?

Most county and city land use plans include descriptions of existing land use. These descriptions include both developments that have already been built and developments that are in the process of being built.

Even parcels that are vacant typically have a "use" as defined by local governments. Vacant parcels are often being used for things such as open space, agriculture, and utility rights-of-way. Also, the existing land use might be different from the future land use identified in a city's general plan and zoning ordinances.

3.1.1 Existing Land Use by Jurisdiction

The following sections describe the existing land uses for each city along S.R. 108.

3.1.1.1 Syracuse, Davis County

Syracuse, which is located in Davis County, is the southernmost incorporated area along S.R. 108. According to the Syracuse City Community Development Director, most land along S.R. 108 is already developed with residential and commercial uses, and the remaining open land is planned for the same types of uses (Worthen 2006). A junior high school and elementary school are located along S.R. 108 just north of the Antelope Drive/S.R. 108 intersection (the junior high school is on the west side and the elementary school is on the east side). The new Syracuse High School at the northeast corner of S.R. 108 and 700 South opened in 2007. The northwest corner of

Antelope Drive and S.R. 108 is a redevelopment area where the City is helping to construct a commercial district.

The growth projections in Exhibit 1.4-1: 2002 and 2035 Population, Households, and Employment in Chapter 1, Purpose of and Need for Action, show that population will increase by 223%, households will increase by 255%, and employment will increase by 210% in Syracuse between now and 2035. The City anticipates that the open agricultural parcels along S.R. 108 on the north end of the city will be developed for commercial uses to help accommodate this growth. Full build-out of the city (and the vacant parcels along S.R. 108) is expected by 2020.

What is build-out?

Build-out means that there is no more land available for development because any undeveloped land is already being used for its intended use of open space, agriculture, or other defined uses. However, build-out rarely means the end of development in a city, because parcels of land can be redeveloped and a city can add to its existing land base by annexing adjacent parcels.

3.1.1.2 West Point, Davis County

Much of the land along S.R. 108 within the boundaries of West Point in Davis County is already developed for residential uses. There are no commercial retail businesses currently along S.R. 108. However, the City considers S.R. 108 to be its most important future commercial zone and anticipates that the remaining large open parcels will be developed as commercial. The growth projections in Exhibit 1.4-1 show that West Point will have the largest population and household growth (376% and 437%, respectively) of the five cities along the S.R. 108 project area between now and 2035 and will experience moderate employment growth (88%) during that same period. Build-out of the city is expected by 2035 (J. Anderson 2006).

3.1.1.3 Clinton, Davis County

Clinton is the northernmost city along S.R. 108 that is in Davis County (the northern Clinton city limit coincides with the county line). Much of the area along S.R. 108 in Clinton is already developed or is in the process of being developed for commercial and residential uses. The area is the primary commercial corridor in the city as demonstrated by recent commercial developments such as Wal-Mart. According to the City's Community Development Director, the remaining open space, including areas currently identified for agriculture, is planned for commercial use. However, it is likely that some new residential developments will also be built. The growth projections in Exhibit 1.4-1 show that Clinton will experience population growth of 114% and household growth of

140% between now and 2030. Build-out is expected by 2025. The City expects the final 10 years of growth (2015 to 2025) to be much slower than the current rate of growth (Vinzant 2006).

3.1.1.4 Roy, Weber County

Most of this southern Weber County city is already developed or is currently being developed; only about 300 acres of developable land remain. Between now and 2030, Roy is expected to experience an 18% increase in population and a 29% increase in households (see Exhibit 1.4-1). S.R. 108 supports Roy's secondary commercial corridor and is fronted by or provides access to a number of residential developments. The City expects the remaining open land to develop as commercial to accommodate the projected 43% employment increase between now and 2030, with minor amounts of residential uses set back from the roadway. Build-out is expected to occur by 2020 or earlier (Larson 2006a).

In the northern part of the project study area, S.R. 108 runs along the western edge of Roy. In this same area, S.R. 108 runs along the eastern edge of West Haven, which is discussed in the following section.

3.1.1.5 West Haven, Weber County

West Haven, which was established in 1991, is the newest incorporated area along S.R. 108. Because it shares S.R. 108 frontage with the much older city of Roy north of about 4800 South, development in this area of West Haven is influenced by the development in Roy. Most of the S.R. 108 corridor adjacent to West Haven is currently open land or large-lot residential, though the City anticipates development of mixed use, commercial, and higher-density residential to occur in these open spaces (S. Anderson 2006a). Such development will help support West Haven's projected population growth of 202%, household growth of 211%, and employment growth of 264% (see Exhibit 1.4-1). Apartments, townhouses, and commercial businesses are currently being developed. Build-out is expected by 2030.

What is mixed use?

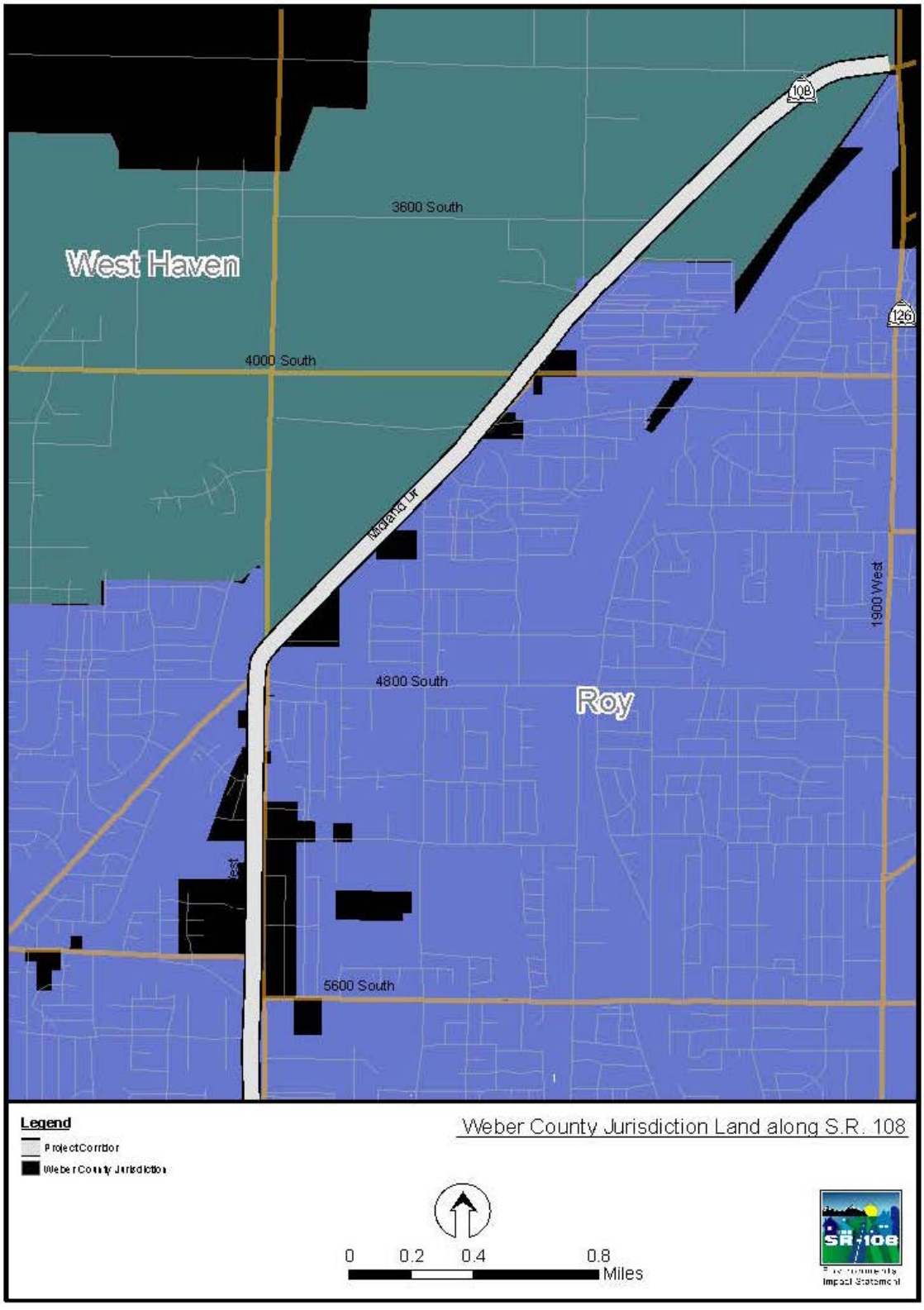
The term *mixed use* is used to describe development that supports more than one type of use in a building or set of buildings. As areas become more urbanized, planners often consider building a mix of residential, commercial, institutional, and other uses in a single area to increase convenience and access.

For example, a developer might include a shopping center and park within the boundaries of a small housing development or might include housing units on the second floor above operating businesses.

3.1.1.6 Weber County

Several parcels along S.R. 108 in Roy and between Roy and West Haven are not within the incorporated area of either city (see Exhibit 3.1-1 below). These isolated parcels are currently under the jurisdiction of Weber County, but neither Roy nor West Haven have plans to annex them. According to the City of Roy, the parcels could be annexed to the city as part of a future subdivision (Larson 2006b). Most of the parcels are currently developed as large-lot residential estates, though there is a minor commercial use at the southeastern corner of S.R. 108 and 5200 South. This area is completely surrounded by the incorporated city of Roy, which also has some commercial uses in the area.

Exhibit 3.1-1: Weber County Jurisdiction Land along S.R. 108



3.1.2 Local Land Use Plans and Zoning Designations

The following sections summarize the general plans and zoning regulations for each city.

3.1.2.1 Syracuse

General Plan. The Syracuse general plan map from February 2006 (see Exhibit 3.1-2: Land Use below for a generalization of the city's map) designates the area near the corner of Antelope Drive and S.R. 108 as suitable for General Commercial and Very High-Density Residential development. The northwestern corner of the intersection is dominated by a redevelopment district that is currently being developed with commercial uses. Other designated uses include Institutional (schools and churches) and Open Space/Recreational. Moving north, the planned uses change to mostly residential neighborhoods of moderate densities (3.79 units/acre to 5.44 units/acre), with some commercial and institutional (school) uses near the intersection of 700 South and S.R. 108.

The Syracuse general plan identifies S.R. 108 as a Major Arterial road (with an ultimate width of 110 feet).

Zoning. The Syracuse zoning map from February 2006 (see Exhibit 3.1-3: Zoning below for a generalization of the city's map) identifies the area around the Antelope Drive/S.R. 108 intersection as largely General Commercial with a pocket of higher-density residential use just northeast of the intersection. Moving north, the designations applied to land along S.R. 108 include single-family residential and agriculture/low-density residential along the eastern side of S.R. 108 near Heritage Parkway and 700 South and a pocket of Industrial and General Commercial along the west side of S.R. 108 near Heritage Parkway and 700 South.

What roadway width does the Syracuse general plan identify for S.R. 108?

The Syracuse general plan identifies S.R. 108 as a Major Arterial road (with an ultimate width of 110 feet).

What is a general plan?

State law requires each city to prepare and adopt a comprehensive, long-range general plan. These plans are intended to identify the present and future land use needs of each city and to outline desired growth and development patterns.

General plans are typically accompanied by a land use or zoning ordinance, which details development standards—such as allowable building heights and required setbacks—and includes maps that show the desired development patterns.

3.1.2.2 West Point

General Plan. The West Point general plan land use map from December 2005 (see Exhibit 3.1-2: Land Use below for a generalization of the city's map) shows the majority of land within one-half mile of S.R. 108 as appropriate for residential uses, though the plan identifies areas for commercial uses along the west side of S.R. 108 between 200 South and 300 North and at the intersections of S.R. 108 and 300 North and S.R. 108 and 800 North.

What roadway width does the West Point general plan identify for S.R. 108?

The West Point general plan does not specifically identify a roadway width for S.R. 108.

Commercial uses at the intersection of S.R. 108 and 300 North are considered to be within the city's Central Business District (a general plan overlay district). The intent of this district is to create a climate, atmosphere, and environment that emphasize implementation of a uniform, professional theme among all business district elements. Any new roadway projects within the district should conform to the standards and guidelines that address lighting, sidewalks, and landscaping to the extent that such projects affect those elements. Finally, there is one parcel identified for Public/Quasi-Public uses (an existing church) west of S.R. 108 between 300 North and 800 North and two parcels identified for Professional Office uses in the southern area of the S.R. 108 corridor within the city.

The West Point general plan does not specifically identify a roadway width for S.R. 108.

Zoning. The West Point zoning map from March 2006 (see Exhibit 3.1-3: Zoning below for a generalization of the city's map) identifies most properties fronting and within one-half mile of S.R. 108 as single-family residential (R-1, 2.2 units/acre, and R-2, 2.7 units/acre) south of 300 North. An exception to this is the southeast corner of 300 North and S.R. 108, which is designated for Neighborhood Commercial uses. Community Commercial uses are identified on the north side of the 300 North/S.R. 108 intersection. Uses return to single-family residential north of this intersection (with densities ranging from 2.2 units/acre to 3.6 units/acre), with a small pocket of two-family residential (R1-12T) on the west side of S.R. 108 between 550 North and 800 North. Large parcels of agriculturally zoned land (A-2, 1 unit/acre) are present to the west of S.R. 108 south of 300 North.

Exhibit 3.1-2: Land Use

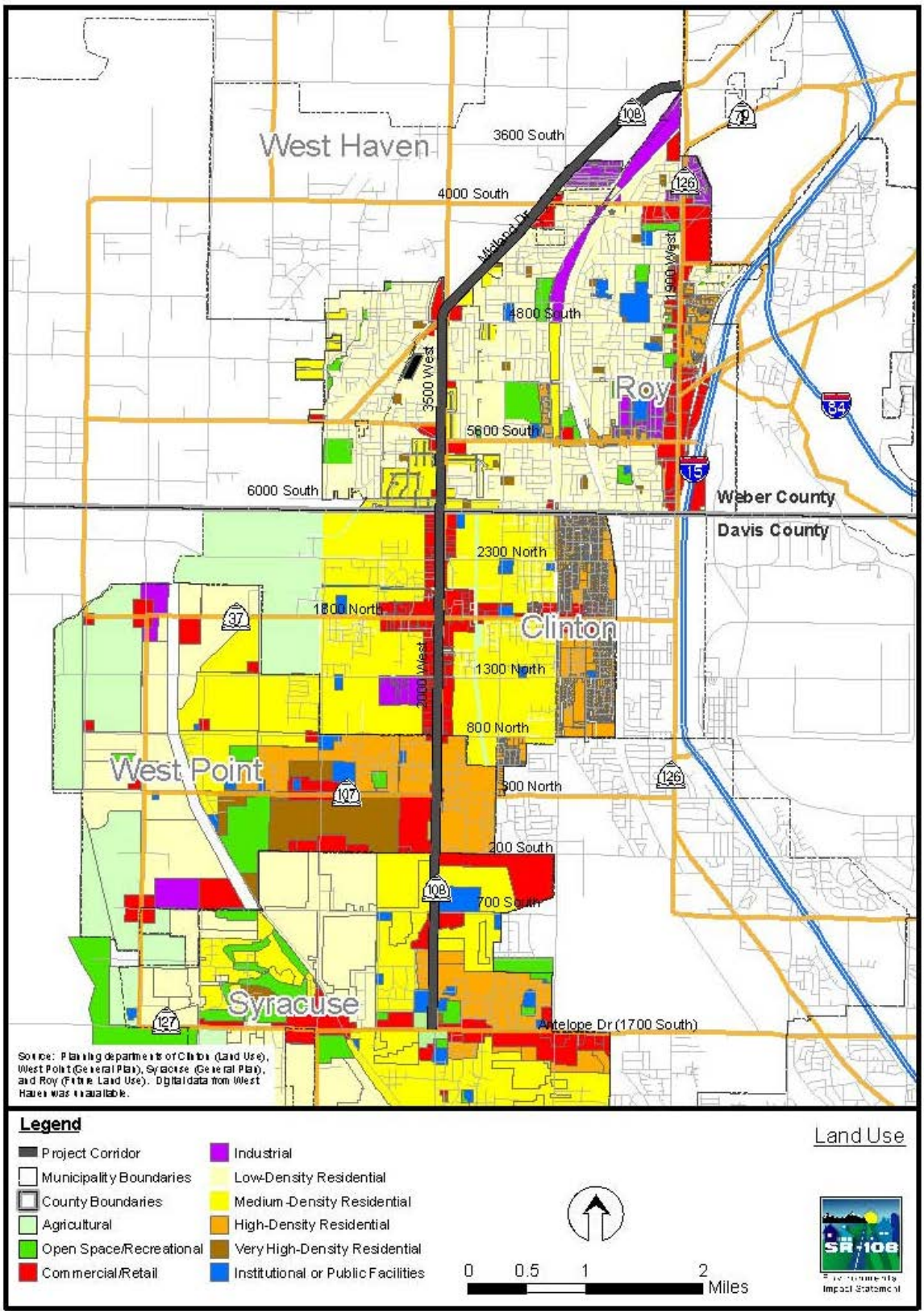
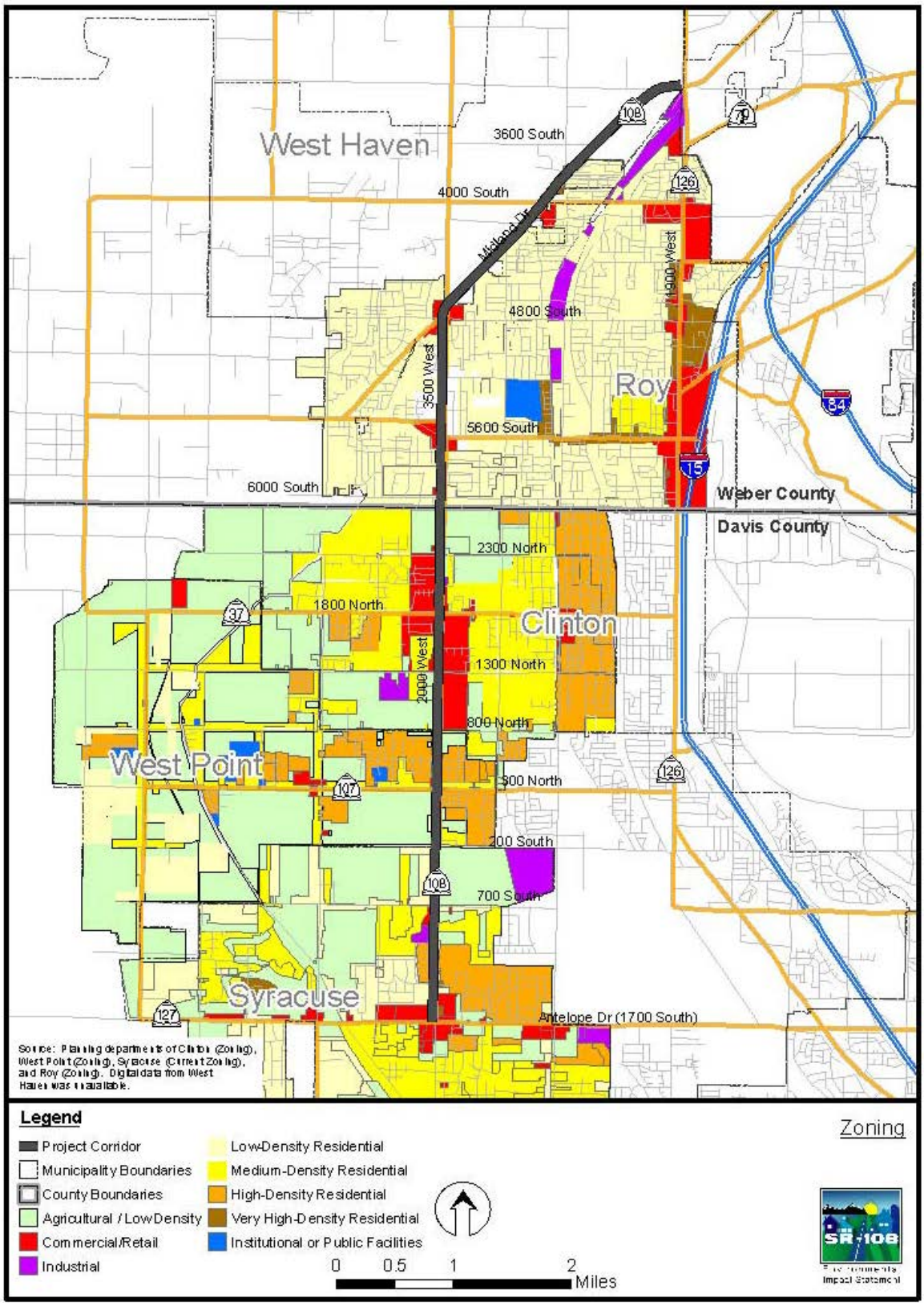


Exhibit 3.1-3: Zoning



3.1.2.3 Clinton

General Plan. The Clinton master land use map from March 2004 (see Exhibit 3.1-2: Land Use above for a generalization of the city's map) identifies all land within one-half mile of S.R. 108 as Performance Zone (PZ, a commercial zone with design standards) and residential (R-1-9, 4.8 units/acre average). The Performance Zone also represents the city's central business district. There are a number of parcels identified for manufacturing (MP-1) on the west side of S.R. 108 between about 2100 West and 2500 West south of 1300 North. Finally, there is a corridor of agriculturally designated land (A-1) to the east of S.R. 108, with an extension to the intersection of 2050 North. This corridor represents a future north-south trail along an old railroad right-of-way between 1500 West and 2000 West and is not used for agricultural production.

The Clinton general plan transportation map identifies S.R. 108 as a five-lane roadway.

What roadway width does the Clinton general plan identify for S.R. 108?

The Clinton general plan transportation map identifies S.R. 108 as a five-lane roadway.

Zoning. The Clinton zoning map (see Exhibit 3.1-3: Zoning above for a generalization of the city's map) outlines more-detailed land uses along S.R. 108. Though the majority of the frontage is designated Performance Zone, agricultural land (A-1, 1 unit/acre) dominates the west side of S.R. 108 south of 1300 North and north of 2300 North. A-1 and Agricultural Estates land (A-E, 2 units/acre) dominate the east side of S.R. 108 north of 2050 North. Other uses along and within one-half mile of S.R. 108 include Light Manufacturing (MP-1), Neighborhood Commercial (CP-1), and lower-density residential (R-1-15, about 3 units/acre).

3.1.2.4 Roy

General Plan. The Roy future land use map (see Exhibit 3.1-2: Land Use above for a generalization of the city's map) shows most of the land along S.R. 108 as residential (Medium-Density Single-Family Residential with an average of 4 units/acre and Low-Density Single-Family Residential with an average of 2 units/acre) and commercial. Commercial uses are concentrated around the major intersections of S.R. 108/Midland Drive and 4000 South, S.R. 108/Midland Drive/3500 West and 4800 South, and S.R. 108/3500 West and 5600 South. Limited areas of Very High-Density, Multi-Family Residential (up to 20 units/acre), High-Density Single/Duplex–

What roadway width does the Roy general plan identify for S.R. 108?

The Roy general plan includes widening S.R. 108 from two to four travel lanes.

Family Residential (an average of 8 units/acre), Utilities, and Schools/Government/Churches parcels are also present along S.R. 108.

The Roy general plan includes widening S.R. 108 from two to four travel lanes.

Zoning. According to the Roy zoning map from December 2005 (see Exhibit 3.1-3: Zoning above for a generalization of the city's map), much of the land along S.R. 108 in the city is identified for low-density, single-family residential use (R-1-6, R-1-8, and R-1-10 at 4 units/acre). Pockets of Community Commercial (CC), Residential Estate (RE, 2 units/acre), Multiple-Family Residential (up to 20 units/acre), and Residential Manufactured Home (RMH-1, manufactured and mobile-home parks) are also present along S.R. 108, as are areas that are not currently included in the incorporated city limits.

3.1.2.5 West Haven

General Plan. West Haven's general plan map is currently being revised. According to the most recent map and city planners, there are two main general plan uses along S.R. 108: Commercial and Mixed Use (which is high/medium/low-density residential and light commercial) (S. Anderson 2006b). The city's plan calls for light industrial uses near the S.R. 108/1900 West intersection. Some lower-density residential lands are present just west of S.R. 108 and would influence and be influenced by future operation of S.R. 108 in the area. One planned trail system connection to Roy is adjacent to S.R. 108 at about 4400 South; this connection is within a utility corridor and is identified as Open Space/Recreational/Residential.

What roadway width does the West Haven general plan identify for S.R. 108?

The West Haven general plan identifies S.R. 108 as a Major Arterial road (with an ultimate width of 100 feet).

The West Haven general plan identifies S.R. 108 as a Major Arterial road (with an ultimate width of 100 feet).

Zoning. As with the general plan map, the West Haven's zoning map is currently being revised. According to city planners, most of the land along S.R. 108 is designated as Commercial, Mixed Use, and Agriculture. Pockets of Light Manufacturing and Medium-Density Multiple-Family Residential are also present along S.R. 108. Commercially designated land dominates the southern portion of S.R. 108 in West Haven, while the Midland Drive/1900 West intersection (which is the northern project terminus) is dominated by

Light Industrial uses. The two areas of Medium-Density Multiple-Family land are near Midland Drive/3600 South and Midland Drive/3300 South. According to the City of West Haven, areas between about 3600 South and 4800 South are likely to be rezoned for higher-density residential, mixed use, and/or commercial uses in the near future (S. Anderson 2006b).

3.1.2.6 Weber County

General Plan. The West Central Weber County general plan does not include the parcels along S.R. 108 between Roy and West Haven on its land use map. Because of their isolation, none of the general plan goals or policies directly apply to these parcels.

Zoning. Weber County has zoned the scattered county-jurisdictional parcels as residential estate (low-density residential) and agriculture. Both zones allow residents to keep farm animals. Agriculture is the preferred use of the agricultural zone, but parcels with this designation are routinely used for rural residential development.

3.1.2.7 Summary of Land Uses

Exhibit 3.1-4 summarizes the future land uses in the impact analysis area (the land uses described in the cities' and counties' general plans). Because some of the cities and counties used different methods of mapping land use, the acreages in the table are only an estimate.

Exhibit 3.1-4: Summary of General Plan Land Use

Land Use Type	Acres	Percent of Total Land in the Impact Analysis Area
Residential[a]	3,590	57.1%
Commercial/Industrial	2,046	32.9%
Mixed Use[b]	386	6.1%
Government/Public Land[c]	245	3.9%
Total	5,990	100.0%

[a] Includes lands designated for rural residential/agricultural development.

[b] West Haven is the only jurisdiction that uses the Mixed Use category.

[c] Includes government land/facilities, quasi-government land/facilities, publicly owned spaces, open space, and private churches.

3.2 Farmland

3.2.1 Introduction

This section discusses general farmland trends and crops as well as the Farmland Protection Policy Act and Agriculture Protection Areas. The S.R. 108 farmland impact analysis area is located in Davis and Weber Counties and crosses the cities of Syracuse, West Point, Clinton, Roy, and West Haven. For the purpose of this analysis, all farmland within one-half mile of each side of the S.R. 108 centerline was identified for the entire 9.5-mile project corridor. In this section, the farmland impact analysis area is described from south to north.

3.2.2 Regulatory Basis for Farmland Analysis

3.2.2.1 Farmland Protection Policy Act

The Farmland Protection Policy Act of 1981 was enacted to "minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses" (7 United States Code [U.S.C.] 4201[b]). For the purpose of this Act, farmland includes prime farmland, unique farmland, and farmland of statewide or local importance.

The federal agency responsible for overseeing compliance with the Farmland Protection Policy Act is the Natural Resources Conservation Service (NRCS). NRCS has stopped making determinations on possible prime, unique, and statewide or local important farmland that is already committed to development within city limits. NRCS's position is that, when funds have already been committed for utilities, water lines, and road replacement and widening, the land is committed to development and can be exempt from a determination. Appendix C, Pertinent Correspondence, includes a copy of the NRCS guidance letter that suspends the requirement to make determinations on farmland that is already committed to development through local actions. Appendix C also includes a record of a September 2006 phone conversation with the local Salt Lake City NRCS office stating that this guidance is still in effect.

What is the Farmland Protection Policy Act?

The Farmland Protection Policy Act was enacted to "minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses." All of the farmland in the S.R. 108 farmland impact analysis area is exempt from the Farmland Protection Policy Act.

All of the farmland in the S.R. 108 farmland impact analysis area is within city limits. Therefore, it is exempt from the Farmland Protection Policy Act.

3.2.2.2 Agriculture Protection Areas

Utah law does not specifically protect agricultural land from development, but one of the purposes of Utah's zoning law is to support the state's agriculture. Zoning is accomplished by a commission for each county that adopts a plan for zoning all land within the county. Utah law also allows the formation of Agriculture Protection Areas (APAs), which are geographic areas where agricultural activities are given special protections.

What are Agriculture Protection Areas?

Agriculture Protection Areas (APAs) are geographic areas where agricultural activities are given special protections. APAs cannot be condemned for highway purposes unless certain conditions are met.

APAs are protected from state and local laws that would restrict farm practices, unless the regulations are required for public safety or are required by federal law. The county in which the APA is located cannot change the zoning designation of the land within the area unless all landowners give written approval for the change.

APAs cannot be condemned for highway purposes unless (1) the landowner requests the removal of the designation, or (2) the applicable legislative body (that is, the legislative body of the county, city, or town in which the APA is located) and the advisory board approve the condemnation, provided that "there is no reasonable and prudent alternative to the use of the land within the Agriculture Protection Area for the project" (Utah Administrative Code, Section 17-41-405 [4][a]). If protected agricultural areas remain in agricultural use, farm equipment access must be provided to allow landowners to move farm machinery between parcels.

A landowner can petition the County to have his or her land designated as an APA. The County then usually has 120 days to grant or deny the request. APA status is typically maintained even after the property is developed and no longer in agricultural use, unless the property owner files a petition to remove the land from the APA. When this occurs, the rest of the APA maintains its status, and the boundaries of the APA are redefined. APAs are reviewed every 20 years to determine if the APA status should be maintained, modified, or terminated.

3.2.2.3 Century Farm and Ranch Program

In 1996, the year of Utah's state centennial, the State initiated a Century Farm and Ranch program that recognizes farms that have been operated continuously by the same family for at least 100 years. These farms receive the Century Farm and Ranch designation from the Utah Farm Bureau Federation and the Utah Department of Agriculture. These operations are typically the few remaining long-term farming operations along the Wasatch Front. The Century Farm and Ranch designation does not grant a farm any special protections.

3.2.3 Future Planning and Zoning for Existing Farmland

The farmland impact analysis area is in a part of Davis and Weber Counties that is undergoing considerable urban development. This section describes the state of existing farmland from a planning and zoning perspective for each city along S.R. 108.

What zoning is planned for farmland along S.R. 108?

According to representatives from the cities along S.R. 108, the remaining parcels of agricultural land in the farmland impact analysis area are planned for commercial or residential use.

Syracuse. According to the Syracuse City Community Development Director, most land along S.R. 108 is already developed with residential and commercial uses, and the remaining agricultural/open land is planned for the same types of uses (Worthen 2006).

West Point. The City of West Point considers the S.R. 108 corridor to be its most important future commercial zone and anticipates that the remaining large open parcels will be developed as commercial (J. Anderson 2006).

Clinton. According to the Clinton City Community Development Director, the remaining open spaces, including areas identified for agricultural uses, are planned for commercial use. However, it is likely that some new residential developments will also be built (Vinzant 2006).

Roy. Most of Roy is already developed or is currently being developed; only about 300 acres of developable land remain. The City expects the remaining open land to develop as commercial or residential (Larson 2006b).

West Haven. Most of the S.R. 108 corridor adjacent to West Haven is currently open land or large-lot residential, though the City anticipates development of mixed use, commercial, and higher-density residential to occur in these open spaces (S. Anderson 2006a).

Weber County. Several parcels along S.R. 108 in Roy and between Roy and West Haven are currently not within the incorporated area of either city. The Weber County zoning map (see Exhibit 3.1-1: Weber County Jurisdiction Land along S.R. 108 above) shows some of these parcels as agricultural use (A-1). This zone allows residents to keep farm animals. Agriculture is the preferred use of the A-1 zone, but parcels with this designation are routinely used for rural residential development.

3.2.4 Cropland

There are a total of about 66,000 combined acres of cropland in Davis and Weber Counties, including almost 44,000 acres of harvested cropland and about 53,000 acres of irrigated land (National Agricultural Statistics Service 2002).

According to the 2002 Census of Agriculture, the acreage of farmland in Davis County decreased by 7% between 1997 and 2002 (from 70,796 acres in 1997 to 65,857 acres in 2002). Many tracts of land currently in agricultural use or zoned for agricultural use are expected to develop into residential subdivisions, and these areas are shown as residential subdivisions in city and county land use plans as described in Section 3.2.3, Future Planning and Zoning for Existing Farmland.

In Weber County, there was a 1% increase in farmland between 1997 and 2002 (from 85,781 acres in 1997 to 86,913 acres in 2002), although that figure does not represent the trend along S.R. 108 in Weber County.

Much of the farmland adjacent to S.R. 108 is under cultivation (cropland), is pastureland used for grazing, or remains dry idle. Dry idle land typically consists of cropland that has not been tended within the past 2 years and less than 10% of the area is stocked with live trees. Based on the rapid development occurring along S.R. 108, it is reasonable to assume that any acreage that remains idle is planned for upcoming development.

In addition to pastureland and dry idle land, other agricultural land in the impact analysis area is used mainly for irrigated crops, such as alfalfa, grain, corn, and onions. The non-irrigated farmland currently remains idle, is fallow, or is in pasture (Utah Division of Water Resources 2003).

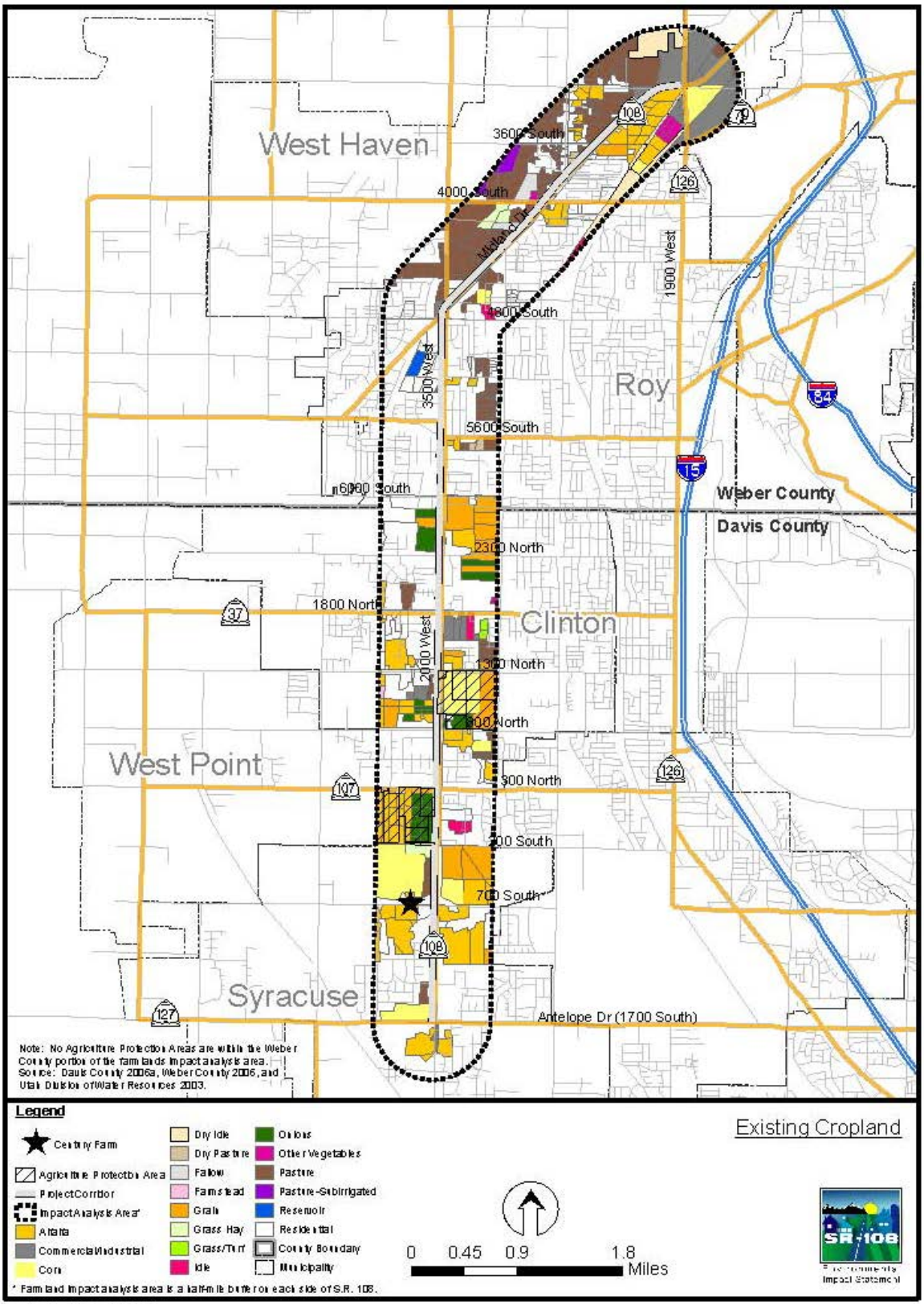
Current cropland or farmland in the impact analysis area is shown in Exhibit 3.2-1 and in Exhibit 3.2-2 below. The table is based on the Utah Division of Water Resources' Water-Related Land Use Data Inventory map dated 2003.

Exhibit 3.2-1: Cropland or Farmland in the Farmland Impact Analysis Area

Crop or Farmland Type	Acres
Irrigated Crops or Farmland	
Pasture	734.78
Alfalfa	650.11
Grain	323.34
Corn	313.53
Onions	142.58
Grass hay	37.37
Other vegetables	26.97
Pasture, sub-irrigated	23.42
Grass/turf	6.86
Total irrigated	**2,258.96**
Non-irrigated Crops or Farmland	
Dry idle	116.06
Idle	41.64
Fallow	30.52
Dry pasture	15.53
Total non-irrigated	**203.75**

Source: Utah Division of Water Resources 2003

Exhibit 3.2-2: Existing Cropland



3.2.4.1 Century Farms

According to the Utah Farm Bureau Federation, there is one Century Farm in the S.R. 108 impact analysis area (Utah Department of Agriculture and Food 2006). The Christensen Century Farm is located at 2204 West 700 South and is shown in Exhibit 3.2-2: Existing Cropland above.

3.2.4.2 Agriculture Protection Areas

There are 12 APAs in the impact analysis area. These areas, which are mostly used to raise crops, have received special zoning protection from the local county jurisdictions to preserve the area as open space related to agriculture.

The 12 APA parcels contain about 281 acres of irrigated farmland. All 12 APAs are located in Davis County; six parcels are located in West Point and six parcels are located in Clinton. All APAs in Weber County are located outside the half-mile buffer that designates the impact analysis area. See Exhibit 3.2-3 and Exhibit 3.2-4 below.

Exhibit 3.2-3: Existing Agriculture Protection Areas

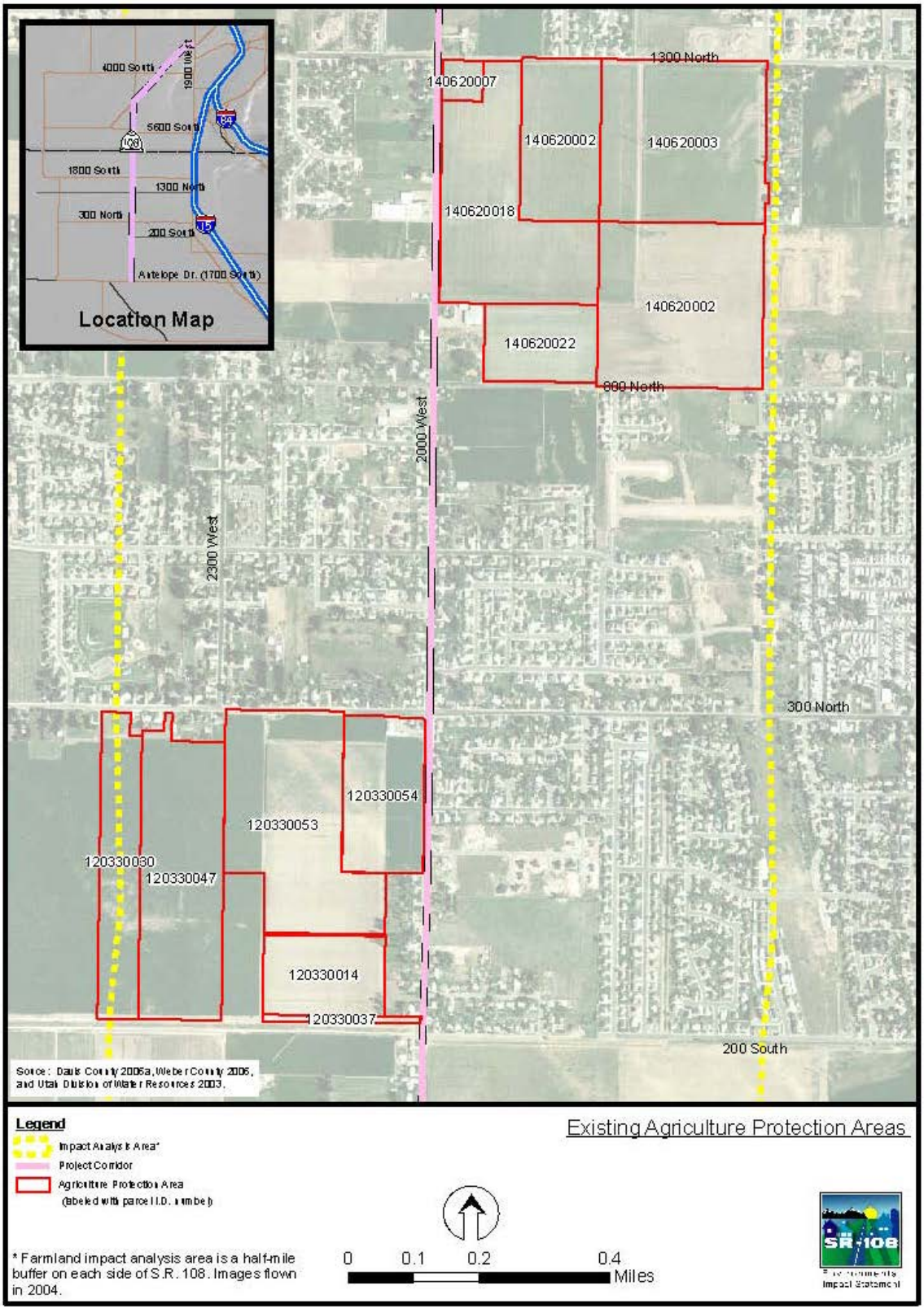


Exhibit 3.2-4: Agriculture Protection Areas in the Farmland Impact Analysis Area

Agriculture Protection Area by Parcel ID	Acreage[a]	Location[b]
12-033-0053[c]	40	269 North 2000 West, West Point
12-033-0054[c]	19	269 North 2000 West, West Point
12-033-0014	15	Between 200 South and 300 North on the west side of S.R. 108, West Point
12-033-0030[d]	18	Between 200 South and 300 North on the west side of S.R. 108, West Point
12-033-0037	2	Between 200 South and 300 North on the west side of S.R. 108, West Point
12-033-0047	35	Between 200 South and 300 North on the west side of S.R. 108, West Point
14-062-0022	13	Between 800 North and 1300 North on the east side of S.R. 108, Clinton
14-062-0002[e]	41	Between 800 North and 1300 North on the east side of S.R. 108, Clinton
14-062-0002[e]	20	Between 800 North and 1300 North on the east side of S.R. 108, Clinton
14-062-0003	40	Between 800 North and 1300 North on the east side of S.R. 108, Clinton
14-062-0007	2	Between 800 North and 1300 North on the east side of S.R. 108, Clinton
14-062-0018	36	Between 800 North and 1300 North on the east side of S.R. 108, Clinton
Total	281	

Sources: Davis County 2006a; Weber County 2006; Utah Division of Water Resources 2003

[a] Acreage shown includes only APA parcel acreage within the half-mile impact analysis area buffer. The entire APA acreage could be more than the acreage shown in the table.

[b] Exact property addresses were not available for most parcels.

[c] These parcels were recently split due to parcel 12-033-0054 being sold to a developer.

[d] This parcel is split by the half-mile buffer (the western boundary extends about 100 feet west of the half-mile buffer). Therefore, the acreage for the entire parcel is included.

[e] These are two separate parcels with the same parcel ID.

3.3 Social Environment

This section describes the social, or community, environment in the S.R. 108 study area. The social environment is analyzed in terms of the following elements:

- Neighborhood and community cohesion
- Quality of life
- Recreation resources
- Community facilities
- Public health and safety
- Housing and relocations
- Public services and utilities

The social impact analysis area includes parts of the cities of Syracuse, West Point, and Clinton in Davis County and Roy and West Haven in Weber County. The social impact analysis area focuses mainly on neighborhoods within one-half mile of the roadway centerline along the 9.5-mile S.R. 108 project corridor.

3.3.1 Resource Identification Methods

Information about the social environment was obtained by reviewing community plans and Web sites, attending public meetings, meeting with local officials with jurisdiction over the relevant resource, reviewing public comments received during public outreach, reviewing city and county maps, and conducting field reviews. During project scoping, the public was asked to complete a Community Profile Survey (HDR 2006b) to help define the existing social environment, identify potential project impacts, and identify important community resources. A total of 171 surveys were completed and returned.

3.3.2 Neighborhood and Community Cohesion

Community cohesion is the degree to which residents have a sense of belonging to their neighborhood or community. Neighborhood and community cohesion can be linked to commitment to the community or a strong attachment to neighbors, institutions, or particular groups. Specific indicators of community cohesion include interaction among neighbors, use of community facilities and services, long-serving community leadership, participation in local organizations, a

What is community cohesion?

Community cohesion is the degree to which residents have a sense of belonging to their neighborhood or community. According to city planners, each of the individual cities that is partially within the social impact analysis area is cohesive.

desire to stay in the community and length of residency, satisfaction with the community, and the presence of families (FDOT 2003).

According to city planners, each of the individual cities that is partially within the social impact analysis area is cohesive. Residents identify with their communities and feel a sense of belonging (J. Anderson 2006; S. Anderson 2006a; Larson 2006a; Vinzant 2006; Worthen 2006). The best information about community cohesion was the information obtained through the Community Profile Survey, and the results of this survey provide a picture of the impact analysis area as a whole. Accordingly, the following discussion addresses neighborhood and community cohesion within the entire impact analysis area rather than within each city.

3.3.2.1 Neighborhood Interaction, Residency, and Families

Over one-third of Community Profile Survey respondents said that the most important characteristic that unites their community is knowing their neighbors. A strong attachment to neighbors is an important characteristic of a cohesive community. Crime-prevention programs such as Neighborhood Watch work well in cohesive neighborhoods because residents feel a strong sense of community and want to keep the area safe (National Sheriff's Association 2006). An overwhelming majority of survey respondents (86%) stated that they feel safe in their neighborhood or community.

Long-term residents tend to have higher levels of social attachment to and integration into neighborhood and community life than shorter-term residents (Kasarda and Janowitz 1974). Almost half of the survey respondents said that they had lived in their community for at least 15 years, which is an indicator of satisfaction with the community environment. Additionally, about one-third of the respondents have lived in their current home for at least 15 years. Compared to the survey data, data from the 2000 U.S. census for each of the five cities show slightly lower percentages of residents who have lived in their current home for more than 11 years (from 26% in Clinton to 37% in Roy) (U.S. Census Bureau 2000a). Regardless, either set of data shows a large percentage of persons staying in the community for many years.

How does long-term residency affect neighborhoods?

Long-term residents tend to have higher levels of social attachment to and integration into neighborhood and community life than shorter-term residents. Almost half of the people who responded to the Community Profile Survey said they had lived in their community for at least 15 years.

The presence of families is an indicator of community cohesiveness. Families with children often interact at school events and other youth activities as well as in a neighborhood setting. Census data show that all of the cities along S.R. 108 have higher percentages of traditional family households than both the state and national averages. Likewise, the percentages of households that consist of families with children are also higher than the state and national averages (U.S. Census Bureau 2000a). Finally, the survey results show that family is a very important community factor.

3.3.2.2 Community Facilities and Groups

S.R. 108 is an urban corridor that already divides neighborhoods to the east and west due to the amount of traffic that travels the corridor. The existing boundaries for churches and school districts along S.R. 108 also contribute to some degree of east-west division in social interaction and community involvement in the impact analysis area. In spite of the existing church and school service area boundaries, the top two associations that survey respondents feel tie their community together are church and school (49% and 31% of respondents, respectively). Nearly 25% of respondents also felt that their church community is an important characteristic that binds the larger community, even though S.R. 108 divides church service areas in some locations. Churches and schools create centers where people can interact, which promotes cohesiveness within the communities.

According to the survey results, many people use local parks. The only other non-school community facilities that are used more are churches. In addition to day-to-day recreation opportunities, the parks also offer locations for local celebrations such as founders' celebrations and seasonal or holiday-related gatherings. See Section 3.3.4, Recreation Resources, and Section 3.3.5, Community Facilities, for more information about parks and other community facilities.

What community facilities are important to residents?

According to the Community Profile Survey, churches, schools, and parks are important community facilities in the S.R. 108 impact analysis area.

3.3.2.3 Community Leadership and Activism

Lastly, the type and amount of leadership and activism occurring in a community also help define cohesiveness. When members of an area are engaged with day-to-day community business, they may feel a strong sense of pride and belonging.

A number of survey respondents felt that locally recognized leaders, such as members of the city council and the mayor, are important community leaders. Respondents also noted that church leaders provide important community guidance.

Activism is very locally focused. Roy's Neighborhood Watch program is focused on keeping the community crime-free. The West Haven community recently worked together to establish its River Parkway Trail, a portion of the planned regional Centennial Trail. The City of Clinton and the City of West Point have newsletters that provide information about how residents can stay active in their community. Finally, Syracuse is very proud of its association with Antelope Island, a state park that relies heavily on local volunteers.

What types of community leaders are important to residents?

According to the Community Profile Survey, a number of respondents feel that local leaders such as members of the city council and mayor, as well as church leaders, are important community leaders.

3.3.2.4 City Particulars

Interviews with city planners have provided additional information about community cohesiveness. According to Rodger Worthen of Syracuse, the city is very cohesive, and residents are proud to identify themselves with the city. S.R. 108 is a dividing line for church service areas within the city, so the roadway socially divides that part of the city to some degree (Worthen 2006).

John Anderson of West Point and Lynn Vinzant of Clinton also describe their respective communities as cohesive and say that residents identify with their cities as communities. S.R. 108 does not divide church service areas in these cities (J. Anderson 2006; Vinzant 2006).

Mark Larson of Roy describes that community as cohesive, but notes that S.R. 108 divides the community to some extent (Larson 2006a).

As a newer city, West Haven is still adjusting to being a more formal community. Many residents have lived in the area for a long time and identify themselves with the rural community that existed before incorporation. City planner Steve Anderson says that some residents

will be unhappy about the development that the city anticipates over the next several years (S. Anderson 2006a).

3.3.2.5 Summary

In summary, available information shows that the communities along S.R. 108 in the impact analysis area are individually as well as regionally cohesive. Residents identify with their individual neighborhoods and communities but are also involved in regional events that occur outside their neighborhoods such as holiday celebrations and festivals. Though S.R. 108 is a physical barrier in the impact analysis area, it provides an important connection within and between the communities.

3.3.3 Quality of Life

Quality of life can be characterized as a person's well-being and happiness. The factors that affect quality of life can vary by person but often include safety, general living environment, accessibility to public services and shopping, and recreation opportunities. See Section 3.3.4, Recreation Resources, Section 3.3.5, Community Facilities, and Section 3.3.8, Public Services and Utilities, for information about recreation, community facilities, and community services, respectively.

Residents of Utah generally consider their quality of life to be high. Contributing factors include a varied four-season climate, a moderate cost of living, diverse natural resources, a low rate of violent crime, high-quality education and health care, and varied cultural and recreation opportunities (State of Utah 2001). The following discussion focuses on the impact analysis area in general.

What issues affect quality of life for residents?

During the scoping process, the public identified a number of roadway-related issues that negatively affect quality of life for residents living along or near S.R. 108. These issues include:

- Accessibility, especially for residents with driveways on S.R. 108
- High traffic speeds
- Traffic congestion
- Inadequate pedestrian facilities
- A lack of east-west mobility
- Unsafe intersections, with signals and realignment needed

3.3.3.1 Safety

Safety is a major contributor to quality of life. According to the survey results, 60% of respondents do not feel safe while driving on S.R. 108. Fifty-one percent of respondents identified traffic as the top issue in the community. Survey respondents and scoping meeting attendees specifically cited congestion, drivers making dangerous turns, speeding, and inadequate pedestrian crossings as problems in the communities. However, some respondents felt that the proposed changes to S.R. 108 could make the roadway less safe by accommodating more and faster traffic. Residents in the impact analysis area use S.R. 108 to travel to work, school, recreation, and shopping areas. In addition, these citizens have to travel south on S.R. 108 to access Antelope Drive and I-15 if their daily travels require freeway access.

Currently, residents feel that their communities are safe from crime. Less than 6% of respondents felt that crime was a problem in the area.

How important is safety to residents?

According to the Community Profile Survey, 60% of respondents do not feel safe while driving on S.R. 108. In addition, 51% of respondents identified traffic as the top issue in the community.

3.3.3.2 General Living Environment

After safety, survey results show that area residents are concerned with the effects of growth on their communities and quality of life. Residents have expressed unease about increased commercial growth in their cities, citing the arrival of large chain stores such as Wal-Mart. Whether they are comfortable with it or not, residents are very aware that their community is changing. Forty-five percent of respondents believe that the characteristics of the community will change over time with or without improvements to S.R. 108. This statistic was echoed by city planners, who noted that the communities would continue to grow at their current rates regardless of the project (J. Anderson 2006; Vinzant 2006; Worthen 2006). However, 51% of the survey respondents believe that the proposed project will exacerbate or accelerate such change. Most survey respondents who gave reasons why they would be willing to leave their community cited traffic and a loss of the rural feeling.

According to census data and information provided by city planners, the growth rates for the cities in the impact analysis area are among the highest of all Utah cities. Cities along S.R. 108 are anticipating this future growth and have designated most land along S.R. 108 for

How do residents feel about growth along S.R. 108?

According to the Community Profile Survey, 45% of respondents believe that the characteristics of their community will change over time with or without improvements to S.R. 108. However, 51% of the survey respondents believe that the proposed project will exacerbate or accelerate such change.

commercial and residential development (City of West Point 2002; City of Clinton 2004b; City of Roy 2005; City of West Haven 2005; Worthen 2006). See Section 3.1, Land Use, for more information about future land use in the impact analysis area.

3.3.3.3 Accessibility

Though more services and shopping areas are becoming available, survey results show that many residents are frustrated with accessibility along S.R. 108. Traffic and a lack of controlled access points such as stoplights inhibit their ability to move easily through the community. In addition, survey results show that residents along S.R. 108 are frustrated with their inability to enter and exit their driveways. During certain times of the day, S.R. 108 is so congested that residents must wait a long time for large enough gaps between vehicles that they can safely exit their driveway.

How important is accessibility to residents?

According to the Community Profile Survey, many residents are frustrated with accessibility along S.R. 108. Traffic and a lack of controlled access points such as stoplights inhibit their ability to move easily through the community.

City officials also believe that improvements to S.R. 108 are needed to promote accessibility. For example, the City of Clinton would like to build an underpass across S.R. 108 at about 1150 North to improve pedestrian crossing safety and to connect the west part of the city to parks and city buildings. In Roy and West Haven, several east-west streets intersect S.R. 108 at an angle, which limits the sight distance of drivers attempting to turn onto S.R. 108 (S. Anderson 2006c; Larson 2006a).

3.3.3.4 Summary

In summary, most residents of the communities along S.R 108 are happy with their quality of life. However, they know that the area is changing and that change will make their communities busier places. Residents would be more likely to adapt to these changes if there is an improved roadway system that allows easy access to community services but that doesn't dramatically affect the overall community atmosphere.

3.3.4 Recreation Resources

Recreation activities refresh, enliven, and enhance people's quality of life. Recreational facilities provide opportunities for social interaction and are often the focus of a neighborhood or community. The five cities along S.R. 108 are close to many different recreation

areas including community parks, nature and wildlife preserves, county fair parks, golf courses, and trail systems. However, the only recreation facilities in the impact analysis area are community parks. Community parks are generally built to accommodate field games, court games, playgrounds, and picnicking and are administered by city or county governments.

The Community Profile Survey included questions about the importance of community parks in the project region. Many survey respondents stated that community recreation activities such as soccer, basketball, and flag football in city parks are important to residents of all ages. In addition, community events are often held at community parks in the pavilions that are available for rental.

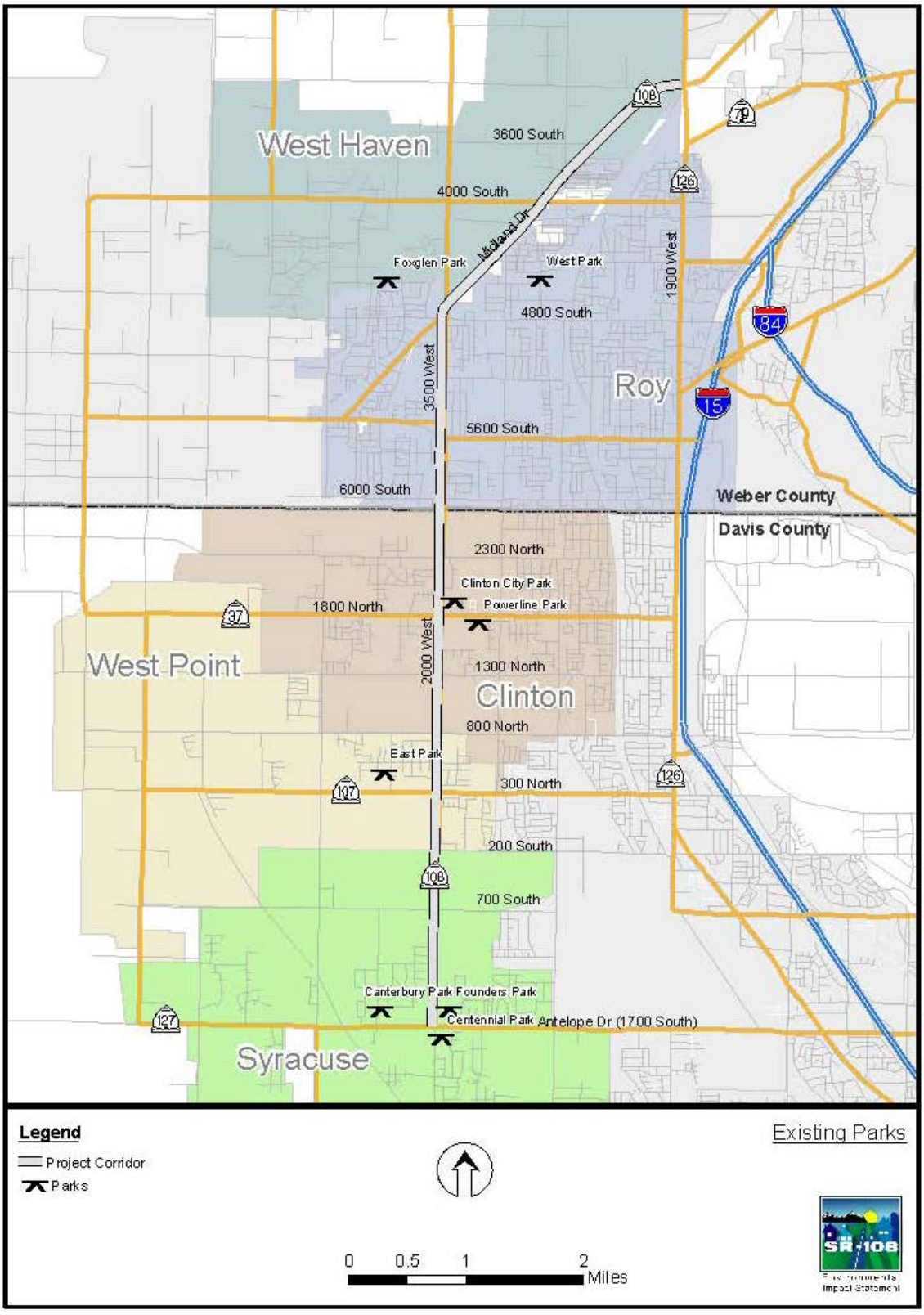
As shown in Exhibit 3.3-1 and in Exhibit 3.3-2 below, there are eight parks in the impact analysis area. In addition to providing places for residents to meet and recreate, the parks are often used for local celebrations and events. The Syracuse Heritage Days celebration in Founders Park is one such event.

Exhibit 3.3-1: Parks in the Social Impact Analysis Area

Park Name	Location	Park Facilities and Activities
Clinton City Park	1906 West 1800 North, Clinton	Ball fields, basketball courts, tennis court, sand volleyball courts, community center, pavilion, children's playground, and restroom
Powerline Park	1740 North 1700 West, Clinton	Soccer fields, walking track, skateboard park, and BMX (bicycle motocross) bike track
Canterbury Park	2500 West 1600 South, Syracuse	Pavilions, restrooms, soccer, jogging, playground, and volleyball
Centennial Park	1800 South 2000 West, Syracuse	Picnic tables, jogging, and playground
Founders Park	1500 South 1900 West, Syracuse	Pavilions, restroom, baseball/softball, soccer, playground, and skateboard facility
East Park	2200 West 550 North, West Point	Baseball, sand volleyball, three pavilions, playground, and walking path
West Park	4500 South 2900 West, Roy	Soccer field, T-ball, concessions, restroom, pavilions, tennis court, sand volleyball pit, skateboard park, and playground
Foxglen Park	4600 South 3900 West, Roy	T-ball field, playground, and pavilion

Sources: City of Clinton 2002; City of Roy 2003; City of Syracuse 2006b; City of West Point 2006

Exhibit 3.3-2: Existing Parks



In Davis County, West Point is pursuing a park-planning program that is expected to include a golf course and 45 acres of new parks (City of West Point 2006). It is not known if the new facilities will be located within the impact analysis area. Clinton is working to link its parks through trails, and the City plans to add park space within the project area on the east side of S.R. 108 at about 1150 North (Davis County Council of Governments 2005). Neither Roy nor West Haven have developed plans for future park or recreation facilities.

3.3.5 Community Facilities

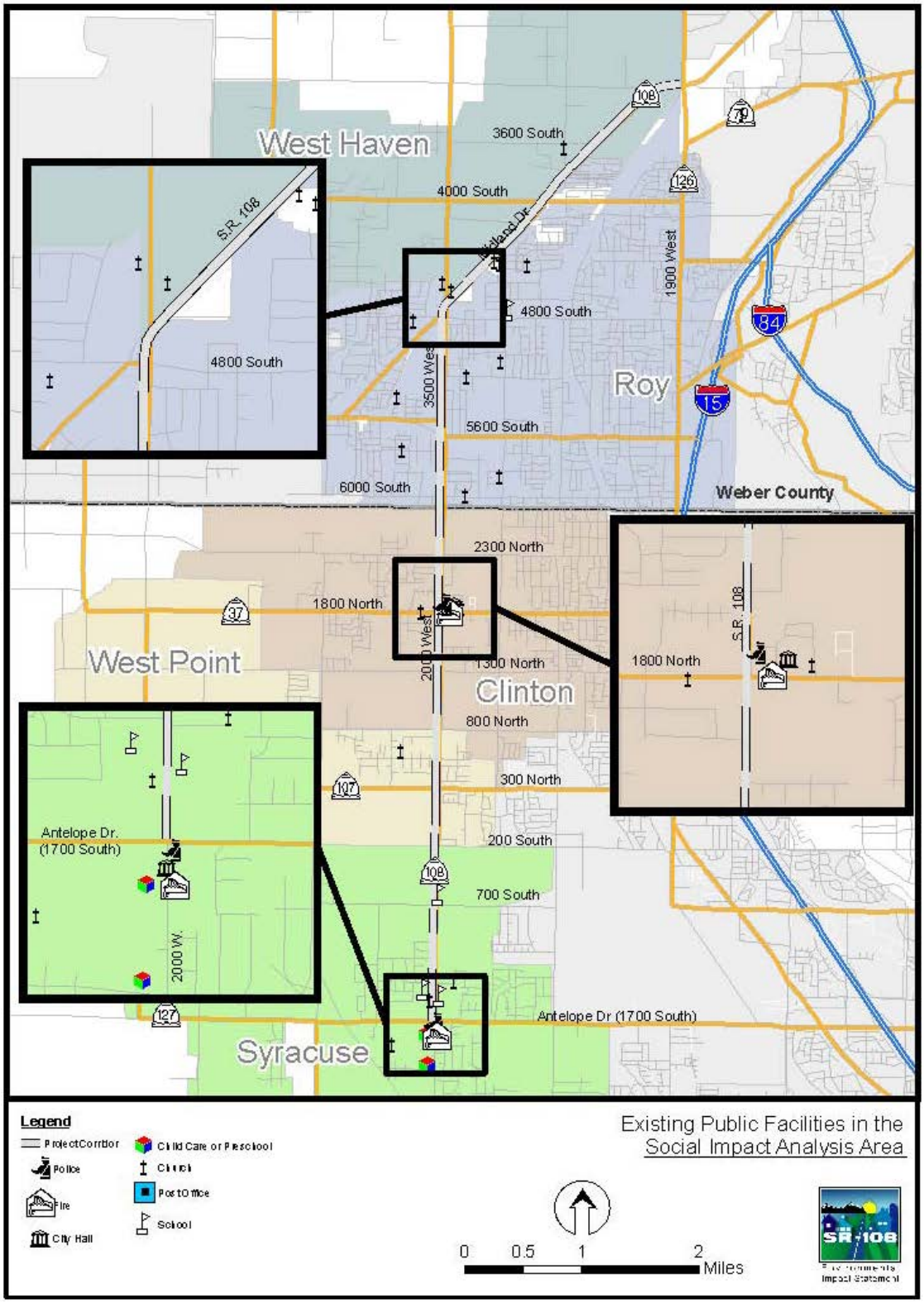
Public, or community, facilities help define communities and also provide opportunities for residents to interact. Community facilities generally include (but are not limited to) churches, schools, parks, law enforcement facilities, fire stations, and government offices. Parks and other recreation-related community facilities are discussed in Section 3.3.4, Recreation Resources. Fire, ambulance, emergency response, and law enforcement facilities are discussed in Section 3.3.6, Public Health and Safety, as is school safety.

Public facilities in the impact analysis area are shown in Exhibit 3.3-3 and Exhibit 3.3-4 below.

Exhibit 3.3-3: Public Facilities in the Social Impact Analysis Area

Facility	Name	Address	City
Church	Amigo International Assembly of God	4433 South 3100 West	Roy
Church	Wasatch Evangelical	4433 South 3100 West	Roy
Church	International Prayer Center	4577 South 3500 West	West Haven
Church	Church of Jesus Christ of Latter-day Saints (LDS)	15 churches in the social impact analysis area; see Exhibit 3.3-4 below	All
City hall	Syracuse City Hall	1787 South 2000 West	Syracuse
City hall	Clinton City Hall	1906 West 1800 North	Clinton
Preschool	Tammy's Teddy Bear Preschool	2050 W. Craig Lane	Syracuse
Preschool	Care-A-Lot Child Care Center	1822 South 2000 West	Syracuse
School	Syracuse Elementary School	1513 South 2000 West	Syracuse
School	Syracuse Junior High School	1450 South 2000 West	Syracuse
School	Syracuse High School	665 South 2000 West	Syracuse
School	Midland Elementary School	3100 West 4800 South	Roy

Exhibit 3.3-4: Existing Public Facilities in the Social Impact Analysis Area



3.3.6 Public Health and Safety

The public health and safety needs of citizens are met by various emergency services such as fire, ambulance, and law enforcement. The discussion about quality of life has more information about how communities in the project area assess and feel about safety (see Section 3.3.3, Quality of Life).

3.3.6.1 Emergency Response and Law Enforcement

For the most part, emergency response is provided by police and fire departments for each city in the impact analysis area. However, because the cities are close to each other and their fire departments are fairly small, each city has cooperative agreements with other cities to provide assistance when needed. Exhibit 3.3-4 above and Exhibit 3.3-5 below show the fire protection and law enforcement facilities in the impact analysis area.

Exhibit 3.3-5: Law Enforcement and Fire Protection Facilities in the Social Impact Analysis Area

Facility	Name	Address	City
Law enforcement	Syracuse Police Department	1751 South 2000 West	Syracuse
Law enforcement	Clinton City Police Department	1906 West 1800 North	Clinton
Fire station	Clinton City Fire Department	1906 West 1800 North	Clinton
Fire station	Syracuse Fire Department	1787 South 2000 West	Syracuse

Emergency service providers in both Davis and Weber Counties have stated that there is a need to widen S.R. 108 and add passing and turning lanes to better facilitate emergency response. These emergency response providers believe that the narrow lanes and rush-hour congestion on S.R. 108 affect emergency response times, although they did not give specific figures (Chillson 2006; Peterson 2006; Ritchie 2006; Wallace 2006; Whinham 2006).

3.3.6.2 School Safety

As shown in Exhibit 3.3-3: Public Facilities in the Social Impact Analysis Area above, there are four public schools in the impact analysis area. Some schools located outside the impact analysis area are included in the following discussion because their service area

boundaries cross S.R. 108 and students who attend these schools likely cross S.R. 108 on their routes to and from school.

Schools in the Davis School District

In Syracuse, Syracuse Elementary School and Syracuse Junior High School are both located on S.R. 108 in the impact analysis area. There is a single crosswalk available for students, but school officials state that it is not big enough for the large number of students crossing the street.

A school survey was sent home with all 850 students at Syracuse Elementary School to help identify student crossing patterns. The survey was developed in coordination with the Davis School District to be a kid-friendly survey with data that could be easily used for a school classroom project. About 36% of the students responded to the survey. Of the respondents, about 53% said that they crossed S.R. 108 to get to and from school. Twenty-nine percent of respondents cross at the south end of Syracuse Elementary School, and about 27% of respondents cross at 1700 South. Additionally, of those respondents who said they are driven to school, 19% said that they would walk if there were adequate sidewalks and bicycle trails.

Other safety concerns for children walking to school include the effects of continuous (current) construction along S.R. 108, a lack of safe walking routes, limitations on walking routes when snow is plowed to the side of the road during the winter, and the length of the school safety zone (Bond 2006; Syracuse Elementary School 2006).

Syracuse Elementary School and Syracuse Junior High School also have problems with traffic safety. School buses have trouble turning into the parking lots, which in the past has led to accidents. Traffic congestion in the area is compounded because the elementary and junior high bus runs overlap somewhat (the elementary school bus runs start as the junior high school bus runs are ending). The busy traffic around school parking lots combined with commuter traffic makes driving difficult and reduces the safety of walking students (Bond 2006). There are plans to modify the parking lots to better accommodate traffic during the busiest hours.

Davis School District is currently constructing a new high school (Syracuse High School) on S.R. 108 in Syracuse. Although the school is not scheduled to open until the fall of 2007, it is included in

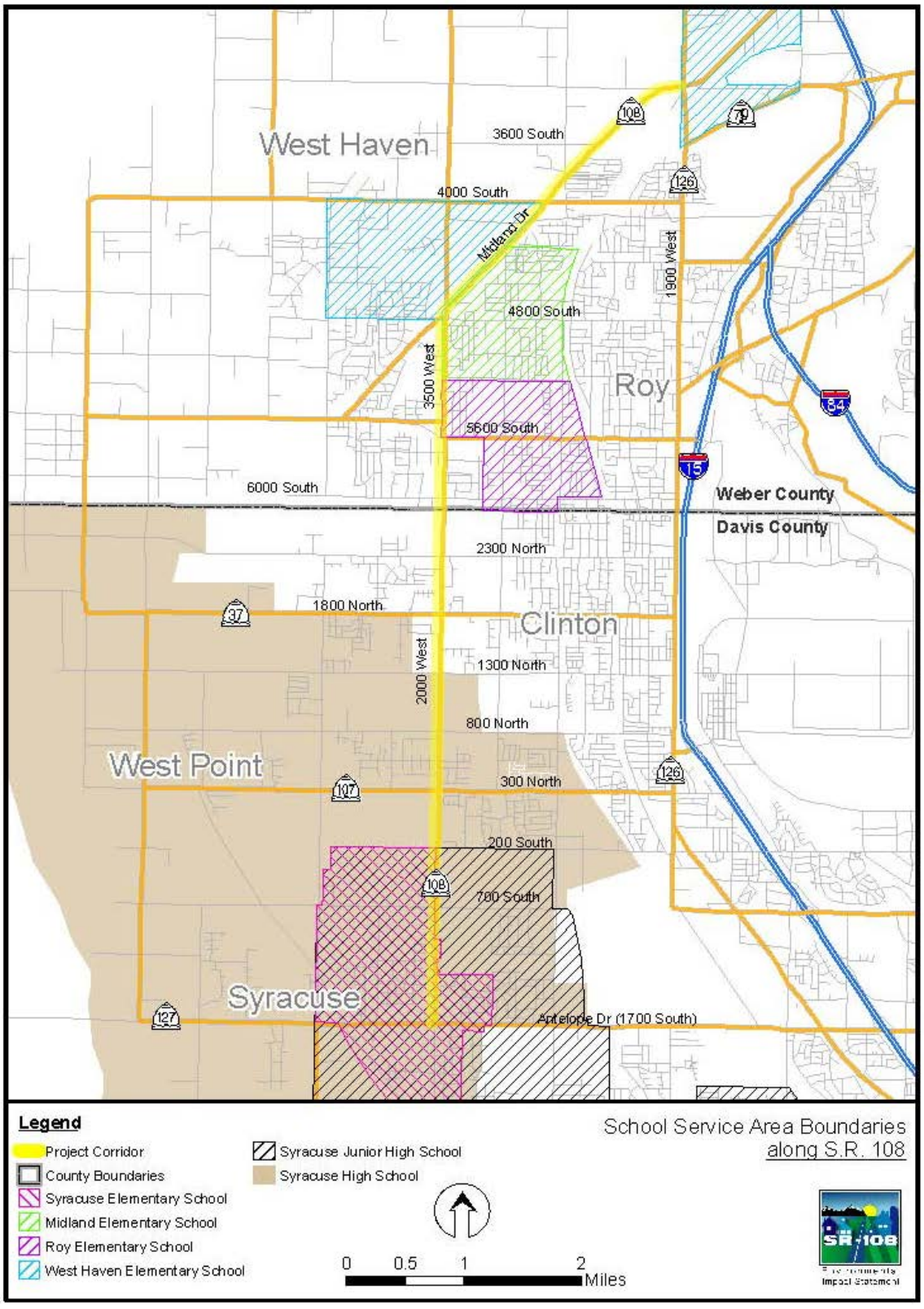
How do conditions on S.R. 108 affect school safety?

According to the Community Profile Survey and school representatives, congestion on S.R. 108 and the lack of continuous sidewalks are safety concerns for students walking to and from school. In addition, school buses have trouble turning into school parking lots at Syracuse Elementary and Syracuse Junior High, which in the past has led to accidents.

the impact analysis area because it would be open when the proposed project improvements would be made. Comments about the new high school were collected from the Community Profile Survey for the S.R. 108 project and during the public meetings. These comments show that members of the community are concerned about how future traffic at the intersection where the new school will be located will further affect congestion and safety along this portion of S.R. 108.

All of the public schools in Clinton and West Point are outside the impact analysis area. However, the service area boundaries of Lakeside Elementary School and West Point Junior High School, which are both in West Point, cross S.R. 108 (see Exhibit 3.3-6 below). Similarly, the service area boundary of Parkside Elementary School in Clinton overlaps the impact analysis area. Although these schools are outside the impact analysis area, some students who attend these schools cross S.R. 108 when walking to school. The City of Clinton would like to build an underpass under S.R. 108 at about 1150 North to improve pedestrian crossing safety and to connect the west part of the city to parks and city buildings. This underpass would also serve students walking to and from school.

Exhibit 3.3-6: School Service Area Boundaries along S.R. 108



Schools in the Weber School District

There is only one school in the Weber School District within the impact analysis area. This school, Midland Elementary School, is located about one-half mile east of S.R. 108 in Roy. The school's Child Access Routing Plan identifies 4800 South as a potential hazard to students because of the heavy traffic and because students cross 4800 South east of the school grounds where there is no school crossing zone. The school is concerned about the hazard of young children crossing outside the school zone on the busy road without supervision (Midland Elementary School 2006). The Routing Plan does not identify any specific recommendations for student safety along S.R. 108.

West Haven Elementary School is located just outside the impact analysis area about 1 mile west of S.R. 108 in West Haven. Many students have to cross 3500 West (S.R. 108) on their route to and from school. Safety concerns include ongoing road construction in the area, which affects the availability of sidewalks, and a lack of safe walking routes. The City has tried to address the problem of limited sidewalks by painting walkways in the street for students. The City has also stated that it will establish safer walking routes as development of the community continues (West Haven Elementary School 2006).

Roy Elementary School is located just outside the impact analysis area at 2888 West 5600 South in Roy. Students who attend Roy Elementary cross S.R. 108 while walking to and from school. The school's Child Access Routing Plan states that additional sidewalks are needed along the walking route, but does not identify specific hazards associated with S.R. 108 (Roy Elementary School 2006).

3.3.7 Housing and Relocations

Most of the S.R. 108 corridor has existing commercial and residential development on both sides of the roadway. Many homes and businesses on S.R. 108 have direct driveway access to the roadway.

Under both of the S.R. 108 action alternatives, residents and businesses would likely need to be relocated. A relocation occurs when construction of the project would require purchasing an

occupied structure, such as a home or business. In such instances, affected residents or business owners would receive relocation assistance in addition to compensation for the fair market value of the property itself.

For residential relocations, the ability of residents to relocate in a given area depends partially on the housing market conditions in the area. The following discussion provides an overview of the current housing and rental market in the project region. The purpose of this information is to provide project decision-makers with an understanding of the available housing market so that they can manage any housing impacts associated with the project.

If displacement of residences, businesses, public facilities, or farms is required within the impact analysis area, UDOT must comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601 et seq. as amended, 1989). The Act provides for uniform and equitable treatment of all people displaced from their homes, businesses, and farms without discrimination on any basis. The guidelines used by UDOT for carrying out the provisions of this Act are contained in its 1997 *Relocation Brochure* (UDOT 1997).

What assistance and compensation are available for relocated residents and business owners?

UDOT would acquire the necessary right-of-way consistent with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and Title VI of the Civil Rights Act of 1964. These policies ensure the uniform and equitable treatment of all people displaced from their homes, businesses, and farms without discrimination on any basis. Relocation resources are available to all residents and businesses that are relocated, and the process for acquiring replacement housing and other sites will be fair and open.

3.3.7.1 Housing Market Conditions

Overall, the S.R. 108 region has a wide variety of available housing that is in good condition. Because the project would not affect any apartment units, the following discussion focuses on single-family housing.

Exhibit 3.3-7 below provides an overview of the housing market conditions. The median home price in the cities along S.R. 108 ranges from about $131,000 to about $207,000 and varies by jurisdiction. The data show that there are available housing units within each county and along S.R. 108 and that there are also ample rental properties along S.R. 108.

Exhibit 3.3-7: Housing Market Conditions in the S.R. 108 Region

Housing Area	Median Home Price	Vacancy Rate for Owner-Occupied Homes	Vacancy Rate for Renter-Occupied Homes
Davis County	$207,076	1.7%	7.7%
Clinton	$130,600	1.5%	10.5%
Syracuse	$184,950	3.4%	3.4%
West Point	$152,500	2.0%	5.0%
Weber County	$159,154	1.8%	9.1%
Roy	$123,700	2.0%	5.6%
West Haven	$175,100	2.8%	15.7%

Sources: Davis County Council of Governments 2005; EquiMark Properties 2006; U.S. Census Bureau 2000b

Housing availability data from the Wasatch Front Multiple Listing Service were also reviewed. These data are presented by ZIP code, and some ZIP codes cover more than one city. In particular, Clinton and Roy share the same ZIP code as Clearfield and Sunset, which are outside the impact analysis area.

As of November 2006, about 170 homes were available in Syracuse with prices ranging from $150,000 to $400,000. Within the ZIP code that encompasses Clinton, Roy, Clearfield, and Sunset, 221 homes were available with prices ranging from $89,000 to $350,000. In Roy, 141 homes were available with prices ranging from $90,000 to $350,000. In West Haven, 193 homes were available with prices ranging from $70,000 to $350,000 (Wasatch Front Multiple Listing Service 2006).

3.3.7.2 Housing Conditions

In 2005, WFRC conducted a "windshield study" of housing conditions in Davis and Weber Counties. For this study, representatives from WFRC drove through the two counties and recorded the structural condition of homes in the area (new, acceptable, deteriorated, or dilapidated). Exhibit 3.3-8 provides an overview of the housing conditions in the area. As shown in the table, most housing in the cities along S.R. 108 is considered to be in new or acceptable condition.

Exhibit 3.3-8: Single-Family Housing Conditions in the S.R. 108 Region

		Housing Condition[a]			
City	Total	New	Acceptable	Deteriorated	Dilapidated
Syracuse	4,539	2,464	2,030	42	3
Clinton	5,176	1,700	3,501	55	12
West Point	2,000	377	1,294	28	3
Roy	12,239	1,302	10,903	26	8
West Haven	1,279	250	1,018	10	1

Sources: Davis County Council of Governments 2005; WFRC 2005

[a] Housing conditions are defined as follows:

- New homes appeared to have been constructed within the last 5 years.
- Acceptable homes have no visible signs of deterioration. These homes need minimal to moderate rehabilitation.
- Deteriorated homes have visible signs of deterioration. These homes are inhabitable but need minimal or moderate rehabilitation.
- Dilapidated homes are considered uninhabitable but might still be inhabited. These types of homes need major rehabilitations or complete replacement.

3.3.8 Public Services and Utilities

The availability of public services and utilities helps define the social environment. If more services are available, then a community is likely to be more densely inhabited.

Utility companies and municipalities were contacted in order to learn more about belowground and overhead facilities in the corridor because the presence of these facilities could affect the alternative alignments. Representatives from the local jurisdictions that operate water, sewer, and storm drainage infrastructure were also contacted. Thirty-two facilities—petroleum, electric, telecommunications, water, storm drains, and sanitary sewer—are adjacent to or cross S.R. 108 between 1700 South and 1900 West. The following facilities are present along or cross S.R. 108:

- Five canal companies operate gravity-flow irrigation systems that cross S.R. 108.
- All five cities along the corridor, in conjunction with UDOT, have storm drain systems along S.R. 108.
- Rocky Mountain Power has mainline service vaults located at the intersection of S.R. 108 and 5600 South.
- Additional power facilities, along with fiber optic and telecommunication facilities, are located both overhead and belowground along S.R. 108.
- Gas lines within the S.R. 108 corridor are low-pressure lines, but it is not known how deep these lines are. Weber County is planning to implement a high-pressure gas line within the next 2 to 7 years; however, the location for this line has not yet been identified and it might not be located anywhere near the S.R. 108 corridor (Brown 2007).

Other utilities in the impact analysis area include secondary water irrigation lines, potable water lines, sanitary sewer lines, and customer service laterals for the gas and water facilities noted above. Throughout the S.R. 108 corridor, the potable water and sewer lines are at least 36 inches deep to avoid freezing. A Chevron distribution line exists at the north end of the corridor but is suspected to be just outside the project limits.

3.4 Environmental Justice Populations

This section summarizes the environmental justice populations within one-half mile of S.R. 108 (the environmental justice impact analysis area). For more information, see the S.R. 108 Environmental Justice Technical Memorandum (HDR 2006a).

Environmental justice is a term used to describe the fair and equitable treatment of minority and low-income people (environmental justice populations) with regard to all federally funded projects and activities. Fair treatment means that no minority or low-income population should be forced to bear a disproportionately high share of negative environmental effects. Fair treatment also includes meaningful involvement and opportunities for minority and low-income people to participate in the decision-making process. Executive Order 12898, Federal Actions To Address Environmental Justice in Minority and Low-Income Populations, mandates that all federal actions be reviewed for possible effects on environmental justice populations.

FHWA defines low-income and minority populations as follows:

- A low-income population is any persons having a household income (or, for a community or group, a median household income) below the poverty thresholds defined by the U.S. Department of Health and Human Services.
- A minority is any person belonging to one of the following five groups: Black, Hispanic, Asian, American Indian or Alaskan Native, or Native Hawaiian or other Pacific Islander.

What is environmental justice?

Environmental justice is a term used to describe the fair and equitable treatment of minority and low-income people (environmental justice populations) with regard to all federally funded projects and activities. Fair treatment means that no minority or low-income population should be forced to bear a disproportionately high share of negative environmental effects.

3.4.1 Resource Identification

Minority and low-income people were defined and environmental justice populations, communities, and individual residences were identified by examining data from the U.S. Census Bureau (2000 census and 2005 American Community Survey), Davis and Weber Housing Authorities, and the National Center for Education Statistics (2004–2005 school year). Information was also gathered from meetings or correspondence with local officials, the Davis and Weber (Ogden) Housing Authorities, and local representatives of

minority-focused groups. Public involvement activities and field observations also helped project planners understand potential environmental justice issues.

3.4.2 Communities Considered

S.R. 108 passes through the cities of Syracuse, West Point, and Clinton in Davis County and Roy and West Haven in Weber County. All of these suburban communities currently have residential areas adjacent to S.R. 108 that range from large-lot, single-family residences to high-density manufactured-home communities. Exhibit 3.4-1 below shows the city boundaries and census block groups along S.R. 108.

What is a block group?

Census data are reported by larger geographic areas called *census tracts* and smaller areas within the census tracts called *block groups*. A census tract–block group number such as 125501-3 indicates both the census tract (125501) and the block group (3). For simplicity, census tract–block groups are referred to as block groups in this EIS.

3.4.3 Public Outreach

Public outreach for the S.R. 108 EIS process included meetings, mailers, signs, and surveys. These efforts were focused on the entire community and allowed project planners to better understand the concerns of local residents as well as the demographics of the area. More information regarding these public outreach efforts is included in Chapter 7, Coordination.

People who attended the scoping meeting could complete a Community Profile Survey. Fifty-seven surveys were returned during the scoping period. The survey was also mailed to 320 residents along S.R. 108 in September 2006. Of these 320 surveys, 114 were returned. The data that the project planners derived from the completed surveys provided important information about the demographics of the project area.

Exhibit 3.4-1: Census Tracts and Block Groups

Project staff made a special effort to involve residents of the two manufactured-home parks along S.R. 108 in Roy. Project staff offered to give a special presentation about the project to residents of Country Meadows Estates. Representatives of Karol's Mobile Estates did not respond to phone messages left by the S.R. 108 project staff.

At the time the Draft EIS was released, the information received through public outreach supported the information about minority and low-income populations that was collected through the process described in Section 3.4.1, Resource Identification. Public outreach will continue through completion of the Final EIS, project planning, and project construction.

3.4.4 Minority Populations

For the purpose of the environmental justice analysis, a minority is any person belonging to one of the following groups: Black, Hispanic, Asian, American Indian or Alaskan Native, or Native Hawaiian or other Pacific Islander. To identify minority communities, the following sources were reviewed:

- 2000 U.S. census data for the state, counties, cities, and census block groups
- Information about minority students for schools in the impact analysis area
- Meetings with local government and county officials for Syracuse, West Point, Clinton, Roy, and West Haven to help identify any known minority communities
- Representatives of various ethnic organizations

What is the difference between racial and ethnic minorities?

The U.S. Census Bureau differentiates between *racial* and *ethnic* minorities, though minority persons sometimes fit both categories. For example, people of Hispanic or Latino ethnicity can be any race. Note that statistics on ethnic and racial minorities should not be combined, because some people could be listed in both categories and so would be counted twice.

3.4.4.1 Census Data for Minority Populations

Exhibit 3.4-2, Exhibit 3.4-3, and Exhibit 3.4-4 below summarize the 2000 census data on the local distribution of race and ethnicity. According to the 2000 U.S. census, communities along S.R. 108 within the impact analysis area predominantly consist of white, non-Hispanic persons. Exhibit 3.4-4 shows the block groups with a percentage of racial or ethnic minorities that is higher than the county average. The minority populations could occur anywhere within the block group and are not necessarily adjacent to S.R. 108.

Exhibit 3.4-2: Racial Minorities

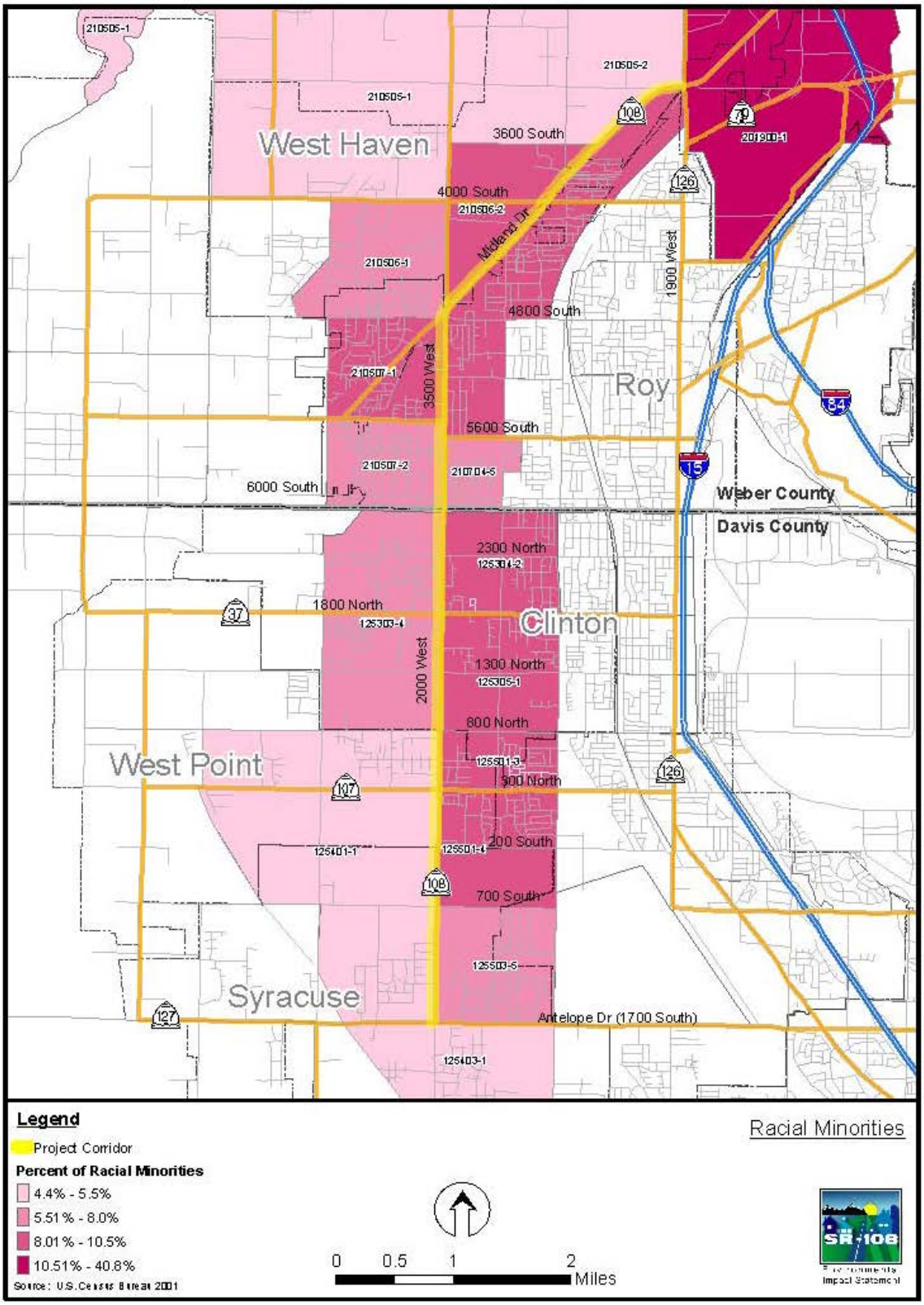


Exhibit 3.4-3: Hispanic Minorities

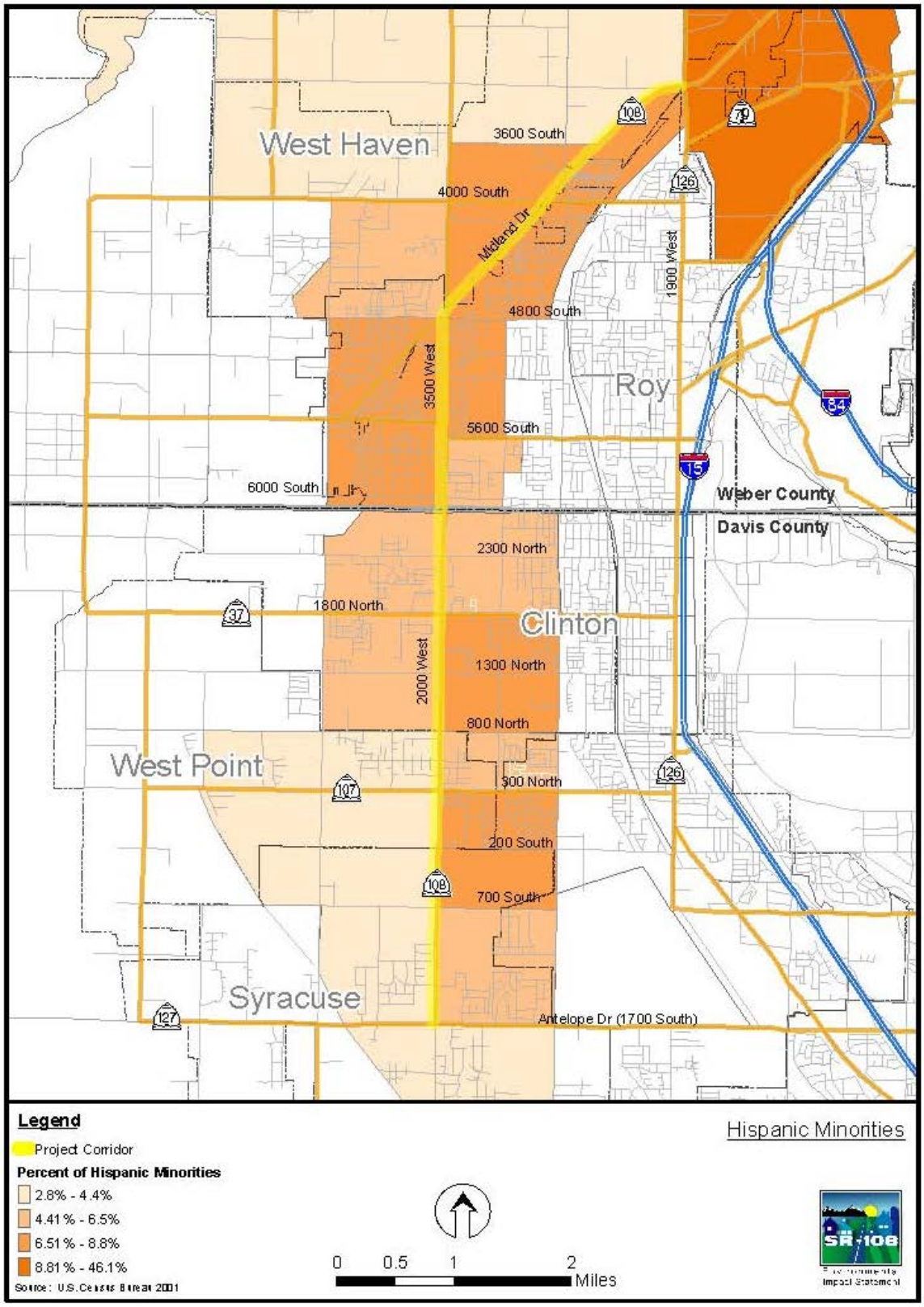


Exhibit 3.4-4: Racial and Ethnic Minority Census Data for the Environmental Justice Impact Analysis Area

Area	Census Block Group	Population	Race		Ethnicity
			Percent Caucasian	Percent Racial Minorities	Percent Hispanic Minority[a]
Utah	—	2,233,169	89.2%	10.8%	9.0%
Davis County	—	238,994	92.3%	7.7%	5.4%
Weber County	—	196,533	87.7%	12.3%	12.6%
Davis County	125304-2	1,863	91.6%	**8.4%**	**6.2%**
	125305-1	1,783	89.5%	**10.5%**	**8.8%**
	125501-3	2,261	91.1%	**8.9%**	**6.2%**
	125501-4	2,598	90.0%	**10.0%**	**7.3%**
	125503-5	2,937	93.1%	6.9%	**6.0%**
Weber County	201900-1	1,288	59.2%	**40.8%**	**46.1%**

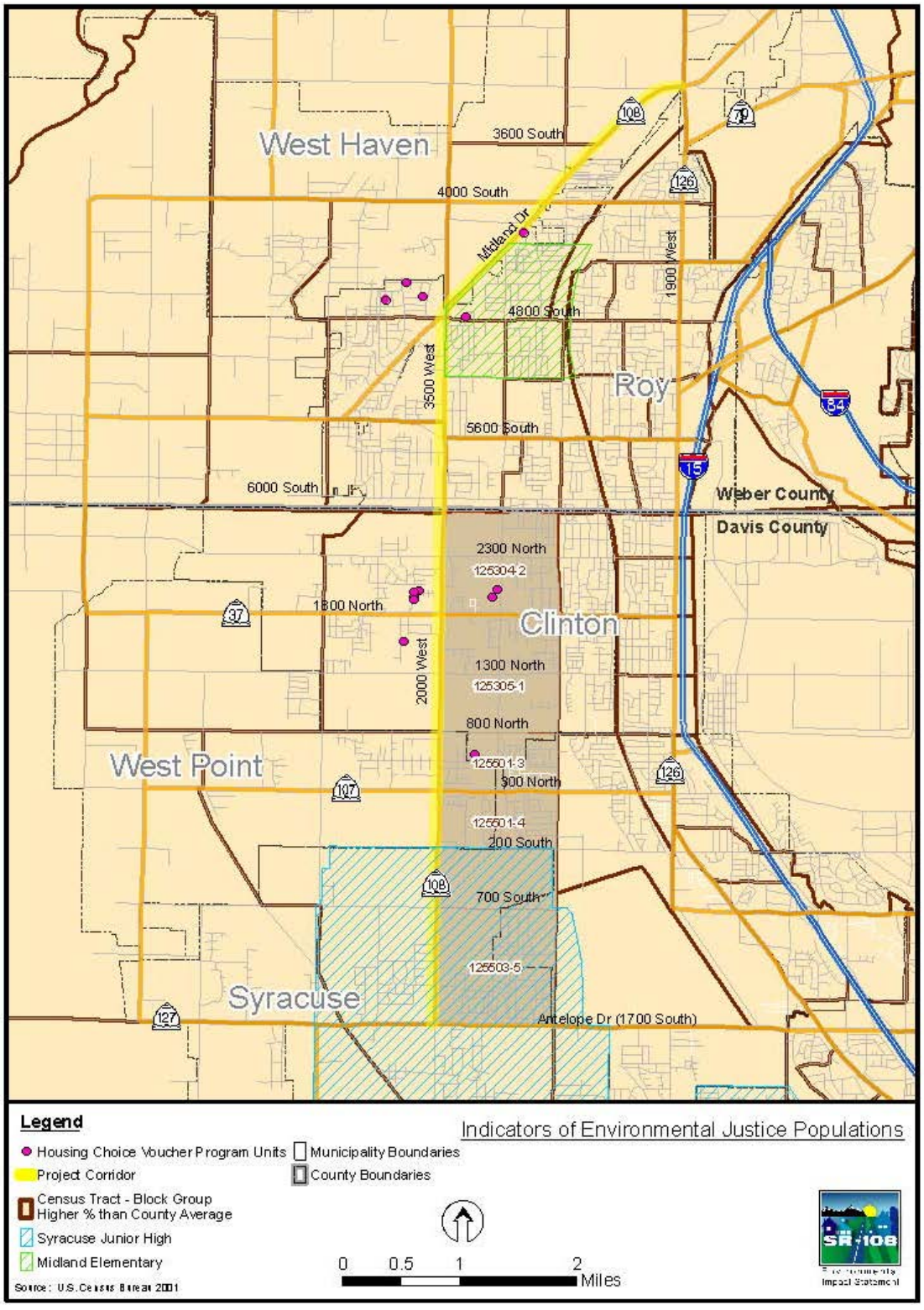
Source: U.S. Census Bureau 2001

Highlighted cells indicate a block group with a higher percentage of racial or ethnic minorities than the county average as shown in this table.

[a] Ethnic Hispanic or Latino, regardless of race

There are five block groups along S.R. 108 in Davis County with percentages of racial and/or ethnic minorities that are higher than the county averages. These block groups are next to each other on the east side of S.R. 108 between Antelope Drive and the Davis County–Weber County line (see Exhibit 3.4-5 below). Although these block groups have percentages of minorities that are higher than the Davis County average, they are still predominantly Caucasian (averaging over 91% Caucasian).

Exhibit 3.4-5: Indicators of Environmental Justice Populations



The 2000 U.S. census data show that Weber County as a whole has higher percentages of racial and ethnic minorities than Davis County as a whole. At the more detailed level, one block group that is adjacent to the northern project terminus at 1900 West (block group 201900-1) has a much higher percentage of minorities than the county as a whole. However, a representative from the Weber (Ogden) Housing Authority stated that these racial and ethnic minorities are not living in the part of the block group nearest to the project but are probably living farther east in Ogden (Phillips and Gardner 2006). The area near the project is dominated by light industry. This fact, combined with information provided by the Housing Authority, indicates that there are no minority populations concentrated near the northern terminus of the project. As in Davis County, the other block groups along S.R. 108 in Weber County are predominantly Caucasian (averaging over 93% Caucasian).

The data on minorities in Davis and Weber Counties from the 2005 American Community Survey, which was conducted by the U.S. Census Bureau, verify the information collected through the 2000 U.S. census.

3.4.4.2 Local Data for Minority Populations

Information to verify and further identify minority populations was obtained from local planning officials and ethnic organization representatives and through a Community Profile Survey. Data on minority students were also obtained from the National Center for Education Statistics for schools in the Davis and Weber School Districts.

Local planning officials did not identify any minority populations along S.R. 108 (J. Anderson 2006; S. Anderson 2006a; Hamilton 2006; Larson 2006a; Vinzant 2006; Worthen 2006). A representative from Weber County noted that Ogden has a large Hispanic community, but this community is quite far from the impact analysis area (Hamilton 2006).

Community Profile Survey results showed that 94.6% of the respondents classify themselves as white, 1.8% classify themselves as biracial, and 3.6% classify themselves as non-white. The survey was distributed at the scoping hearing and mailed to households living along S.R. 108 regardless of race or ethnicity. The percentage

of white residents reported through the survey is slightly higher than the census estimates.

Representatives from local ethnic organizations either did not respond to detailed requests for information or did not note any specific populations of minorities in the impact analysis area.

A number of schools serve the project area. Only three schools are within the impact analysis area: Syracuse Junior High School, Syracuse Elementary School, and Midland Elementary School. As shown in Exhibit 3.4-6, Syracuse Junior High School and Midland Elementary School have a percentage of minority students that is higher than the respective county averages. Syracuse Junior High School, which is in the Davis School District, serves an area that extends far beyond the impact analysis area. However, students from all areas access the school from S.R. 108 since the junior high is located on S.R. 108.

Exhibit 3.4-6: Minority and Low-Income Student Data for the Environmental Justice Impact Analysis Area

School or District	Students	Percent Racial/Ethnic Minority Students[a]	Percent of Students Eligible for Free or Reduced-Price Lunch[b]
Davis School District	58,953	7.2%	22.0%
Syracuse Elementary	853	4.9%	**22.3%**
Syracuse Junior High	991	**9.1%**	21.5%
Weber School District	28,475	6.5%	26.0%
Midland Elementary	687	**15.3%**	**29.1%**

Sources: National Center for Education Statistics, no date; Weber School District, no date; Davis School District 2005a, 2005b; Sears 2006; U.S. Census Bureau 2006a

Highlighted cells indicate a percentage of either minority students or students eligible for reduced-price or free lunches that is higher than the school district average as shown in this table.

[a] Minorities are students of American Indian/Alaskan Native, Asian, Black, or Hispanic ancestry or origin.

[b] Children from families with incomes at or below 185% of the poverty level (2005 poverty level was $19,350 for a family of four, so 185% is $35,797).

Midland Elementary School, which is in the Weber School District, serves students living east of S.R. 108 in Roy between about 4400 South and 5200 South. A large part of this school's service area is within one-half mile of S.R. 108. Though the National Center for Education Statistics data show that the percentage of racial and ethnic minority students is more than double the county average, census data for the area that includes this school service area do not show higher-than-average percentages of racial or ethnic minorities.

3.4.4.3 Summary of Minority Populations

According to the 2000 census data, communities along S.R. 108 predominantly consist of Caucasian, non-Hispanic persons. To further refine the census data, information was collected from local city governments and the National Center for Education Statistics. Based on this information and the S.R. 108 Community Profile Survey, the following minority populations were identified in the S.R. 108 impact analysis area:

- **Davis County Cities of Syracuse, West Point, and Clinton.** Data for five census block groups east of S.R. 108 between Antelope Drive and the Davis County–Weber County line show that this area has a higher percentage of racial and/or ethnic minorities than Davis County as a whole. However, the overall percentage of minorities in these block groups is 10.5% or less.
- **Syracuse Junior High School Service Area, Syracuse, Davis County.** Though this school service area extends far beyond the impact analysis area, construction could affect students' ability to access the school. The school has a higher-than-average percentage of minority students (9.1%) compared to Davis District schools overall (7.2%).
- **Midland Elementary School Service Area, Roy, Weber County.** Much of this school service area is within one-half mile of the eastern edge of S.R. 108 between about 4400 South and 5200 South. The school has a higher-than-average percentage of minority students (15.3%) compared to other Weber District schools overall (6.5%).

3.4.5 Low-Income Populations

Low-income persons are defined by FHWA as individuals having a household or median income below the poverty thresholds defined by the U.S. Department of Health and Human Services. Possible low-income populations in the impact analysis area were identified using the following sources:

- Data from the 2000 census at the state, county, and block-group levels for persons identified as living below the federally defined poverty level
- Information from the National Center for Education Statistics on the percentages of students eligible for reduced-price and free lunches at schools in the impact analysis area
- Meetings with local city representatives and the Davis and Weber Housing Authorities
- Information from the U.S. Department of Housing and Urban Development on poverty and Entitlement and Enterprise communities

How is poverty defined?

The federal government considers individuals and households who earn 30% or less of the median family income to be living in poverty. For the purposes of determining poverty and eligibility for assistance programs, the federal government establishes median family income on an annual basis based on the location and number of persons in the family.

For example, the 2005 fiscal year median family income for a family of four in the Salt Lake City–Ogden Metropolitan Statistical Area was $61,350. The corresponding poverty-level threshold for a family of four was $18,400. For a family of six, the poverty-level threshold was $21,350.

3.4.5.1 Census Data for Low-Income Populations

Exhibit 3.4-7 and Exhibit 3.4-8 below summarize the 2000 census data for poverty in the impact analysis area. As shown in Exhibit 3.4-8 and in Exhibit 3.4-5: Indicators of Environmental Justice Populations above, three block groups adjacent to S.R. 108 have a percentage of persons living in poverty that is greater than the countywide average.

As with minority populations, the 2005 American Community Survey data on low-income persons in Davis and Weber Counties verify the information collected through the 2000 census.

Exhibit 3.4-7: Poverty in the Local Area

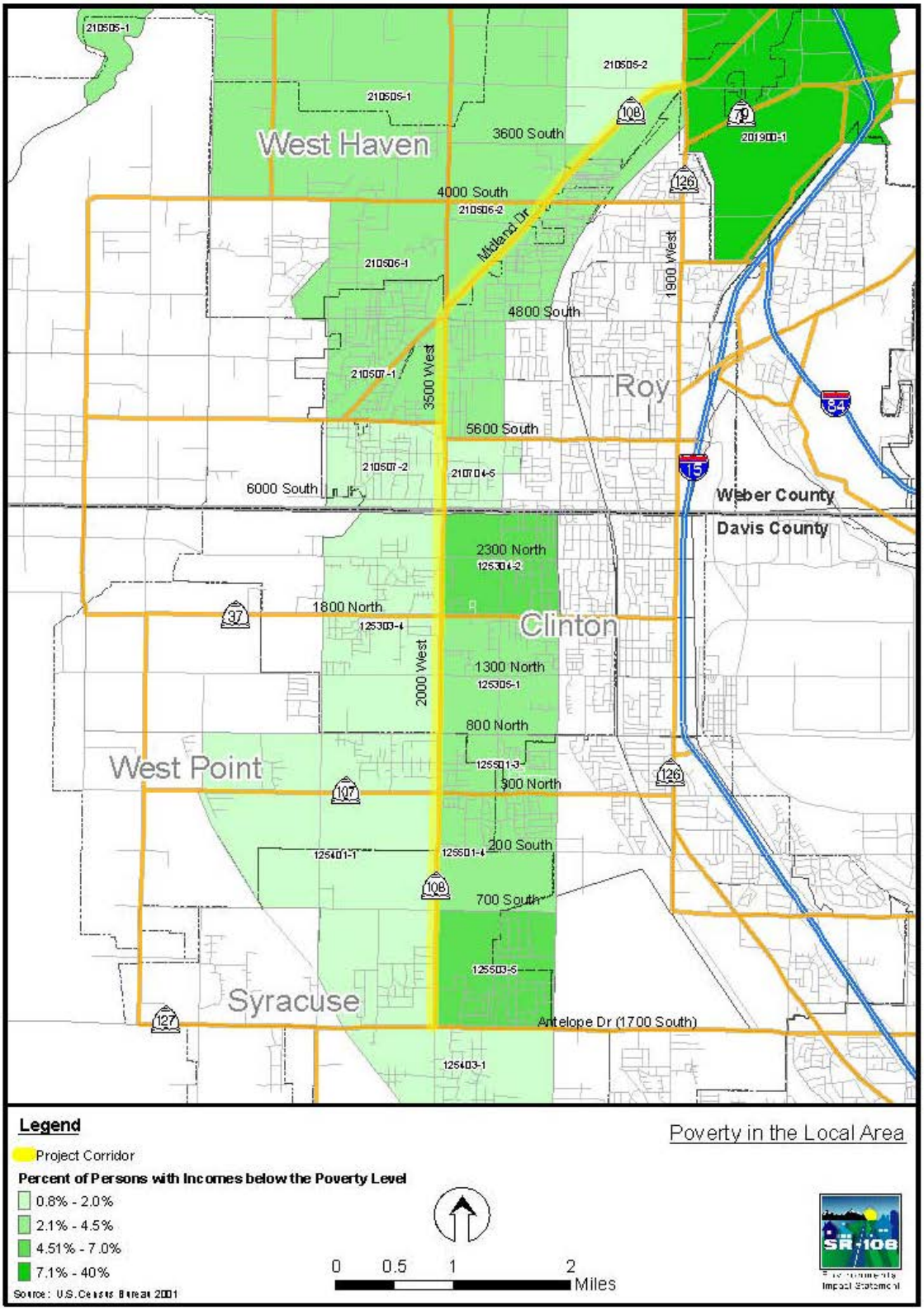


Exhibit 3.4-8: Persons Living below Poverty Level in the Environmental Justice Impact Analysis Area

Area	Census Block Group	Persons for Whom Poverty Status Is Determined	
		Total	Below Poverty Level
Utah	—	2,195,034	206,328 (9.4%)
Davis County	—	236,480	11,984 (5.1%)
Weber County	—	193,776	18,022 (9.3%)
Davis County	125304-2	1,811	**127 (7.0%)**
	125503-5	2,798	**187 (6.7%)**
Weber County	201900-1	1,128	**451 (40.0%)**

Source: U.S. Census Bureau 2002b

Highlighted cells indicate a percentage of persons living below poverty level that is higher than the county average as shown in this table.

3.4.5.2 Housing and Urban Development Information

The U.S. Department of Housing and Urban Development (HUD) establishes yearly income limits for the purpose of determining eligibility for assistance programs, including the Section 8 Contract program. This program, also known as the Housing Choice Voucher Program (HCVP), provides eligible low-income families with rental assistance in the form of vouchers that allow participants to reduce the portion of their income spent on rent. The program is administered by local housing authorities.

Representatives of the Davis and Weber County housing authorities said that there were no "concentrations" of HCVP units in the impact analysis area (Phillips and Gardner 2006; Wilson 2006). A review of actual locations of HCVP units supported this conclusion, finding only 22 units within one-half mile of S.R. 108 out of 112 total in the ZIP codes that apply to the project area (see Exhibit 3.4-5: Indicators of Environmental Justice Populations above). An area of Davis County along S.R. 108 between 1500 North and 2000 North has seven HCVP units. This is the same area that Lynn Vinzant with the City of Clinton said might have lower-income households (see Section 3.4.5.3, Local Data for Low-Income Populations). Although

the City of Clinton identified areas with lower-income households, these households are not necessarily below poverty level.

HUD data also include figures for "very low income" families (between 30% and 50% of the area median income) and "low income" families (between 50% and 80% of the area median income). In 1999, a very-low-income family of four in the Salt Lake City–Ogden Metropolitan Statistical Area made between $15,100 and $25,150. A low-income family made between $25,150 and $40,250.

All of the census block groups in the impact analysis area had a 1999 median income that was higher than the low-income limit of $40,250, with the exception of the northernmost block group in Weber County (block group 201900-1).

The one block group with a 1999 median income below the low-income limit of $40,250 is at the northern terminus of the project north and east of 1900 West (block group 201900-1). There are no residential areas in this block group near S.R. 108, and any persons in this block group are probably living in Ogden (see Section 3.4.4.1, Census Data for Minority Populations); therefore, it is not likely that low-income individuals are concentrated near the project area.

What is the difference between families, households, and individuals?

The U.S. Census Bureau gathers data about families (related persons living together), households (related and/or non-related persons living together), and individuals. Because data on families do not include all people living in a community, data on households are preferred when reviewing the demographics of an area. In some cases, the Census Bureau collects data about individuals only.

In this EIS, all of the census and American Community Survey data on poverty are for individuals. This is because the American Community Survey collected local data on the poverty level of individual persons only.

3.4.5.3 Local Data for Low-Income Populations

Local government representatives provided information to help further define low-income communities along S.R. 108. Information about local school populations was also retrieved from the National Center for Education Statistics database and from the results of the Community Profile Survey.

Local government representatives were not able to provide specific information on the locations of low-income communities but did say that some areas might have low- and moderate-income households. According to John Anderson with the City of West Point, there might be lower-income households near the northeast corner of S.R. 108 and 200 South (J. Anderson 2006). Lynn Vinzant with the City of Clinton also said that there are some lower-income housing units west of S.R. 108 in Clinton (Vinzant 2006). Mark Larson with the City of Roy said that the entire city is low to moderate income (Larson 2006a), a statement that was echoed by Kevin Hamilton of Weber County (Hamilton 2006). Finally, Steve Anderson with the

City of West Haven said that some of West Haven's older homes might have lower-income families (S. Anderson 2006a). The general consensus is that most of the project area supports moderate-income households, but that there are lower-income households interspersed throughout. Information provided by John Anderson and Lynn Vinzant is consistent with census data for those parts of West Point and Clinton. Although city officials identified areas that might contain lower-income households, census data do not show these areas as having many households below poverty level.

The Davis and Weber School Districts participate in the U.S. Department of Agriculture's National School Lunch Program. This program provides free lunches to students from families with incomes at or below 130% of the nationally determined poverty level and provides reduced-price lunches to children from families earning between 130% and 185% of the nationally determined poverty level. The income limits for the 2004–2005 school year were $24,505 for free lunches and $34,873 for reduced-price lunches (USDA 2004). During the 2004–2005 school year, 22% of Davis School District students and 26% of Weber School District students were eligible to receive free or reduced-price lunches.[1]

Two Davis District schools are within one-half mile of S.R. 108. During the 2004–2005 school year, 22.3% of the students at Syracuse Elementary School, which is on S.R. 108 near the southern end of the project, were eligible for free or reduced-price lunches. This percentage is consistent with the district average of 22%. Syracuse Junior High School, also on S.R. 108, had an eligibility rate of 21.5%, which is also similar to the district average. Statistics from these schools do not indicate an unusually high percentage of lower-income students. Exhibit 3.4-6: Minority and Low-Income Student Data for the Environmental Justice Impact Analysis Area above summarizes the eligibility data for the schools within one-half mile of S.R. 108.

The one Weber District school within the impact analysis area, Midland Elementary School, had a free and reduced-price lunch eligibility rate of 29.1%, which is 3.1 percentage points higher than

[1] Separate data for free lunch and reduced-price lunch eligibility were not available for the Davis School District, so a combined percentage for both districts was used. During the 2004–2005 school year, 17% of Weber School District students were eligible for free lunches and 9% were eligible for reduced-price lunches.

the school district average. Although Roy is described by local government representatives as being dominated by low- to moderate-income families, there are no other indicators of poverty in the area. The median income for the block group that includes the school (block group 210506-2) is higher than the county and state averages, and the percentage of persons living in poverty is lower than the county and state averages.

Finally, information obtained through the Community Profile Survey shows that a very small percentage of individuals receives income support or employment assistance (5%). Most residents own their homes (98%) and do not feel that a lack of affordable housing is an issue. The Community Profile Survey did not collect data on poverty, though information about income can be used to examine poverty. Nine percent of respondents reported that their annual income was less than $20,000. However, because the 2005 poverty-level income for a family of three was $16,600, the percentage of these respondents that are actually living in poverty cannot be assumed.

3.4.5.4 Summary of Low-Income Populations

According to the 2000 census, three block groups in the impact analysis area—two in Davis County and one in Weber County—had percentages of persons living in poverty that were higher than the county averages.

Block group 201900-1 requires special consideration. This block group is not actually within the project limits but is adjacent to the northern project terminus at 1900 West. As shown in Exhibit 3.4-8: Persons Living below Poverty Level in the Environmental Justice Impact Analysis Area above, the percentage of persons living in poverty for this block group, which is in Weber County, is substantially higher than both the state and county averages. However, near S.R. 108 this block group has industrial land uses and no residential populations.

Overall, no concentrations of low-income populations were identified adjacent to S.R. 108. The few households below poverty level are spread throughout the impact analysis area and are described below:

- **Block Groups 125304-2 and 122503-5, Davis County.** These block groups have a higher percentage of persons living in poverty than the county average. The number of persons living in poverty in block group 125304-2, which is in Clinton, is 1.9 percentage points higher than the county average. The number in block group 125503-5, which is in Syracuse, is 1.6 percentage points higher than the county average.
- **Service Area for Midland Elementary School, Roy, Weber County.** This school, which is within one-half mile of S.R. 108, has a student population with a slightly higher-than-average rate of eligibility for free and reduced-price lunches (29.1%) compared to Weber School District overall (26%).

3.5 Transportation

This section describes the existing transportation infrastructure along S.R. 108 including the existing roads and transit system. The transportation impact analysis area includes the roads that intersect S.R. 108 and the transit that currently operates on S.R. 108. This section also includes a description of the existing level of service of other roadways that intersect or parallel S.R. 108.

What is level of service?

Level of service, or LOS, is a method of describing the congestion level of a street or freeway using a letter "grade" from A to F. LOS A represents excellent traffic conditions and LOS F represents heavy congestion. For more information, see Section 1.4.3, Current and Future Traffic Congestion.

3.5.1 Roadway System

The roadway system in the area of S.R. 108 consists of a series of east-west and north-south arterials and collectors. The only continuous north-south transportation facilities in the area besides S.R. 108 are I-15 and S.R. 126, which are both about 2 miles to the east. The main types of roads in the area are arterials, collectors, and local roads.

- **Arterials.** An arterial is a street with traffic signals whose primary purpose is to serve through traffic and whose secondary purpose is to provide access to adjacent properties.
- **Collectors.** The collector street system provides access to properties and allows traffic to travel through residential neighborhoods and commercial and industrial areas. It differs from the arterial system in that collector streets can extend into residential neighborhoods in order to distribute traffic from the arterials to its ultimate destination.
- **Local Roads.** The local street system consists of all facilities that are not one of the systems noted above. It primarily allows direct access to adjacent properties and connections to arterials and collectors. It offers the lowest level of mobility and usually contains no bus routes. Through traffic is generally discouraged from using local roads.

Exhibit 3.5-1 below shows the existing operating conditions of the north-south and east-west roadways in the transportation impact analysis area. Exhibit 3.5-2: Existing Roadway Network on page 3-62 shows the locations of these roadways.

Exhibit 3.5-1: Existing Roadway Network in 2005

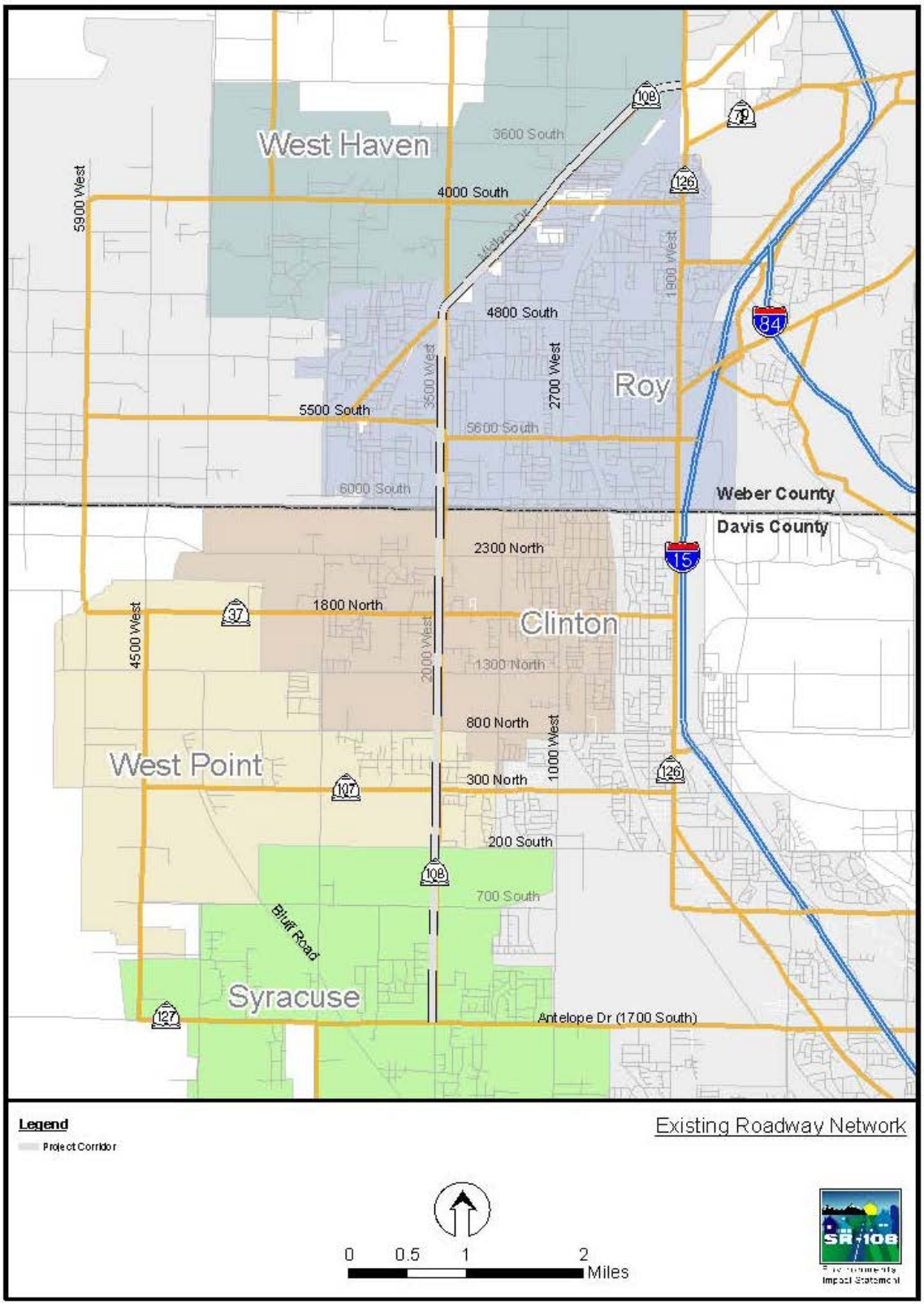
Roadway (County)	Roadway Type	Number of Travel Lanes	Average Annual Daily Traffic[a]	Level of Service
North-South Roads				
I-15	Principal arterial – freeway	6	105,270	E
S.R. 126	Minor arterial	4	38,175	E
1000 West (Davis)	Collector	2	11,175	D
2700 West (Weber)	Collector	2	1,000[b]	A
4500 West (Davis)	Collector	2	2,250	A
5900 West (Weber)	Collector	2	2,240	A
Bluff Road	Local	2	1,280	A
East-West Roads				
Antelope Drive	Minor arterial	2	24,355	F
200 South (Davis)	Minor arterial	2	4,840	A
300 North (Davis)	Collector	2	11,400	D
800 North (Davis)	Collector / local	2	10,305	D
1800 North (Davis)	Minor arterial	2	12,505	D
2300 North (Davis)	Collector	2	4,000[b]	A
5500 South (Weber)	Minor arterial	2	17,715	E
4800 South (Weber)	Collector / local	2	15,885	E
4000 South (Weber)	Collector	2	8,160	C

[a] 2005 annual average daily traffic (AADT) based on UDOT *Traffic on Utah Highways*

[b] Modeled AADT volumes

As shown in Exhibit 3.5-1 above, 11 of the 16 roads that intersect or parallel S.R. 108 operate at an acceptable level of service of LOS D or better. Of the roads that intersect S.R. 108, only Antelope Drive, 5500 South, and 4800 South operate at an unacceptable level of service of LOS E or LOS F.

Exhibit 3.5-2: Existing Roadway Network



3.5.2 Transit System

Mass transit service is provided by UTA, which operates throughout Davis, Weber, and Salt Lake Counties as well as more distant counties in the Wasatch Front region. Existing transit service consists of scattered bus routes that serve the suburban areas surrounding S.R. 108. UTA Route 626 provides approximately hourly service along S.R. 108 between the Weber State University Davis Campus and about 6200 South (Weber County) with frequent stops on S.R. 108.

What transit is currently present along S.R. 108?

Transit along S.R. 108 consists of one bus route, 626, which provides service to Weber State University.

In the future, bus service will likely spread and serve more of the area surrounding S.R. 108. Commuter rail is planned to parallel S.R. 108 between S.R. 126 and S.R. 108. Commuter rail is scheduled to open in late 2008 and is projected to provide high-speed transit service every 20 minutes in the peak periods and every 40 minutes in the off-peak periods between Weber and Salt Lake Counties.

3.6 Economic Conditions

This section examines the economic conditions in the S.R. 108 economic impact analysis area. The economic impact analysis area includes Weber and Davis Counties, the cities along S.R. 108, and the businesses adjacent to the roadway that could experience adverse or beneficial impacts from construction and operation of an improved S.R. 108. Data were reviewed on commercial and industrial activities, employment, wages, and income to provide an overview of the existing economic conditions in the economic impact analysis area.

The cities along S.R. 108—Syracuse, West Point, Clinton, Roy, and West Haven—have all experienced commercial growth along S.R. 108. In addition, Davis and Weber Counties have experienced growth in households, employment, and income. The land use plans for the cities along S.R. 108 show that the cities are planning for continued near- and long-term residential and commercial growth along S.R. 108 over the next 20 years.

Businesses along S.R. 108 primarily consist of service, office, and retail businesses. In recent years, growth in retail commercial developments has occurred throughout the corridor, but particularly in Syracuse and West Point.

3.6.1 Employment and Income Trends

Exhibit 3.6-1 provides data on employment in Weber and Davis Counties and in the Wasatch Front Multi-County District (MCD), which includes Davis, Morgan, Salt Lake, Tooele, and Weber Counties. Overall, employment in these areas has increased considerably since 1990. Between 1990 and 2000, employment in the Wasatch Front MCD increased by 33%. In Weber and Davis Counties, employment increased by 32% and 42%, respectively. In Roy, Clinton, West Point, and Syracuse, employment levels increased by 41% to 127%. Forecasts from the Utah Governor's Office of Planning and Budget project that employment will continue to grow by up to 35% in the MCD between 2005 and 2020.

What agency is responsible for forecasting economic trends?

For Utah, the Governor's Office of Planning and Budget forecasts economic indicators such as population, employment, and household growth.

Exhibit 3.6-1: Current and Forecasted Employment

	Employment				Percent Change		
Area	1990	2000	2005	2020 (Projected)	1990–2000	2000–2005	2005–2020 (Projected)
Utah	900,419	1,340,109	1,482,410	2,084,097	49%	11%	41%
Wasatch Front MCD	526,275	698,404	955,714	1,289,105	33%	37%	35%
Weber County	73,666	97,119	113,112	150,864	32%	17%	33%
West Haven	NA	1,912	—	—	—	—	—
Roy	11,342	16,002	—	—	41.1%	—	—
Davis County	82,803	117,852	136,174	174,133	42%	16%	28%
Clinton	3,242	6,201	—	—	91.4%	—	—
West Point	1,673	2,786	—	—	66.5%	—	—
Syracuse	2,005	4,551	—	—	127.0%	—	—

Sources: Utah Governor's Office of Planning and Budget 2006a, 2006b; U.S. Census Bureau 2006b
NA = Data not available

As shown in Exhibit 3.6-2 below, unemployment in the Wasatch Front MCD and in Weber and Davis Counties decreased between 1990 and 2000 but rose between 2000 and 2004, following the same trend as the state overall. By 2004, the unemployment rates in Weber and Davis Counties were 5.4% and 4.4%, respectively.

Exhibit 3.6-2: Unemployment Rates

Area	1990	2000	2004
Utah	4.3%	3.3%	4.7%
Wasatch Front MCD	4.0%	3.2%	4.8%
Weber County	5.0%	4.2%	5.4%
Davis County	3.8%	3.1%	4.4%

Source: Utah Governor's Office of Planning and Budget 2006b

Exhibit 3.6-3 shows the payroll employment by nonagricultural sector of the state economy for 2004. The Wasatch Front MCD includes 58% of the state's nonagricultural employment, and Weber and Davis Counties include 16% of the state's nonagricultural employment (see Exhibit 3.6-4 below). These numbers demonstrate that the counties in this region contribute substantially to the state's economy.

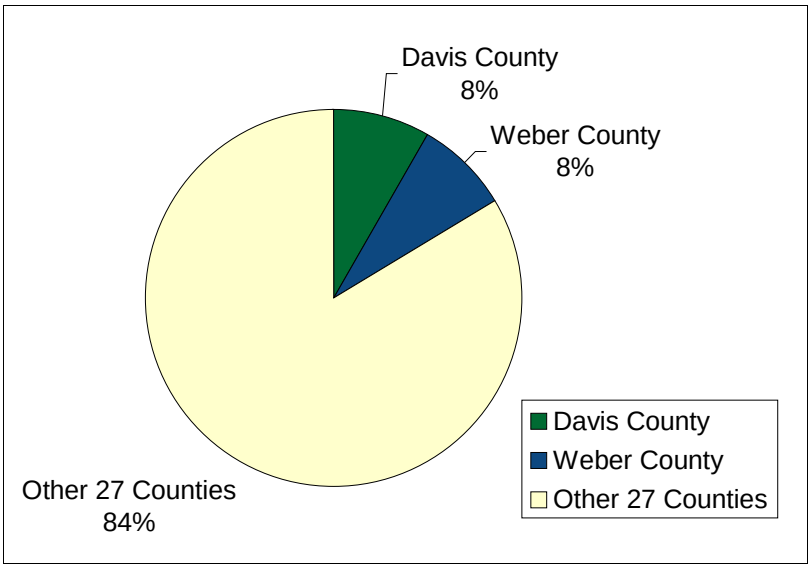
The large services sector, which includes professional and business, education and health, leisure and hospitality, and other services, includes about one-third of the overall employment in the state, the Wasatch Front MCD, and the counties in the impact analysis area. The trade, transportation, and utilities and government sectors also account for a large portion of the employment in the region.

Exhibit 3.6-3: Nonagricultural Payroll Employment by Industry Sector in 2004

Industry Sector	Utah	Wasatch Front MCD	Weber County	Davis County
Mining	7,083	1,848	12	118
Construction	72,631	44,608	5,218	7,493
Manufacturing	114,765	63,378	11,773	10,462
Trade, transportation, utilities	219,212	132,304	16,538	19,431
Information	30,272	20,131	1,668	880
Finance	65,040	47,911	4,178	3,831
Professional and business services	138,220	93,500	9,717	8,220
Education and health services	123,282	62,236	9,951	8,319
Leisure and hospitality	102,031	52,825	7,735	8,291
Other services	32,915	20,550	2,724	2,775
Government	198,877	106,736	19,713	23,433
Total nonagricultural employment	**1,104,328**	**637,151**	**89,227**	**93,253**

Source: Utah Governor's Office of Planning and Budget 2006b

Exhibit 3.6-4: Nonagricultural Employment in Davis and Weber Counties in 2004



Source: Utah Governor's Office of Planning and Budget 2006b

Employment along S.R. 108 consists primarily of government, retail trade, and service-oriented jobs. The Davis County School District operates two schools—Syracuse Junior High School and Syracuse Elementary School—along S.R. 108. The district opened a new high school (Syracuse High School) on S.R. 108 in 2007. Other large employers along S.R. 108 are several retail businesses including a Wal-Mart store that usually employs between 225 and 350 people. Two new Wal-Mart stores are currently under development along S.R. 108.

Weber and Davis Counties are home to several large employers as shown in Exhibit 3.6-5 below. Hill Air Force Base, which employs between 10,000 and 15,000 people, is the largest employer in Davis County and one of the largest in Utah. It is located about 2 miles east of S.R. 108 in the neighboring city of Layton. The public sector, which includes various government agencies and public education institutions, is also among the largest employers in the area. With the exception of two of the Davis County schools in Syracuse and the Weber State University West Center in Roy, the large employers listed in Exhibit 3.6-5 are not located on S.R. 108. However, S.R. 108 provides an important connection to employment centers throughout Davis and Weber Counties.

Exhibit 3.6-5: Largest Employers in Weber and Davis Counties in 2005

Name	Industry	Employees
Weber County		
Internal Revenue Service	Federal government	5,000–6,999
Weber County School District	Public education	3,000–3,999
Autoliv	Motor vehicle equipment manufacturing	2,000–2,999
McKay-Dee Hospital	Hospital	2,000–2,999
Weber State University	Higher education	2,000–2,999
Davis County		
Hill Air Force Base	Air base/federal defense	10,000–14,999
Davis County School District	Public education	5,000–6,999
Lagoon Corporation Inc.	Amusement and theme park	1,000–1,999
Lifetime Products Inc.	Sports and athletic equipment manufacturing	1,000–1,999
Smith's Marketplace Distribution	Distribution center	1,000–1,999

Source: Utah Department of Workforce Services 2005

As with employment and wages, personal income and per-capita income in Weber and Davis Counties also increased between 2000 and 2004 as shown in Exhibit 3.6-6. Total personal income ranked third in the state for Davis County and fourth for Weber County.

Exhibit 3.6-6: Income and Wages

	Weber County			Davis County		
Income Type	2000	2004	Percent Change	2000	2004	Percent Change
Total personal income (millions)	$4,593	$5,531	20.4%	$6,024	$7,297	21.1%
Per capita personal income	$25,066	$27,914	11.4%	$23,360	$26,551	14.1%

Source: U.S. Department of Commerce, Bureau of Economic Analysis 2006

3.6.2 Commerce

S.R. 108 is becoming an economically valuable transportation corridor of local and regional importance. It provides a local connection between the cities along the roadway and a regional connection to communities in Weber and Davis Counties. As a local connection, S.R. 108 provides access for local shopping alternatives, professional services, and public education. As a regional connection, S.R. 108 serves as a major link to employment destinations and to the larger regional transportation network.

What are the future economic plans for the S.R. 108 corridor?

Representatives from the cities along S.R. 108 stated that their long-range plans include making the S.R. 108 corridor a primary or secondary commercial area for the city.

Representatives from the cities along S.R. 108 stated that they plan for the roadway to serve as both a primary and secondary commercial corridor (S. Anderson 2006a; Larson 2006a; Vinzant 2006; Worthen 2006). Future land use plans adopted by the cities along S.R. 108 show that the cities expect continued commercial development of the corridor over the next 10 to 20 years. To facilitate commercial development, the cities have recommended in their respective transportation, land use, or general plans that S.R. 108 should be widened to accommodate the anticipated commercial growth along S.R. 108 and to reduce congestion that could limit the economic vitality of businesses along S.R. 108.

The commercial importance of the roadway can best be demonstrated by the recent expansion of businesses. There are currently about 80 businesses immediately adjacent to S.R. 108, many of which have opened in recent years. A Wal-Mart store also recently opened in Clinton, and two more stores are planned in Syracuse and West Haven. An Albertson's grocery store and accompanying retail development are also located in Clinton. Other businesses along S.R. 108 include a number of retail and restaurant chains, several medical offices, and a variety of locally owned retail businesses. The cities have noted that safe and efficient access to commercial areas will be crucial to maintaining and promoting economic growth in the cities along S.R. 108.

Many cities have come to rely heavily on local sales taxes from businesses to provide municipal revenue. These taxes are also a measure of the economic activity in a community. Each of the cities along S.R. 108 has adopted a local option sales tax which generates revenues from retail businesses. The cities of Clinton, Roy, Syracuse, and West Haven generate significant revenues from local businesses.

The city of West Point currently has no taxable properties to generate sales taxes but is expecting to have commercial businesses within the next 12 to 24 months (Harper 2006).

As shown in Exhibit 3.6-7, sales tax revenue from retail and other commercial businesses along S.R. 108 has increased considerably in recent years (by 13% to 79%) as S.R. 108 has become a center for retail activity. As a result, the S.R. 108 corridor is an important source of revenue for the communities.

Exhibit 3.6-7: Local Option Sales Tax Revenues

City	2001	2005	Percent Change
Clinton	$923,677	$1,653,703	79%
Roy	$3,074,728	$3,467,306	13%
Syracuse	$929,618	$1,366,078	47%
West Haven	$591,890	$895,861	51%
West Point[a]	—	—	—

Source: University of Utah, Center for Public Policy and Administration 2006

[a] Information not available for West Point

3.7 Joint Development

Under FHWA guidelines (Technical Advisory T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents), an agency developing a project that uses federal money should identify and discuss those joint development measures that will preserve or enhance an affected community's social, economic, environmental, and visual values. As required by that guideline, this section discusses proposed recreation and public works projects that might be developed jointly with the proposed action.

What is joint development?

Joint development is a term used by FHWA which, in this context, encompasses opportunities and expected impacts that are also addressed elsewhere in this EIS (for example, opportunities to construct pedestrian and bicycle trails).

3.7.1 Clinton City Trail

The City of Clinton's administrative facilities, a city park, and an elementary school are located in a complex at about 1150 North on the eastern side of S.R. 108. In its land use plan, the City shows an existing canal trail on the west side of S.R. 108 connecting to the city's administrative facilities and the recreational facilities on the east site. The City has requested that a pedestrian underpass across S.R. 108 be designed and analyzed as part of this EIS process. Once the City obtains funding, it plans to construct the underpass.

3.8 Pedestrian and Bicycle Resources

This section identifies current and proposed pedestrian and bicycle facilities in the pedestrian and bicyclist impact analysis area. The pedestrian and bicyclist impact analysis area is the area within one-half mile of S.R. 108 because this is where direct and indirect impacts from the proposed improvements would likely occur.

The information about current and proposed facilities was collected from city and county planning staff and by reviewing local and regional land use master plans.

The five cities along S.R. 108 do not have their own comprehensive pedestrian and bicycle facility plans. WFRC developed the Wasatch Front Urban Area Long-Range Transportation Plan to address communities' needs regarding pedestrian paths and bicycle routes through 2030 as well as many other transportation needs for the Wasatch Front (WFRC 2003). The plan incorporates the Weber and Davis County trail master plans as well as individual community plans. These community plans identify facilities for bicycle travel within street rights-of-way as well as separate paths or trails that will need to be considered when routes are designed and street and other improvements are constructed (WFRC 2003).

What pedestrian and bicycle facilities currently exist along S.R. 108?

Currently, there are no established bicycle routes or bicycle lanes along S.R. 108. In addition, the sidewalks along S.R. 108 are generally discontinuous.

3.8.1 Existing Facilities

Currently, there are no established bicycle routes or bicycle lanes along S.R. 108. Sidewalks along S.R. 108 are generally discontinuous, and where sidewalks exist they were built as part of recent residential and commercial development. Walking and riding routes for students are often disturbed by frequent construction and alteration of sidewalks along S.R. 108 (Bond 2006). See Section 3.3.6.2, School Safety, for more information.

The most recent trail map provided by the City of Clinton shows that the existing Clinton Creek trail on 2050 North crosses S.R. 108. The City plans to encourage bicycle and pedestrian use of this trail by slightly realigning the trail and constructing a proposed underpass at the intersection of S.R. 108 and 2050 North. No other existing trails cross or connect to S.R. 108 in Davis County, and no existing trails cross or connect to S.R. 108 in Weber County.

3.8.2 Proposed Facilities

Exhibit 3.8-1 shows the locations of proposed facilities in the impact analysis area.

Exhibit 3.8-1: Proposed Facilities in the Pedestrian and Bicyclist Impact Analysis Area

City	Intersection or Connection with S.R. 108	Name of Facility	Facility Location
West Point	Connects to S.R. 108 at 200 South	Not yet named	Within S.R. 108 right-of-way[a]
Syracuse	Connects to S.R. 108 at 1200 South and 1700 South	Not yet named	Within S. R. 108 right-of-way[a]
Clinton	Intersects S.R. 108 at 2050 North	Clinton Creek Trail	Underpass[b]
West Haven	Connects to S.R. 108 at 4500 South	Power Line Corridor Trail	Within S.R. 108 right-of-way[a]

Sources: WFRC 2003; Davis County 2006b; City of Clinton 2007

[a] These facilities are planned within the S.R. 108 right-of-way and would connect to the improved pedestrian and bicycle facilities on S.R. 108.

[b] Proposed underpass at the intersection of S.R. 108 and 2050 North.

3.9 Air Quality

This section describes the existing air quality in the S.R. 108 air quality impact analysis area. Because the S.R. 108 project would be located in Davis and Weber Counties, these counties make up the impact analysis area for the air quality analysis.

Air quality in a given area depends on several factors such as the area itself (size and topography), the prevailing weather patterns (meteorology and climate), and the pollutants released into the air. Air quality is described in terms of the concentrations of various pollutants in a given area of atmosphere (for example, parts per million or micrograms per cubic meter).

3.9.1 Regulatory Basis for Air Quality Analysis

3.9.1.1 National Ambient Air Quality Standards (NAAQS) Requirements

National Ambient Air Quality Standards (NAAQS) include both primary and secondary standards. Primary standards protect public health, while secondary standards protect public welfare (such as protecting property and vegetation from the effects of air pollution). These standards, which are set by the U.S. Environmental Protection Agency (EPA), have been adopted by the Utah Division of Air Quality as the official ambient air quality standards for Utah. The current NAAQS are listed below in Exhibit 3.9-1.

If an area meets the NAAQS for a given air pollutant, the area is called an *attainment area* for that pollutant (because the standards have been attained). If an area does not meet the NAAQS for a given air pollutant, the area is called a *non-attainment area*. A *maintenance area* is a non-attainment area that has not had a recorded violation of the NAAQS in several years and is on its way to being redesignated as an attainment area.

What are attainment, non-attainment, and maintenance areas?

An *attainment area* is an area that meets (or "attains") the NAAQS for a given pollutant. A *non-attainment area* is an area that does not meet the NAAQS for a given pollutant. A *maintenance area* is a non-attainment area that has not had a recorded violation of the NAAQS in several years and is on its way to being redesignated as an attainment area.

Exhibit 3.9-1: National and Utah Ambient Air Quality Standards (NAAQS)

Pollutant	National (EPA) and Utah Standard[a]	
	Primary	Secondary
Lead (Pb)		
Quarterly average	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$
Particulate Matter (PM_{10})		
Annual arithmetic mean	Revoked[b]	(no standard)
24-hour average	150 $\mu g/m^{3,c}$	(no standard)
Particulate Matter ($PM_{2.5}$)		
Annual arithmetic mean	15.0 $\mu g/m^{3,d}$	15.0 $\mu g/m^3$
24-hour average	35 $\mu g/m^{3,e}$	(no standard)
Sulfur Dioxide (SO_2)		
Annual average	0.03 ppm	(no standard)
24-hour average	0.14 ppm	(no standard)
3-hour average	(no standard)	0.50 ppm
Carbon Monoxide (CO)		
8-hour average	9 ppm (10 mg/m^3)	(no standard)
1-hour average	35 ppm (40 mg/m^3)	(no standard)
Ozone (O_3)		
8-hour average	0.08 ppm	0.08 ppm
1-hour average[c]	0.12 ppm	0.12 ppm
Nitrogen Dioxide (NO_2)		
Annual average	0.053 ppm (100 $\mu g/m^3$)	0.053 ppm (100 $\mu g/m^3$)

Source: EPA 2007a

Annual standards are never to be exceeded. Short-term standards are not to be exceeded more than 1 day per calendar year unless noted otherwise.

ppm = parts per million
PM_{10} = particulate matter 10 microns in diameter or less
$PM_{2.5}$ = particulate matter 2.5 microns in diameter or less
$\mu g/m^3$ = micrograms per cubic meter
mg/m^3 = milligrams per cubic meter

[a] Primary standards are set to protect public health. Secondary standards are based on other factors (for example, protecting crops and materials or avoiding nuisance conditions).

[b] EPA revoked the annual PM_{10} standard in 2006 (effective December 17, 2006).

[c] Not to be exceeded more than once per year on average over 3 years.

[d] To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 $\mu g/m^3$.

[e] To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 $\mu g/m^3$ (effective December 17, 2006).

3.9.1.2 National Environmental Policy Act Requirements

FHWA's guidance for preparing environmental documents (T6640.8A) requires the project sponsor to evaluate air quality in terms of mesoscale and microscale impacts. Mesoscale evaluations analyze regional air quality impacts, while microscale evaluations analyze localized air quality impacts, usually for individual roads or intersections.

3.9.1.3 Conformity Requirements

All states are required to develop a State Implementation Plan, which explains how the state will comply with the requirements of the federal Clean Air Act of 1970. Section 176(c) of the Clean Air Act and the related requirements of the Federal Aid to Highways Act require that transportation plans, programs, and projects that are developed, funded, or approved by the U.S. Department of Transportation and metropolitan planning organizations must demonstrate that such activities conform to the State Implementation Plan. Conformity requirements apply to the specific pollutants for which the area has been designated non-attainment (for example, carbon monoxide or ozone).

According to Section 176(c) of the Clean Air Act, transportation projects are said to "conform" to the provisions of the Clean Air Act if the project, both alone and in combination with other planned projects, does not:

- Create new violations of the NAAQS,
- Increase the frequency or severity of existing violations of the NAAQS, or
- Delay attainment of the NAAQS.

The most recent conformity analysis for the Wasatch Front was prepared in June 2007 (WFRC 2007). The analysis concluded that the 2030 Regional Transportation Plan conformed to the State Implementation Plan for all pollutants in applicable non-attainment or maintenance areas.

In addition, during the project development phase, a project must satisfy detailed "hot-spot" requirements if it is located in a non-

What is a "hot-spot" analysis?

A *"hot-spot" analysis* is a project-level analysis that looks at localized impacts, such as at intersection crosswalks or residences near a roadway.

attainment or maintenance area for carbon monoxide (CO) or particulate matter (PM_{10}) and must comply with the control measures in the State Implementation Plan for PM_{10} and $PM_{2.5}$.

3.9.2 Major Pollutants of Concern

The major air pollutants of concern for transportation projects are carbon monoxide (CO), particulate matter (PM_{10} and $PM_{2.5}$), ozone (O_3), and nitrogen oxides (NO_x).

Why are these pollutants considered to be major pollutants of concern?

Carbon monoxide, particulate matter, ozone, and nitrogen oxides are considered to be major pollutants of concern because they are emitted as vehicle exhaust and are known to have health effects.

- **CO**, which is emitted by vehicle engines, is a colorless, odorless, poisonous gas that reduces the amount of oxygen carried in the bloodstream by forming carboxyhemoglobin, which prevents oxygenation of the blood. The NAAQS for CO are intended to protect people from adverse health effects; exposure to CO concentrations that meet the NAAQS will not cause elevated carboxyhemoglobin levels. CO is emitted directly into the atmosphere from automobiles with the highest emission levels occurring at slow speeds, in stop-and-go traffic, and at colder temperatures. Since it disperses to non-harmful levels fairly quickly, CO is considered a localized hot-spot pollutant and is the primary pollutant analyzed at the individual project level.
- **Particulate matter** of concern generally falls into one of two categories: particulate matter with a diameter of 10 microns or less (PM_{10}) and particulate matter with a diameter of 2.5 microns or less ($PM_{2.5}$). For transportation projects, the primary source of particulate matter is vehicle emissions. Particulate matter has been linked to a range of serious respiratory and cardiovascular health problems.
- **O_3** is a secondary pollutant formed when precursor emissions—NO_x and volatile organic compounds—react in the presence of sunlight. O_3 is a major component of photochemical smog. O_3 irritates the eyes and respiratory tract and increases the risk of respiratory and heart diseases.
- **NO_x** is composed mainly of nitric oxide (NO) and nitrogen dioxide (NO_2). NO is formed in high-temperature combustion processes such as those in internal combustion engines. When NO reaches the atmosphere, most of it oxidizes and produces NO_2, the brown component of photochemical smog.

3.9.3 Other Pollutants

3.9.3.1 Hazardous Air Pollutants

In addition to the NAAQS, EPA has also established a list of 33 urban air toxics (64 *Federal Register* 38706). Urban air toxics are pollutants that can cause cancer or other serious health effects or adverse environmental effects. Most air toxics originate from human-made sources including road mobile sources, non-road mobile sources (such as airplanes), and stationary sources (such as factories or refineries).

Air toxics are in the atmosphere as a result of industrial activities and motor vehicle emissions. Scientific research has shown that the health risks to people exposed to urban air toxics at sufficiently high concentrations or lengthy durations include an increased risk of contracting cancer, damage to the immune system, and neurological, reproductive, and/or developmental problems (EPA 2000).

To better understand the effects that urban air toxics have on human health, EPA developed a list of 21 mobile-source air toxics (MSAT) including acetaldehyde, benzene, formaldehyde, diesel exhaust, acrolein, and 1,3-butadiene (66 *Federal Register* 17230). EPA assessed the risks of various kinds of exposures to these pollutants.

In July 1999, EPA published a strategy to reduce urban air toxics; in March 2001, EPA issued regulations for automobile and truck manufacturers to decrease the amounts of these pollutants by target dates in 2007 and 2020. Under the March 2001 regulation, between 1990 and 2020, highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde will be reduced by 67% to 76% and on-highway diesel particulate matter emissions will be reduced by 90%. These reductions will be achieved by implementing mobile-source control programs including the reformulated gasoline program, a new cap on the toxics content of gasoline, the national low-emission vehicle standards, the Tier 2 motor vehicle emission standards and gasoline sulfur-control requirements, the heavy-duty engine and vehicle standards, and the on-highway diesel fuel sulfur-control requirements (EPA 2000). On February 26, 2007, EPA further tightened the standards related to mobile air toxics and took steps to reduce benzene emissions, limit emissions from cold-start vehicles, and limit emissions from portable gas canisters.

3.9.3.2 Greenhouse Gases

The issue of global climate change is an important national and global concern that is being addressed in several ways by the federal government. The transportation sector is the second-largest source of total greenhouse gases in the United States and the largest source of carbon dioxide (CO_2) emissions, the predominant greenhouse gas. In 2004, the transportation sector was responsible for 31% of all CO_2 emissions produced in the United States. The principal anthropogenic (human-made) source of carbon emissions is the combustion of fossil fuels, which account for about 80% of anthropogenic emissions of carbon worldwide. Almost all (98%) of transportation-related greenhouse gas emissions result from the consumption of petroleum products such as motor gasoline, diesel fuel, jet fuel, and other residual fuels.

Recognizing this concern, FHWA is working with other modal administrations through the U.S. Department of Transportation Center for Climate Change and Environmental Forecasting to develop strategies to reduce transportation's contribution to greenhouse gases—particularly CO_2 emissions—and to assess the risks to transportation systems and services from climate changes.

In Utah, the Governor's Blue Ribbon Advisory Council on Climate Change identified measures that the state could take to minimize the impacts of transportation-related greenhouse gas emissions. The recommended measures include reducing vehicle-miles traveled (VMT) through developing and encouraging the use of mass transit, ridesharing, and telecommuting. Other strategies outlined in the report include promoting alternative fuels and hybrid vehicles and vehicle technologies resulting in greater fuel efficiency. In addition, the report encourages an idle-reduction program for school buses and heavy-duty trucks.

The relationship of current and projected Utah highway CO_2 emissions to total global CO_2 emissions is presented in the Exhibit 3.9-2 below. Utah highway CO_2 emissions are expected to decrease by 6.2% between 2006 and 2030. The UDOT Planning Division predicts that statewide VMT will increase by 58% between 2006 and 2030.

Exhibit 3.9-2: Greenhouse Gas Emissions

Global CO_2 Emissions, 2006 (MMT)[a]	Utah Highway CO_2 Emissions, 2006 (MMT)	Projected Utah 2030 Highway CO_2 Emissions (MMT)	Utah Highway Emissions, Percent of Global Total, 2006 (%)
27,578	16.2	15.2	0.06%

MMT = million metric tons

[a] EIA 2007

3.9.4 Climate

Weather directly influences air quality. Important meteorological factors include wind speed and direction, atmospheric stability, temperature, sunlight intensity, and mixing height. The air quality impact analysis area is located along the Wasatch Front at an elevation of about 4,200 feet above sea level.

How does weather affect air quality?

In the impact analysis area, weather affects air quality primarily through temperature inversions, which trap particulates and CO close to the ground.

The Great Salt Lake contributes to weather conditions in the impact analysis area in both winter and summer. In the winter, the water in the lake is warmer than the air. This increases the moisture content of the air, which creates thermal instability that causes "lake effect" storms. As a result, areas surrounding the lake receive more snowfall than more distant areas. In the summer, the Great Salt Lake has a high evaporation rate, which humidifies the air and causes thunderhead clouds to develop.

The lowest average daily temperatures (28 °F [degrees Fahrenheit]) occur in January, and the highest average daily temperatures (78 °F) occur in July. The highest amount of precipitation generally occurs during April, when the average precipitation is 2.6 inches. Average annual precipitation is 15.6 inches. The area receives an annual snowfall of 63 inches (National Weather Service 1997).

Temperature inversions, which are associated with higher air pollution concentrations, occur when warmer air overlies cooler air. During temperature inversions, which typically occur between November and February in the impact analysis area, particulates and CO from stationary and mobile sources can be trapped close to the ground, which can lead to violations of the NAAQS.

The primary pollutants associated with wintertime inversions in Utah are PM_{10}, $PM_{2.5}$, CO, and sulfur dioxide (SO_2). The Utah Division of Air Quality issues health advisories for sensitive individuals based on the amount of pollutants in the air during an inversion. When a health advisory is issued, those at risk (for example, people with asthma, emphysema, heart disease, or bronchitis) are encouraged to limit outdoor exertion whenever possible. In addition, during inversions people are encouraged to limit their driving, and restrictions can be imposed on burning wood.

3.9.5 Current Air Quality Status

The Clean Air Act Amendments of 1990 require that all areas with recorded violations of the NAAQS are designated as non-attainment areas. A State Implementation Plan must be developed for non-attainment areas to identify control strategies for bringing the region back into conformance with the NAAQS. Non-attainment areas are also classified as marginal, moderate, serious, severe, or extreme depending on the severity of the recorded violations. An area classified as marginal will have less time to reach attainment than an area classified as extreme. Maintenance areas are those areas that have been in violation of the NAAQS but have not had a recorded violation in several years and are on their way to being redesignated as attainment areas.

Exhibit 3.9-3 shows the air quality attainment status for motor vehicle–related pollutants in the impact analysis area.

Exhibit 3.9-3: Air Quality Attainment Status for Motor Vehicle–Related Pollutants in the Air Quality Impact Analysis Area

Non-attainment Area	Status	Pollutant
Davis County		
Davis County	Maintenance area	Ozone (O_3)
Weber County		
Ogden	Moderate non-attainment area	Particulate matter (PM_{10})
Ogden	Maintenance area	Carbon monoxide (CO)

Source: State of Utah 2007

As shown in Exhibit 3.9-3 above, Davis County is classified as a maintenance area for O_3, and Ogden in Weber County is classified as a moderate non-attainment area for PM_{10} and a maintenance area for CO. With the exception of O_3, the S.R. 108 project corridor meets the NAAQS for all priority pollutants. The Wasatch Front region is currently in attainment for the new 8-hour ozone standard. Davis and Weber Counties always met past state requirements for ozone-related emissions (that is, pollutants that are precursors to ozone). Projections for the Wasatch Front indicate a steady decrease in ozone-related emissions from mobile sources.

The expected air pollutants associated with the existing project corridor are wind-blown dust and particulates from exposed soils and agricultural tilling practices and vehicle emissions (primarily CO) from traffic on existing highways in the area.

The Utah Division of Air Quality maintains a network of air quality monitoring stations throughout the area. In general, these monitoring stations are located where there are known air quality problems, so they are usually in or near urban areas or close to specific emission sources. Other stations are located in remote areas to provide an indication of regional air pollution levels.

Exhibit 3.9-4 through Exhibit 3.9-9 below show the monitoring results for priority pollutants from 2001 through 2005 at the monitoring stations in Davis and Weber Counties.

Exhibit 3.9-4: Summary of CO Monitoring Data for Davis and Weber Counties

Station	Parameter	2005	2004	2003	2002	2001
Davis County						
Bountiful (65 West 300 South, Bountiful)	Peak 1-hour value (ppm)[a]	NA	NA	3.7	4.3	5.9
	Peak 8-hour value (ppm)[b]	NA	NA	2.3	2.0	2.6
	Days above standard	0	0	0	0	0
Weber County						
Ogden (2540 South Washington Blvd., Ogden)	Peak 1-hour value (ppm)	16.8	21.2	6.1	9.0	22.2
	Peak 8-hour value (ppm)	5.3	6.6	4.1	4.5	6.2
	Days above standard	0	0	0	0	0
Washington Terrace (4601 South 300 West, Washington Terrace)	Peak 1-hour value (ppm)	NA	NA	4.4	5.2	4.8
	Peak 8-hour value (ppm)	NA	NA	2.8	2.5	3.0
	Days above standard	0	0	0	0	0

Source: EPA 2007b

NA = Data not available

[a] 1-hour CO standard = 35 ppm

[b] 8-hour CO standard = 9 ppm

Exhibit 3.9-5: Summary of O_3 Monitoring Data for Davis and Weber Counties

Station	Parameter	2005	2004	2003	2002	2001
Davis County						
Bountiful (65 West 300 South, Bountiful)	Peak 1-hour value (ppm)[a]	NA	NA	0.097	0.110	0.134
	Peak 8-hour value (ppm)[b]	NA	NA	0.076	0.093	0.109
	Days above standard	0	0	0	5	2
Bountiful #2 (171 West 1370 North, Bountiful)	Peak 1-hour value (ppm)	0.129	0.095	0.101	NA	NA
	Peak 8-hour value (ppm)	0.108	0.077	0.083	NA	NA
	Days above standard	8	0	0	0	0

Source: EPA 2007b

NA = Data not available

[a] 1-hour O_3 standard = 0.12 ppm

[b] 8-hour O_3 standard = 0.08 ppm

Exhibit 3.9-6: Summary of SO_2 Monitoring Data for Davis and Weber Counties

Station	Parameter	2005	2004	2003	2002	2001
Davis County						
Bountiful (65 West 300 South, Bountiful)	Annual average (ppm)[a]	NA	NA	0.002	0.002	0.002
	Peak 24-hour value (ppm)[b]	NA	NA	0.008	0.010	0.012
	Peak 3-hour value (ppm)[c]	NA	NA	0.018	0.034	0.038
	Peak 1-hour value (ppm)[d]	NA	NA	0.026	0.055	0.041
	Days above standard	0	0	0	0	0
Bountiful #2 (171 West 1370 North, Bountiful)	Annual average (ppm)[a]	0.002	0.002	0.002	NA	NA
	Peak 24-hour value (ppm)[b]	0.012	0.009	0.005	NA	NA
	Peak 3-hour value (ppm)[c]	0.035	0.022	0.014	NA	NA
	Peak 1-hour value (ppm)[d]	0.045	0.031	0.026	NA	NA
	Days above standard	0	0	0	0	0

Source: EPA 2007b

NA = Data not available

[a] Annual SO_2 standard = 0.03 ppm

[b] 24-hour SO_2 standard = 0.14 ppm

[c] No 3-hour SO_2 standard

[d] No 1-hour SO_2 standard

Exhibit 3.9-7: Summary of NO_2 Monitoring Data for Davis and Weber Counties

Station	Parameter	2005	2004	2003	2002	2001
Davis County						
Bountiful (65 West 300 South, Bountiful)	Annual average (ppm)[a]	NA	NA	0.017	0.019	0.019
	Peak 1-hour value (ppm)[b]	NA	NA	0.079	0.122	0.100
	Days above standard	0	0	0	0	0
Bountiful #2 (171 West 1370 North, Bountiful)	Annual average (ppm)	0.019	0.021	0.022	NA	NA
	Peak 1-hour value (ppm)	0.081	0.079	0.072	NA	NA
	Days above standard	0	0	0	0	0
Weber County						
Ogden (228 32nd Street, Ogden)	Annual average	0.024	0.025	0.026	0.027	0.028
	Peak 1-hour value	0.090	0.096	0.144	0.158	0.078
	Days above standard	0	0	0	0	0

Source: EPA 2007b

NA = Data not available

[a] Annual NO_2 standard = 0.053 ppm

[b] No 1-hour NO_2 standard

Exhibit 3.9-8: Summary of PM_{10} Monitoring Data for Davis and Weber Counties

Station	Parameter	2005	2004	2003	2002	2001
Davis County						
Bountiful (65 West 300 South, Bountiful)	Annual average ($\mu g/m^3$)[a]	NA	NA	18	NA	NA
	Peak 24-hour value ($\mu g/m^3$)[b]	NA	NA	64	NA	NA
	Days above standard	0	0	0	0	0
Bountiful #2 (171 West 1370 North, Bountiful)	Annual average ($\mu g/m^3$)	30	31	24	NA	NA
	Peak 24-hour value ($\mu g/m^3$)	77	92	42	NA	NA
	Days above standard	0	0	0	0	0
Weber County						
Ogden (228 32nd Street, Ogden)	Annual average ($\mu g/m^3$)	23	28	29	35	32
	Peak 24-hour value ($\mu g/m^3$)	122	136	229	344	171
	Days above standard	0	0	2	1	0

Source: EPA 2007b

NA = Data not available

[a] Annual PM_{10} standard = 50 $\mu g/m^3$

[b] 24-hour PM_{10} standard = 150 $\mu g/m^3$

Exhibit 3.9-9: Summary of $PM_{2.5}$ Monitoring Data for Davis and Weber Counties

Station	Parameter	2005	2004	2003	2002	2001
Davis County						
Bountiful (65 West 300 South, Bountiful)	Annual average ($\mu g/m^3$)[a]	NA	NA	7.5	11.0	10.0
	Peak 24-hour value ($\mu g/m^3$)[b]	NA	NA	45.0	81.0	66.0
	Days above standard	0	0	0	0	0
Bountiful #2 (171 West 1370 North, Bountiful)	Annual average ($\mu g/m^3$)	9.9	13.3	9.7	NA	NA
	Peak 24-hour value ($\mu g/m^3$)	48.0	74.0	47.0	NA	NA
	Days above standard	0	0	0	0	0
Weber County						
Ogden (228 32nd Street, Ogden)	Annual average ($\mu g/m^3$)	10.5	13.9	10.0	14.5	11.6
	Peak 24-hour value ($\mu g/m^3$)	42.0	74.0	38.0	108.0	67.0
	Days above standard	0	0	0	0	1
Washington Terrace (4601 South 300 West, Washington Terrace)	Annual average ($\mu g/m^3$)	8.8	11.6	7.6	12.5	10.4
	Peak 24-hour value ($\mu g/m^3$)	34.0	70.0	33.0	83.0	66
	Days above standard	0	0	0	0	0
Ogden #2 (425 West 2550 North, Ogden)	Annual average ($\mu g/m^3$)	9.0	11.5	8.0	12.2	9.2
	Peak 24-hour value ($\mu g/m^3$)	38.0	74.0	31.0	98.0	52.0
	Days above standard	0	0	0	0	0

Source: EPA 2007b

NA = Data not available

[a] Annual $PM_{2.5}$ standard = 15 $\mu g/m^3$

[b] 24-hour $PM_{2.5}$ standard = 35 $\mu g/m^3$

3.10 Noise

This section describes the existing noise environment in the S.R. 108 noise impact analysis area. The impact analysis area for the noise analysis is defined as the land adjacent to the proposed alignments that could be affected by an increase in noise from construction and operation of the S.R. 108 proposed alternatives. To provide a general context for the noise environment, this section provides a regional overview. This section also describes the general characteristics of noise, provides a regulatory overview of the noise standards that apply to the proposed project, and presents the monitored noise levels that were recorded along S.R. 108.

3.10.1 Characteristics of Noise

Noise is defined as unwanted sound. The decibel (dB) is the accepted unit for measuring noise levels. Sound-level meters measure the actual pressure fluctuations caused by sound waves and record separate measurements for different sound frequency ranges.

What is noise?

Noise is defined as unwanted sound. This EIS uses the A-weighted decibel scale (dBA) for measuring noise levels.

Most sounds consist of a broad range of sound frequencies. Several frequency-weighting schemes have been used to develop composite decibel scales that approximate the way the human ear responds to noise levels. The A-weighted decibel scale (dBA) is most widely used for this purpose. Exhibit 3.10-1 below shows the noise levels associated with everyday noise sources.

A noise level change of 3 dBA is barely perceptible to humans, but a 5-dBA change is noticeable. A 10-dBA change in noise is generally perceived as a doubling of noise loudness, while a 20-dBA change is considered a dramatic change in noise levels.

Exhibit 3.10-1: Human Perceptions of Sound Levels

Examples of Sound Sources	dBA[a]	Human Perception
	0	Threshold of hearing
	10	Just audible
Broadcasting studio background	20	
Soft whisper at 15 feet	30	Very quiet
In living room, bedroom, or library	40	
	50	Quiet
Air conditioner at 20 feet; light auto traffic at 50 feet	60	
Freeway traffic at 50 feet	70	Intrusive; telephone use difficult
Passenger train at 100 feet; freight train at 50 feet; helicopter at 500 feet	80	Annoying
Heavy truck at 50 feet; pneumatic drill at 50 feet	90	Hearing damage after 8 hours
Shout at 0.5 foot; inside New York subway station	100	Very annoying
Riveting machine; jet takeoff at 2,000 feet	110	
Jet takeoff at 200 feet; auto horn at 3 feet; inside discotheque	120	Threshold of feeling and pain
	130	Painfully loud
Carrier deck jet operation	140	Limit of amplified speech

Source: CEQ 1970

[a] Typical A-weighted sound levels taken with a sound-level meter and expressed as decibels on the A-weighted scale (dBA), which approximates the frequency response of the human ear.

3.10.2 Regulatory Basis for Noise Analysis

3.10.2.1 UDOT and FHWA

Equivalent Sound Level. Federal regulatory agencies often use the equivalent sound level (L_{eq}) to evaluate noise impacts. The L_{eq} is defined as a constant sound level containing the same sound energy as a more fluctuating sound. Equivalent sound levels are used to develop single-value descriptions of average noise exposure over stated periods of time. $L_{eq}(24)$, for example, is the equivalent sound level for a 24-hour period. Most often, 1-hour L_{eq} values are used to describe traffic noise levels.

Federal Highway Administration Noise Standards. The Federal Noise Control Act of 1972 requires that all federal agencies administer programs in a manner that promotes an environment free from noise that could jeopardize public health or welfare. FHWA has adopted criteria for evaluating noise impacts associated with federally funded highway projects. If the noise impacts from a project are high enough, they could justify funding for noise mitigation (FHWA, 23 Code of Federal Regulations [CFR] 772).

FHWA noise-abatement criteria are based on peak-hour L_{eq} noise levels. The peak-hour outdoor L_{eq} criterion for permissible noise levels in residential, educational, and healthcare facilities is 67 dBA. The peak 1-hour outdoor L_{eq} criterion for commercial and industrial areas is 72 dBA. The FHWA noise-abatement criteria as implemented by UDOT are summarized in Exhibit 3.10-2.

Exhibit 3.10-2: UDOT Noise-Abatement Criteria

Activity Category	L_{eq} Noise Levels	Description of Activity Category
A	56 dBA (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	66 dBA (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals
C	71 dBA (exterior)	Developed lands, properties, or activities not included in above categories
D	—	Undeveloped lands
E	51 dBA (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Source: UDOT 2008 (revised UDOT Noise Policy dated January 15, 2008)

Utah State Guidelines. UDOT's Noise-Abatement Policy (UDOT 08A2-1) establishes policies and procedures for conducting traffic noise studies, coordinating within UDOT, involving the public and local government agencies, and approving mitigation measures. The policy references FHWA 23 CFR 772 and Utah Administrative Code (UAC) 72-6-111 and 72-6-112.

Under UDOT Policy 08A2-1, the proposed S.R. 108 project is considered a Type I project, which is defined as construction of a highway at a new location or a physical alteration of an existing highway that substantially changes the alignment or increases the number of

through-traffic lanes. According to UDOT Policy 08A2-1, a traffic noise impact occurs when either of the following conditions occurs at a sensitive land use (such as a residence, school, park, or hospital):

1. The expected noise level with the project is greater than or equal to 66 dBA, or
2. The expected noise level with the project exceeds the existing noise level by 10 dBA or more.

3.10.3 Existing Noise Levels

The noise impact analysis area consists of a mix of undeveloped land with residential, recreational, and commercial land uses interspersed along S.R. 108 (see Section 3.1, Land Use).

To determine existing noise levels, measurements were taken at 10 locations throughout the impact analysis area. These locations were chosen to represent existing residential developments, recreation areas, schools, and other areas where people frequently could be exposed to traffic noise. Exhibit 3.10-3 lists the noise level that was measured at each monitoring location. Exhibit 3.10-4 through Exhibit 3.10-6 below show the locations along S.R. 108 where noise was monitored. With the exception of monitoring location ML-7, all monitored noise levels were below the UDOT noise-abatement criterion of 66 dBA for residential and recreation locations.

What does noise monitoring along S.R. 108 show?

Noise levels along S.R. 108 are typical of mixed urban and suburban environments that have a mix of residential and commercial uses with high levels of street traffic.

Exhibit 3.10-3: Monitored Noise Levels

Monitoring Location (ML)	UDOT Category[a]	Location	Monitored L_{eq} (dBA)
ML-1	B	Syracuse Junior High School	53
ML-2	B	Residential area, 1150 South 2035 West	45
ML-3	B	Residential area, 1350 South 1960 East	60
ML-4	B	Residential area, 2100 West 632 North	44
ML-5	B	Residential area, 1520 North 1977 West	58
ML-6	B	Residential area, 2265 North 2100 West	48
ML-7	B	Residential area, 3500 West 5350 South	66
ML-8	B	Residential area, 3450 West 4950 South	58
ML-9	B	Karol's Mobile Estates	52
ML-10	B	Century Park Meadows	58

[a] See Exhibit 3.10-2: UDOT Noise-Abatement Criteria above for a description of UDOT activity category B.

Exhibit 3.10-4: Noise Monitoring Locations, ML-1 to ML-4

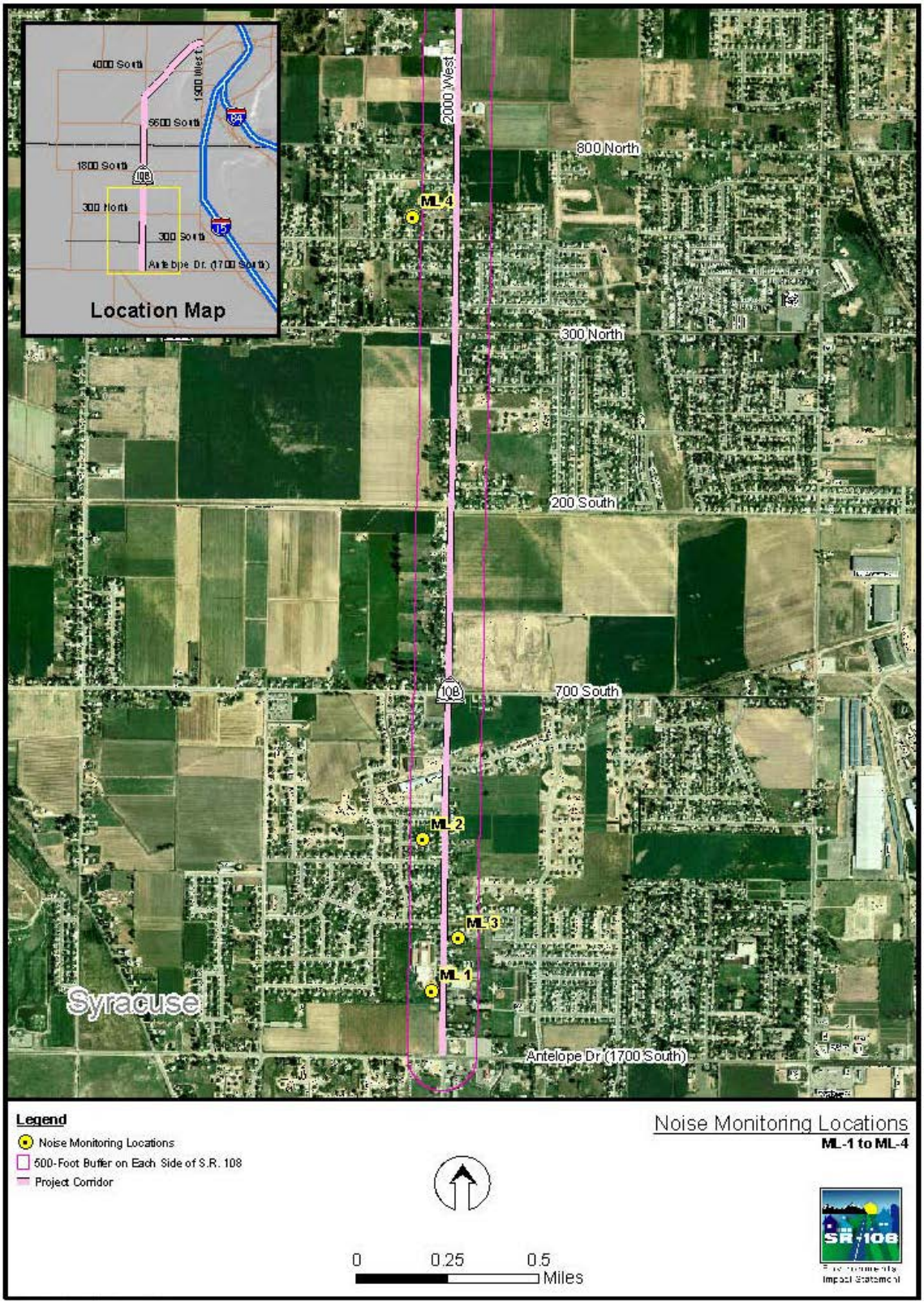


Exhibit 3.10-5: Noise Monitoring Locations, ML-5 to ML-7

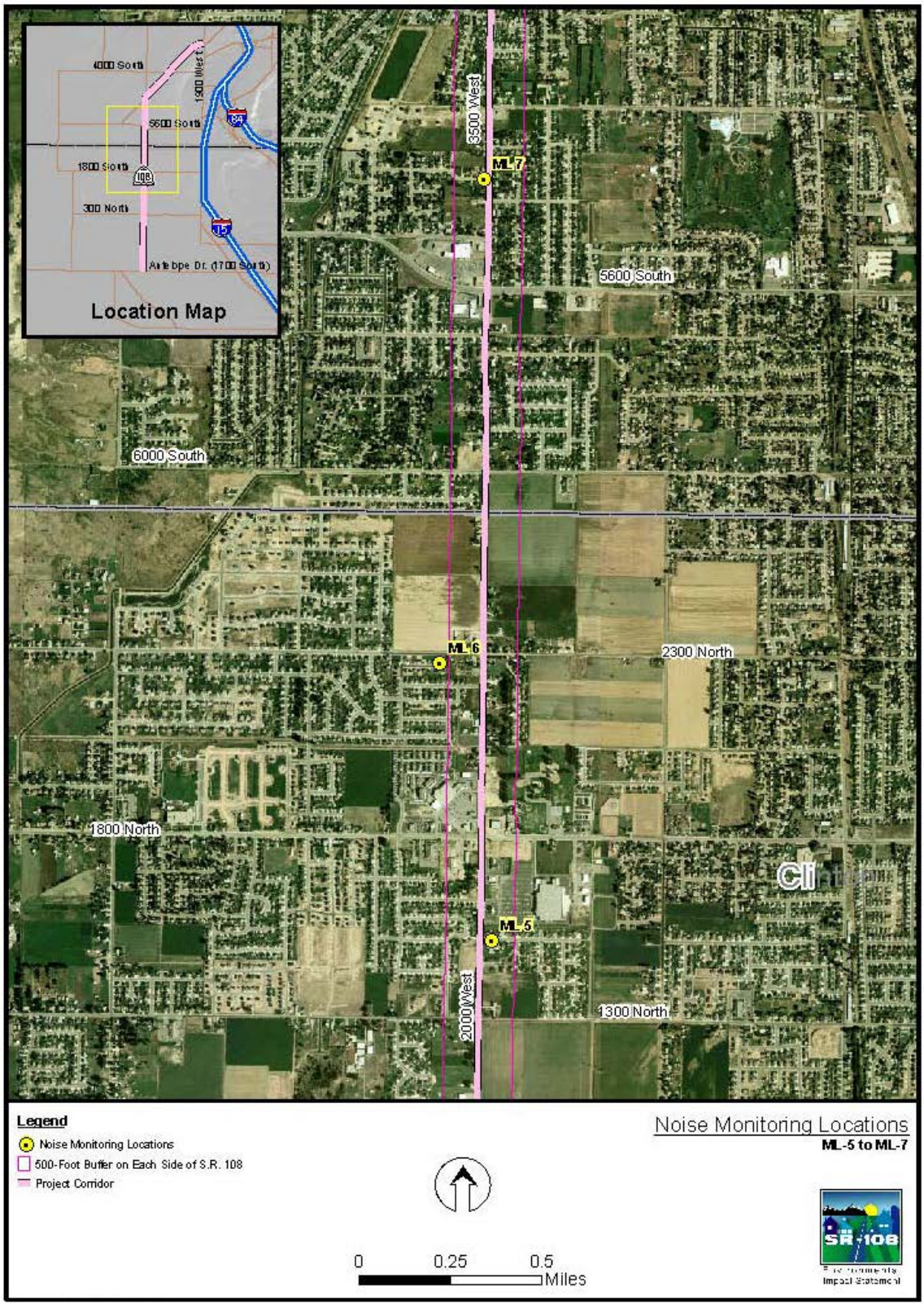
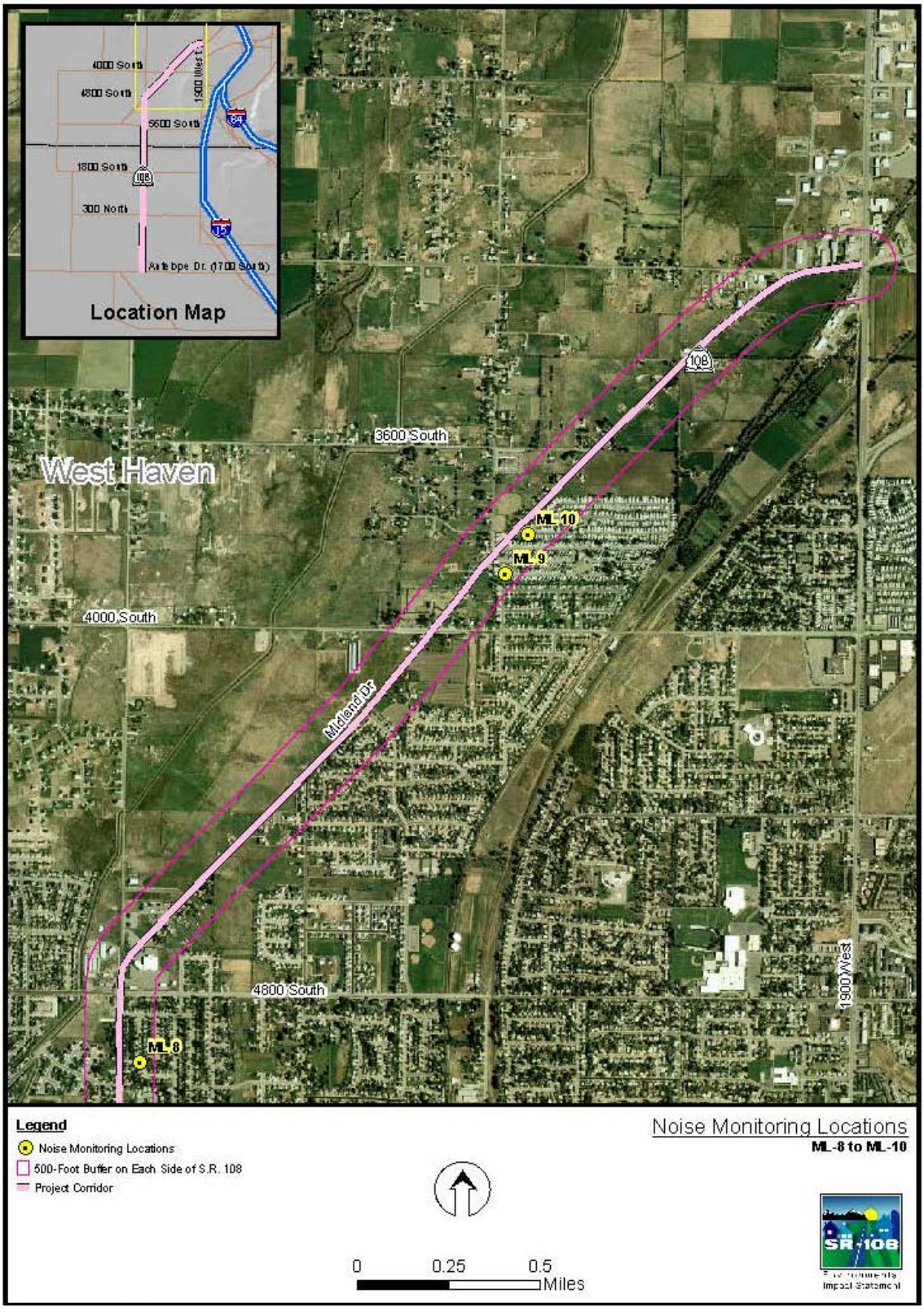


Exhibit 3.10-6: Noise Monitoring Locations, ML-8 to ML-10



3.11 Water Quality

This section describes the existing conditions of surface water and groundwater in the water quality impact analysis area. The water quality impact analysis area includes the water bodies that could be affected by construction and operation of S.R. 108. Most of these waters flow toward the Great Salt Lake, which is about 3 miles from S.R. 108.

3.11.1 Water Quality Regulations

Water quality in Utah is regulated by EPA's federal Clean Water Act and the regulations of the Utah Division of Water Quality and the Utah Division of Drinking Water (UAC Rule 317 and Rule 309) as summarized below.

3.11.1.1 Water Quality Standards

Under the federal Clean Water Act, every state must establish and maintain water quality standards designed to protect, restore, and preserve the quality of waters in the state. These standards consist of numeric standards, narrative standards, and antidegradation provisions.

Water bodies are considered to have various *beneficial uses* such as providing drinking water, supporting wildlife, and supporting recreation. Numeric standards for water quality are intended to protect these beneficial uses by limiting the amounts of certain pollutants in the water. Narrative standards are more general statements that prohibit unacceptable water quality conditions such as visible pollution. Antidegradation provisions are intended to maintain high-quality waters at levels above the applicable water quality standards.

The Utah Administrative Code (Rule 317) classifies surface water bodies in the state according to their beneficial uses, and most classifications have associated numeric water quality standards. The beneficial uses for water bodies in Utah are listed in Exhibit 3.11-1 below.

What are beneficial uses?

Lakes, rivers, and other water bodies have uses to humans and other life. These uses are called *beneficial uses*. The State of Utah defines 13 different beneficial uses for rivers, streams, lakes, and reservoirs in Utah (see Exhibit 3.11-1 below).

Exhibit 3.11-1: Designated Beneficial Uses for Rivers, Streams, Lakes, and Reservoirs in Utah

Class	Description
1	Protected for use as a raw water source for domestic water systems.
1C	Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.
2	Protected for recreational use and aesthetics.
2A	Protected for primary contact recreation such as swimming.
2B	Protected for secondary contact recreation such as boating, wading, or similar uses.
3	Protected for use by aquatic wildlife.
3A	Protected for cold-water species of game fish and other cold-water aquatic life, including the necessary aquatic organisms in their food chain.
3B	Protected for warm-water species of game fish and other warm-water aquatic life, including the necessary aquatic organisms in their food chain.
3C	Protected for nongame fish and other aquatic life, including the necessary aquatic organisms in their food chain.
3D	Protected for waterfowl, shore birds, and other water-oriented wildlife not included in classes 3A, 3B, or 3C, including the necessary aquatic organisms in their food chain.
3E	Severely habitat-limited waters. Narrative standards will be applied to protect these waters for aquatic wildlife.
4	Protected for agricultural uses including irrigating crops and stock watering.
5	The Great Salt Lake. Protected for primary and secondary contact recreation; waterfowl, shore birds, and other water-oriented wildlife including the necessary aquatic organisms in their food chain; and mineral extraction.

Source: Utah Administrative Code R317-2-13, Classification of Waters of the State, September 2006

Before granting a permit for a project, EPA, through the U.S. Army Corps of Engineers, requires the Utah Department of Environmental Quality (UDEQ) to certify that the project would not cause Utah's water quality standards to be exceeded. This certification process is in accordance with Clean Water Act Section 401.

3.11.1.2 Pollutants in Surface Water

EPA delegated authority for the National Pollutant Discharge Elimination System (NPDES) program in Utah to UDEQ. Under this program, certain activities such as industrial processes, wastewater treatment operations, municipal stormwater discharges, construction projects that disturb more than 1 acre of land, and construction dewatering projects require a Utah Pollutant Discharge Elimination System (UPDES) permit.

3.11.1.3 Pollutants in Groundwater and Aquifers

Classifications of Groundwater. Utah classifies groundwater according to the concentrations of total dissolved solids (TDS) and contaminants (Utah Division of Water Quality 2006). The four classifications of groundwater are:

- **Class I** – TDS concentrations of less than 500 mg/L (milligrams per liter) and no contaminants that exceed the groundwater quality standards. (The groundwater quality standard is a lengthy list of contaminants and standards for contaminant concentrations.)
- **Class II** – TDS concentrations between 500 mg/L and 3,000 mg/L. No contaminants that exceed the groundwater quality standards.
- **Class III** – TDS concentrations between 3,000 mg/L and 10,000 mg/L, *or* one or more contaminants that exceed the groundwater quality standards.
- **Class IV** – TDS concentrations above 10,000 mg/L. This is considered saline groundwater.

Classifications of Aquifers. The Utah Water Quality Board classifies aquifers according to their quality and use (such as ecologically important, irreplaceable, drinking water quality, and saline). The Utah Division of Water Quality publishes numeric standards for each class of aquifer. Any person can petition the Board to classify an aquifer. In addition, the Division requires groundwater permits for activities that discharge pollutants into groundwater.

What is the narrative standard for Utah waters?

The narrative standard applies to all waters in Utah. This standard states:

"It shall be unlawful, and a violation of these regulations, for any person to discharge or place any waste or other substance in such a way as will be or may become offensive such as unnatural deposits, floating debris, oil, scum or other nuisances such as color, odor or taste; or cause conditions which produce undesirable aquatic life or which produce objectionable tastes in edible aquatic organisms; or result in concentrations or combinations of substances which produce undesirable physiological responses in desirable resident fish, or other desirable aquatic life, or undesirable human health effects, as determined by bioassay or other tests performed in accordance with standard procedures."

3.11.1.4 Drinking Water Source Protection Plans and Zones

Owners of public water systems are responsible for protecting sources of drinking water and for submitting a Drinking Water Source Protection Plan to the Utah Division of Drinking Water. Drinking Water Source Protection Plans must identify drinking water source protection zones around each drinking water source (such as a lake, river, spring, or groundwater well), existing sources of contamination, and the types of new construction projects that are restricted within each zone.

The Utah Division of Drinking Water requires the Drinking Water Source Protection Plan to identify four distinct drinking water source protection zones for a groundwater wellhead:

- **Zone 1** is the area within a 100-foot radius from the wellhead.
- **Zone 2** is the area within a 250-day groundwater time of travel to the wellhead.
- **Zone 3** is the area within a 3-year groundwater time of travel to the wellhead.
- **Zone 4** is the area within a 15-year groundwater time of travel to the wellhead.

In general, certain types of development are not allowed within a designated drinking water source protection zone unless it can be shown that the withdrawal point is isolated from the contaminant source by a confining layer or that the specific development would not be a source of contamination. In most cases, roads are an allowable form of development.

3.11.2 Surface Waters

The S.R. 108 water quality impact analysis area is within the Weber River watershed, but no natural rivers or creeks cross the water quality impact analysis area. There are no high-quality waters in the impact analysis area, so these resources are not discussed in this section. There are, however, a few unnamed drainage canals that cross under S.R. 108.

What surface waters are present in the impact analysis area?

There are no natural rivers or creeks in the water quality impact analysis area. A few unnamed drainage canals cross under S.R. 108, but none of these are high-quality waters.

In the southern part of the impact analysis area, these drainage canals discharge to the Hooper Canal and ultimately to the Great Salt Lake. Storm drains and ditches in the northern part of the impact analysis area discharge to Howard Slough, which is located about 1 mile west of S.R. 108, and the stormwater then discharges to the Great Salt Lake. For water quality analysis purposes, the impact analysis area includes Howard Slough, Hooper Canal, and the Great Salt Lake.

Howard Slough has beneficial use classifications of 2B, 3C, and 4 (protected for secondary contact recreation, non-game fish and other aquatic life, and agricultural uses). No designated beneficial uses are listed in UAC Rule 317 for Hooper Canal. Because UDEQ does not maintain water quality data for these waters, the existing water

quality is assumed to be similar to the water quality in the lower reaches of the Weber River watershed.

3.11.2.1 Great Salt Lake

The Great Salt Lake is a remnant of Lake Bonneville, a freshwater lake that covered the majority of the Salt Lake, Davis, and Weber Counties 10,000 to 30,000 years ago and left visible shorelines, called benches, along the Wasatch Front range. At its lowest level, the lake covers an area of 610,000 acres. Although it is about 3 miles from S.R. 108, the Great Salt Lake is included in the water quality analysis because storm water runoff that originates in or passes through the impact analysis area ultimately discharges to the Great Salt Lake.

UDEQ classifies the Great Salt Lake as a Class 5 water, which means it is protected for primary and secondary contact recreation, aquatic wildlife, and mineral extraction. UDEQ has established a narrative standard that protects these beneficial uses, but no numeric standards are currently in effect. Water quality constituents in the lake are sodium, magnesium, potassium, calcium, chloride, and sulfate. The marketable resources from the lake are salt products, potassium sulfate for fertilizer, magnesium chloride brines used in the production of magnesium metals and chlorine gas, and brine shrimp and their eggs.

The Great Salt Lake is known for its high salinity. Salinity is a measure of the salt content in water. The salinity of the Great Salt Lake ranges from 9% to 28% (Utah Geological and Mineral Survey 1990). For comparison, the salinity of most ocean water is about 3%.

3.11.3 Groundwater

3.11.3.1 Groundwater Quality

East Shore Aquifer System

The East Shore aquifer system is located between the Wasatch Range and the Great Salt Lake. The aquifer system is bounded on the north by North Ogden and on the south by North Salt Lake and underlies the entire water quality impact analysis area.

Within the East Shore aquifer system, groundwater occurs in unconsolidated sand and gravel deposits both as a water table and under pressurized (artesian) conditions. Most groundwater is withdrawn from the deep, confined portion of the aquifer. Water enters the deep aquifers primarily along the east edge of the Weber River delta and all along the Wasatch Fault zone where the aquifers are unconfined. Near the impact analysis area, the deep, confined portion of the aquifer water moves up toward the surface (Utah Department of Natural Resources 1990). This upward gradient recharges the shallow groundwater in some locations.

Groundwater levels have generally declined throughout the East Shore area since the 1950s, though a few wells have shown a slight increase in water levels. Levels around Hill Air Force Base have experienced some of the largest declines in all of Utah. The State Engineer has closed the East Shore area to new groundwater appropriations except for 1-acre-foot applications and shallow wells less than 30 feet deep (Utah Division of Water Resources 2004).

The quality of groundwater in the East Shore area is directly related to the quality of its recharge water and the composition of the rocks and soil through which the water flows from the points of recharge to the points of discharge (Utah Department of Natural Resources 1990). Therefore, groundwater quality, especially in shallow water-bearing geologic deposits, can vary greatly by location and over time.

There are no protected or classified aquifers in the water quality impact analysis area, and no springs have been identified (Utah Division of Water Quality 2001).

3.11.3.2 Groundwater Rights

The Utah Division of Water Rights classifies groundwater wells according to their use: domestic (drinking water), irrigation, stock watering, municipal, or recreational. The municipal classification indicates that the well is owned by a city or county for a variety of uses, including drinking water or agriculture. The Division of Water Rights tracks groundwater rights according to an inventoried water right number. Each water right number represents one or more actual groundwater wells. The approximate locations of the well or cluster of wells corresponding to a water right number are shown in Exhibit 3.11-2 and Exhibit 3.11-3 below.

What is an aquifer?

An *aquifer* is an underground geologic formation that easily stores and transmits water. Aquifers can be composed of either porous rock or unconsolidated deposits of sand and gravel. An aquifer is said to be *confined* if it is covered by an impermeable layer of rock or clay. Due to this confining layer, the groundwater in confined aquifers is usually under pressure. Drilling a well into a confined aquifer can produce an *artesian well*—one where the pressurized water rises to the surface without the aid of a pump.

What aquifers are present in the impact analysis area?

The East Shore aquifer system underlies the entire water quality impact analysis area. However, there are no protected or classified aquifers in the impact analysis area.

Exhibit 3.11-2: Existing Water Resources in Davis County

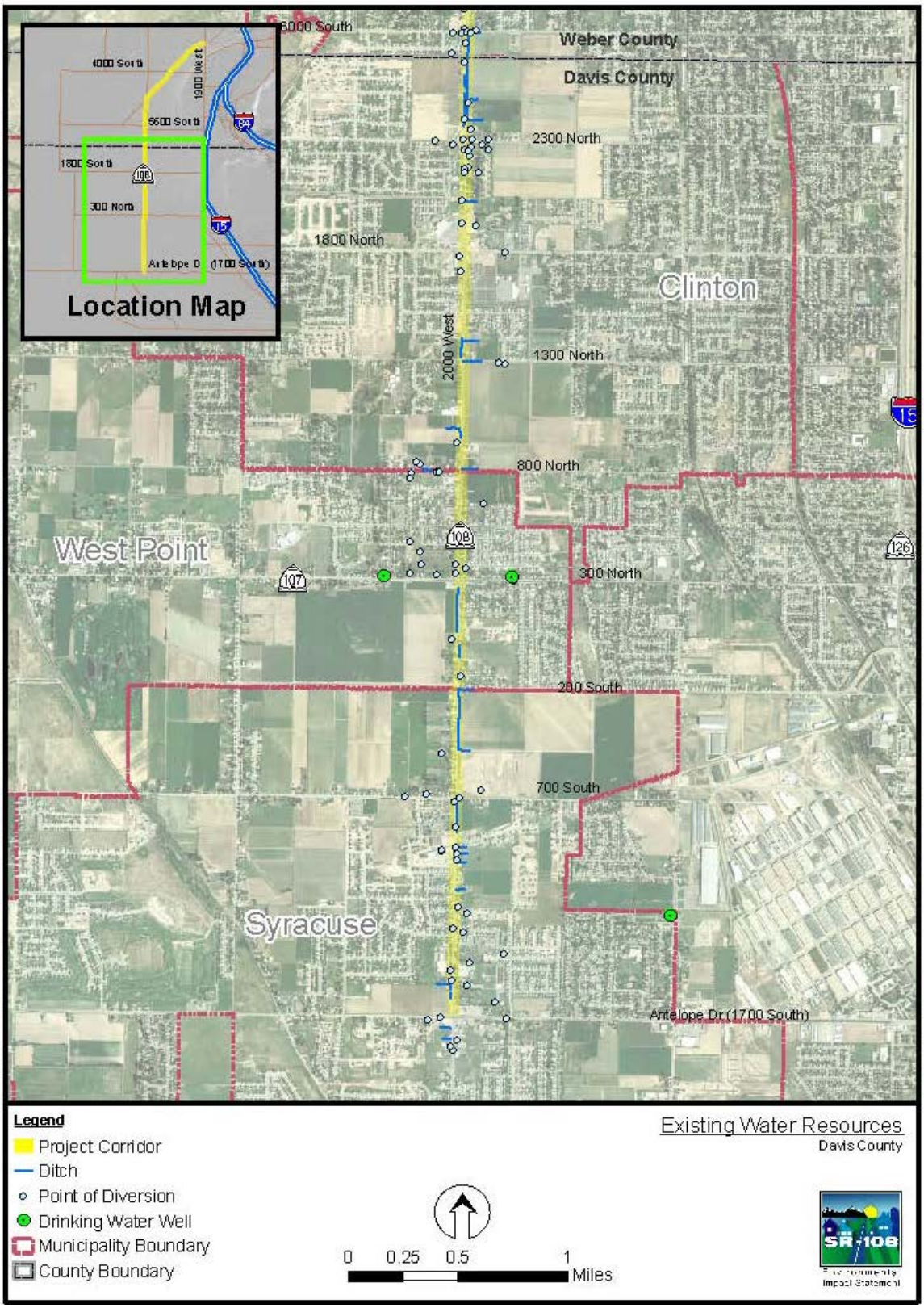
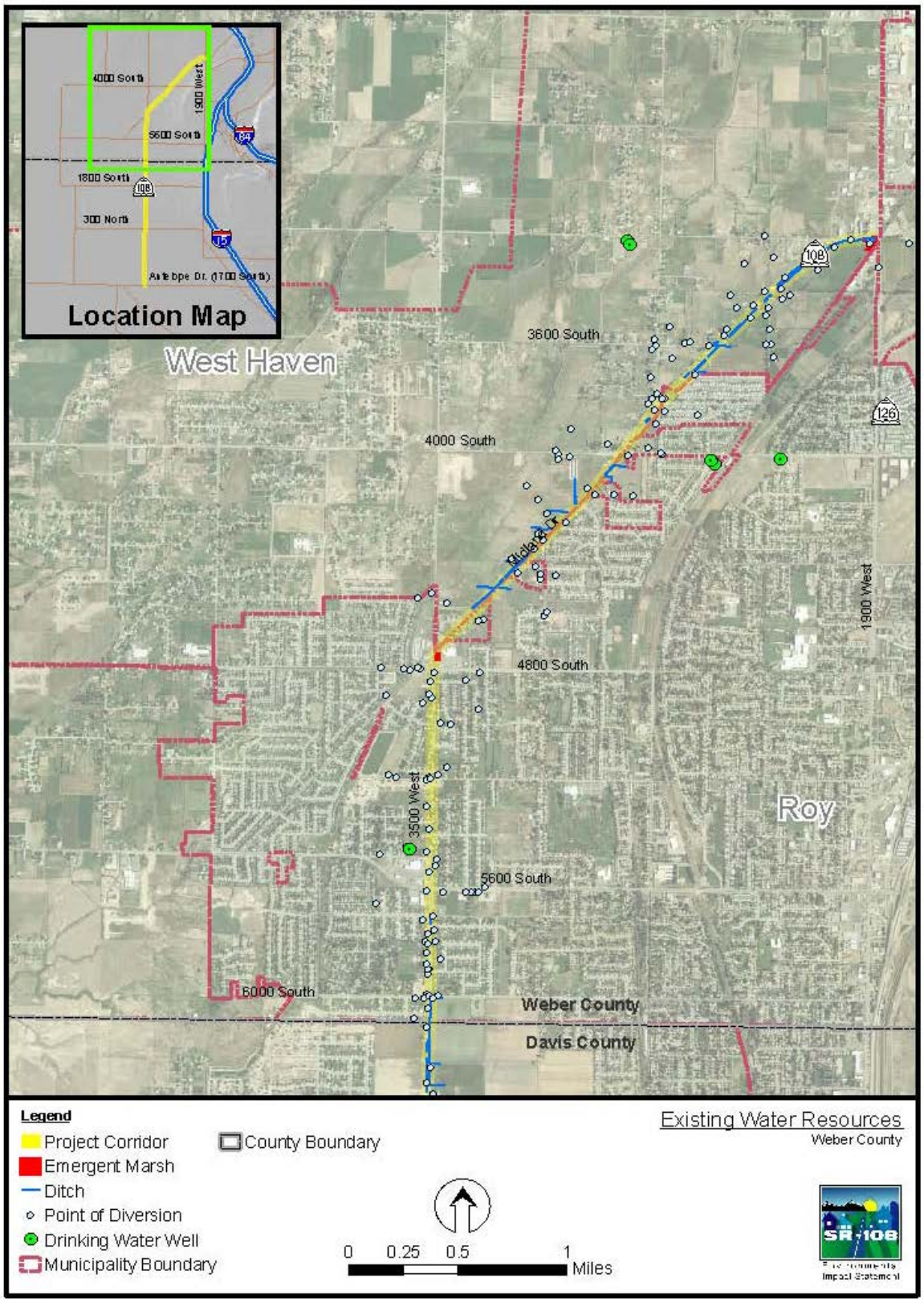


Exhibit 3.11-3: Existing Water Resources in Weber County



3.11.4 Drinking Water Source Protection Zones

There are nine drinking water wells with source protection zones in the water quality impact analysis area. Exhibit 3.11-4 provides an overview of the wells along S.R. 108. In general, certain types of development are not allowed within a designated drinking water protection area unless it can be shown that the well is isolated from the surface by a confining layer, or the development would not be a source of contamination.

Exhibit 3.11-4: Drinking Water Sources in the Water Quality Impact Analysis Area

Water System Owner	Sources
West Point Water System	2
Syracuse Water System	1
Hooper Water Improvement District	3
Roy	1
Taylor–West Weber Water Improvement District	2
Total	**9**

Source: Jensen 2006

3.12 Ecosystem

This section describes the existing bird and wildlife habitat, wildlife, special-status species, and wetlands in the ecosystem impact analysis area. For this evaluation, the ecosystem impact analysis area includes both the S.R. 108 project corridor and adjacent areas (such as the Great Salt Lake) that support wildlife that might use the project corridor. The S.R. 108 project corridor used in this analysis consists of the existing roadway and the surrounding area out to a distance of 200 feet on either side of the roadway.

What are ecosystem resources?

In this EIS, ecosystem resources consist of bird and wildlife habitat, wildlife, special-status species, and wetlands.

The Utah Division of Wildlife Resources and the U.S. Fish and Wildlife Service (USFWS) were asked to be participating agencies on this project, and USFWS was also invited to be a cooperating agency. USFWS requested to be a participating agency and the Utah Division of Wildlife Resources declined to be a participating agency. Both agencies were contacted to determine whether there are any State of Utah sensitive species or federally listed wildlife or plant species in the ecosystem impact analysis area. USFWS and the Utah Division of Wildlife Resources provided a list of sensitive species for both Davis and Weber Counties. Some of these species could be present within the counties but not within the S.R. 108 ecosystem impact analysis area.

Field surveys were conducted between June and September 2006 and in November 2006 to document the existing conditions in the ecosystem impact analysis area and to identify habitat that could support sensitive species. Aerial photographs of the impact analysis area were reviewed, and then onsite field investigations were conducted.

3.12.1 Habitat for Fish, Wildlife, and Migratory Birds

In general, the ecosystem impact analysis area is highly developed and urbanized and consists of residential and commercial areas with a few remaining agricultural remnants, many of which are idle and planned for development. The dominant vegetation types are landscaped, ornamental plants; agricultural species; invasive weedy species on disturbed sites; native plants, pasture grasses, and invasive species on active or idle pastureland; and emergent plants in drainage ditches and stormwater collection ponds.

What are emergent plants?

Emergent plants grow with their roots and lower stems in the water, but most of the plant is above the water's surface (cattails are an example).

There is no fish habitat in the impact analysis area. There is also no pristine wildlife habitat in the impact analysis area, only areas that have been converted to urban uses or agriculture. This disturbed and fragmented habitat provides very little benefit to most species except those that have adapted to an urban environment.

3.12.1.1 Wildlife Habitat

The S.R. 108 project corridor and areas within one-half mile of this area consist of pastureland, cropland, urbanized areas, and disturbed sites (see Exhibit 3.2-2: Existing Cropland above). About 60% of the land within one-half mile of S.R. 108 is non-agricultural land that primarily consists of residential properties with a small amount of commercial development. Of the agricultural land within one-half mile of S.R. 108, about 70% is classified in some way as cropland, including smaller areas of small vegetable plots, turf grass, and idle cropland. The other 30% of agricultural land is classified as pastureland (irrigated, semi-irrigated, dry, or fallow).

What wildlife habitat is present along S.R. 108?

About 60% of the land along S.R. 108 is residential or commercial properties, with the remaining 40% being cropland or pastureland. Developed land provides little habitat for wildlife, and most of the cropland and pastureland in the area does not have the variety of native plants needed to provide high-quality habitat. There are also some small areas of riparian (riverbank) vegetation along irrigation ditches and stormwater drainages.

Although the pastureland and cropland might provide some small value to wildlife, all of the city community development offices along S.R. 108 have targeted the agricultural land within their incorporated city limits for future residential or commercial development. The only open areas not identified for future residential or commercial development are parcels in Weber County that are not currently within any city's incorporated area. Weber County has identified some of this unincorporated land as agricultural (A-1) and apparently prefers it to remain that way, but residential development is still possible in the future (see Section 3.2.3, Future Planning and Zoning for Existing Farmland).

Pastureland

Pastureland can be usable habitat for some wildlife species. However, the value of pastureland as usable habitat depends on the quality of the pastureland. A pasture that mostly consists of non-native pasture grasses and invasive weeds is of much lower value to wildlife than a pasture with a wide variety of native plants, shrubs, and small trees.

The pastureland along S.R. 108 varies from maintained, irrigated pasture to weedy, dry, abandoned parcels. The vegetation in these

pastures includes native or introduced grasses (*Agropyron cristatum*, *Poa bulbosa*, and *Bromus* spp.), forbs (*Cirsium* spp., *Kochia scoparia*, *Chenopodium berlandieri*, *Trifolium* spp., *Lepidium* spp., and *Sisymbrium altissimum*), shrubs (*Chrysothamnus* spp., *Rhus* spp., and *Ribes* spp.), and small trees (*Elaeagnus angustifolia*, *Populus* spp., and *Acer negundo*). However, most of the pastureland along S.R. 108 lacks the shrubs and trees needed to provide high-value habitat for wildlife.

Cropland

The cropland areas consist of irrigated crops such as alfalfa, grain, corn, and onions. This land type also includes small vegetable plots, turf grass, and idle croplands.

Urbanized Areas

The landscaping found in urbanized areas (residential and commercial) consists mainly of turf grasses, decorative shrubs, non-native trees and flowers, and cultivated fruit and vegetable species.

Disturbed Sites

The disturbed sites along S.R. 108 are typical of those found in northern Utah. Along S.R. 108, disturbed sites are mostly abandoned lots and soon-to-be-developed areas that vary considerably in their species mix. These sites most often include cheatgrass (*Bromus tectorum*), halogeton (*Halogeton glomeratus*), Russian thistle (*Salsola pestifer*), kochia (*Kochia scoparia*), tumbling mustard (*Sisymbrium altissimum*), thistle (*Cirsium* or *Carduus* spp.), and annual sunflower (*Helianthus annuus*).

Drainages

There are a few small irrigation ditches and stormwater drainages along S.R. 108 that provide riparian (riverbank) habitat for wildlife. The most prevalent vegetation along these drainages is cattails (*Typha* spp.), sedges (*Carex* spp.), and rushes (*Juncus* spp.). Jurisdictional wetlands are discussed in Section 3.12.4, Waters of the U.S.

3.12.1.2 Migratory Bird Habitat

The Great Salt Lake ecosystem is 3 miles west of S.R. 108 and is a critical part of the North American migratory flyway for shorebirds, waterfowl, raptors, and songbirds. This ecosystem includes habitats such as open water, saltwater and freshwater marshes, and shoreline mudflats. None of these critical habitats are present along S.R. 108.

Migratory songbirds and game birds favor shrub-community habitat. Although this type of habitat can sometimes remain in urban areas along fences and drainages, there is little shrub-community habitat along S.R. 108 because most of the patches of pastureland are bordered by residential or commercial developments. Therefore, there is very little high-quality migratory bird habitat along S.R. 108. However, the types of habitat discussed in Section 3.12.1.1, Wildlife Habitat, could be used by migratory birds, even if they are not ideal habitat.

3.12.2 Wildlife

The wildlife habitats along S.R. 108 are primarily those associated with an urbanized environment. Several species that are adapted to open spaces around human environments are likely to be common along S.R. 108, including the starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), magpie (*Pica hudsonia*), mule deer (*Odocoileus hemionus*), and deer mouse (*Peromyscus maniculatus*). Other species such as migratory songbirds, raptors, and game animals typically require large, unbroken ranges of native habitat.

What kinds of wildlife are present along S.R. 108?

Most of the wildlife along S.R. 108 is species that are adapted to open spaces around human environments. In addition, some species of songbirds, small non-game mammals, and rodents use the riparian vegetation in irrigation ditches and storm drainages.

The ecosystem impact analysis area includes small areas of riparian vegetation in irrigation ditches and storm drainages that provide a narrow corridor of wildlife habitat. The species that use these areas include miscellaneous songbirds such as red-winged blackbird (*Agelaius phoeniceus*), several species of small non-game mammals such as raccoon (*Procyon lotor*) and striped skunk (*Mephitis mephitis*), and a variety of rodents such as meadow vole (*Microtus virginianus*) and mice (*Peromyscus* spp.). These species also use the disturbed upland habitats associated with urban corridors.

3.12.3 Special-Status Species

Special-status species include plant and animal species that are currently listed, or are proposed for listing, as threatened and endangered by USFWS. Special-status species also include sensitive species designated by the State of Utah. Species listed by USFWS are protected from activities that could affect individuals or their habitat. Exhibit 3.12-1 below shows the species listed by the above agencies that are either known to exist or that might exist in Davis and Weber Counties.

What special-status species are present along S.R. 108?

There are no State of Utah sensitive species that have habitat or that are known to exist along S.R. 108. The only federally listed species that might exist in or near the impact analysis area is the bald eagle.

In compliance with the Endangered Species Act of 1973, as amended, USFWS was contacted to determine whether the S.R. 108 alternatives would affect any threatened, endangered, or special-status species. USFWS had previously requested to be a participating agency on the project due to its interest in protecting federally listed species and migratory birds. As Exhibit 3.12-1 shows, the only federally listed species that might exist in or near the impact analysis area is the bald eagle, which is discussed in more detail on page 3-107.

The Utah Division of Wildlife Resources was also contacted to determine whether the S.R. 108 alternatives would affect any State of Utah sensitive species. The Division declined to be a participating agency because it did not feel that there was a large amount of wildlife habitat along S.R. 108. As Exhibit 3.12-1 shows, there are no State of Utah sensitive species that have habitat or that are known to exist along S.R. 108.

Exhibit 3.12-1: Status and Probability of Occurrence of Special-Status Species

Common Name	Scientific Name	Sensitive Status: Federal	Sensitive Status: State	Probability of Occurrence
Plants				
Ute ladies'-tresses	*Spiranthes diluvialis*	T	SPC	No habitat in project corridor[a]
Birds				
Bald eagle	*Haliaeetus leucocephalus*	T	T	Known to occur outside project corridor
Yellow-billed cuckoo	*Coccyzus americanus occidentalis*	C	T	No habitat in project corridor
American white pelican	*Pelecanus erythrorhynchos*	—	SPC	Known to occur outside project corridor
Bobolink	*Dolichonyx oryzivorus*	—	SPC	No habitat in project corridor
Burrowing owl	*Athene cunicularia*	—	SPC	No habitat in project corridor
Ferruginous hawk	*Buteo regalis*	—	SPC	No habitat in project corridor
Grasshopper sparrow	*Ammodramus savannarum*	—	SPC	No habitat in project corridor
Greater sage-grouse	*Centrocercus urophasianus*	—	SPC	No habitat in project corridor
Lewis' woodpecker	*Melanerpes lewis*	—	SPC	No habitat in project corridor
Long-billed curlew	*Numenius americanus*	—	SPC	Known to occur outside project corridor
Northern goshawk	*Accipiter gentilis*	—	CS	Known to occur outside project corridor[b]
Sharp-tailed grouse	*Typanuchus phasianellus*	—	SPC	No habitat in project corridor
Short-eared owl	*Asio flammeus*	—	SPC	No habitat in project corridor
Reptiles/Amphibians/Fish				
June sucker	*Chasmistes liorus*	E	—	No habitat in project corridor
Bluehead sucker	*Catostomus discobolus*	—	CS	No habitat in project corridor
Bonneville cutthroat trout	*Oncorhynchus clarkii utah*	—	CS	No habitat in project corridor
Columbia spotted frog	*Rana luteiventris*	—	CS	No habitat in project corridor
Least chub	*Iotichthys phlegethontis*	—	CS	No habitat in project corridor
Smooth greensnake	*Opheodrys vernalis*	—	SPC	Known to occur outside project corridor
Western toad	*Bufo boreas*	—	SPC	No habitat in project corridor
Invertebrates				
Ogden rocky mountainsnail	*Oreohelix peripherica wasatchensis*	C	—	No habitat in project corridor
Deseret mountainsnail	*Oreohelix peripherica*	—	SPC	No habitat in project corridor
Lyrate mountainsnail	*Oreohelix haydeni*	—	SPC	No habitat in project corridor
Western pearlshell	*Margaritifera falcata*	—	SPC	No habitat in project corridor
Mammals				
Canada lynx	*Lynx canadensis*	T	—	No habitat in project corridor
Gray wolf	*Canis lupus*	E	—	No habitat in project corridor
Kit fox	*Vulpes macrotis*	—	SPC	No habitat in project corridor
Townsend's big-eared bat	*Corynorhinus townsendii*	—	SPC	No habitat in project corridor

[a] Known to occur within Weber and/or Davis Counties, but not known to occur in the project corridor

[b] Migrant through the project corridor

Federal status:
- T = Federal threatened
- E = Federal endangered
- C = Federal candidate

State of Utah status:
- T = State threatened
- SPC = State species of special concern
- CS = Conservation species

3.12.3.1 Federally Listed Species

The only federally listed species that is known to exist near the ecosystem impact analysis area is the bald eagle (*Haliaeetus leucocephalus*). No other federally listed species that might exist in Weber or Davis Counties have habitat along S.R. 108.

Bald Eagle. The bald eagle is primarily a migrant through Utah, although two nesting pairs are known to exist in the state. There are migratory roosts in small sites along the mountains of the Wasatch Front where groups of bald eagles rest during migration and feed during stopovers to the Great Salt Lake ecosystem. Bald eagles usually choose non-migratory roosting sites in dense stands of deciduous or preferably coniferous trees that are a convenient distance from feeding areas (up to 18 miles).

There are no known migratory roosts for bald eagles along S.R. 108. Cottonwood snags (upright dead trees) along S.R. 108 could be used by bald eagles as a temporary perch, but there is no roosting, nesting, or foraging habitat for this species along S.R. 108.

3.12.3.2 State of Utah Sensitive Species

No State of Utah sensitive species have habitat or are known to exist along S.R. 108.

3.12.4 Waters of the U.S.

This section describes how wetlands and other potential waters of the U.S. along S.R. 108 were identified and evaluated. Waters of the U.S. include streams, drainages, and wetlands. The U.S. Army Corps of Engineers (USACE) determines whether areas identified as wetlands or other waters are regulated as waters of the U.S.

3.12.4.1 Wetlands Inventories

Wetlands inventories were performed between July and September 2006 and in April 2008. Existing data including aerial photographs and soil information from NRCS were used to aid the field investigations.

Wetlands were identified according to routine delineation methods described in the *Corps of Engineers Wetlands Delineation Manual* (USACE 1987). The manual uses a three-parameter approach

What are waters of the U.S.?

Under the Clean Water Act, *waters of the U.S.* are defined as waters that are navigable waters, those that are interstate waters, and/or those used for interstate commerce, their tributaries, and their associated wetlands. Waters of the U.S. are under the jurisdiction of USACE, so they are sometimes referred to as *jurisdictional waters*.

USACE has jurisdiction over most wetlands, but some wetlands are not considered jurisdictional. A wetland that is not navigable and is not used for interstate commerce or otherwise does not fit the definition of a water of the U.S. would not qualify as a jurisdictional wetland. This type of wetland is called an *isolated wetland.*

(hydrophilic vegetation, hydric soils, and wetland hydrology) to determine the presence of jurisdictional wetlands (that is, wetlands that are waters of the U.S.). Positive indicators for all three parameters are typically required for an area to qualify as a jurisdictional wetland. The boundaries of identified wetland areas were mapped using a global positioning system (GPS) unit. Additionally, other potentially jurisdictional waters such as ditches and canals were identified and assessed.

Two potentially jurisdictional emergent marsh wetlands were identified along S.R. 108 (see Exhibit 3.12-2 below). The first wetland is northeast of the Midland Drive/4800 South intersection. This wetland area appears to be a human-made detention basin and is surrounded by turf grass. It is an isolated 0.05-acre basin that contains wet soils and is dominated by emergent wetland vegetation. The second wetland is in the southwest corner of the S.R. 108 and 1900 West intersection. This wetland is about 0.36 acre of emergent marsh.

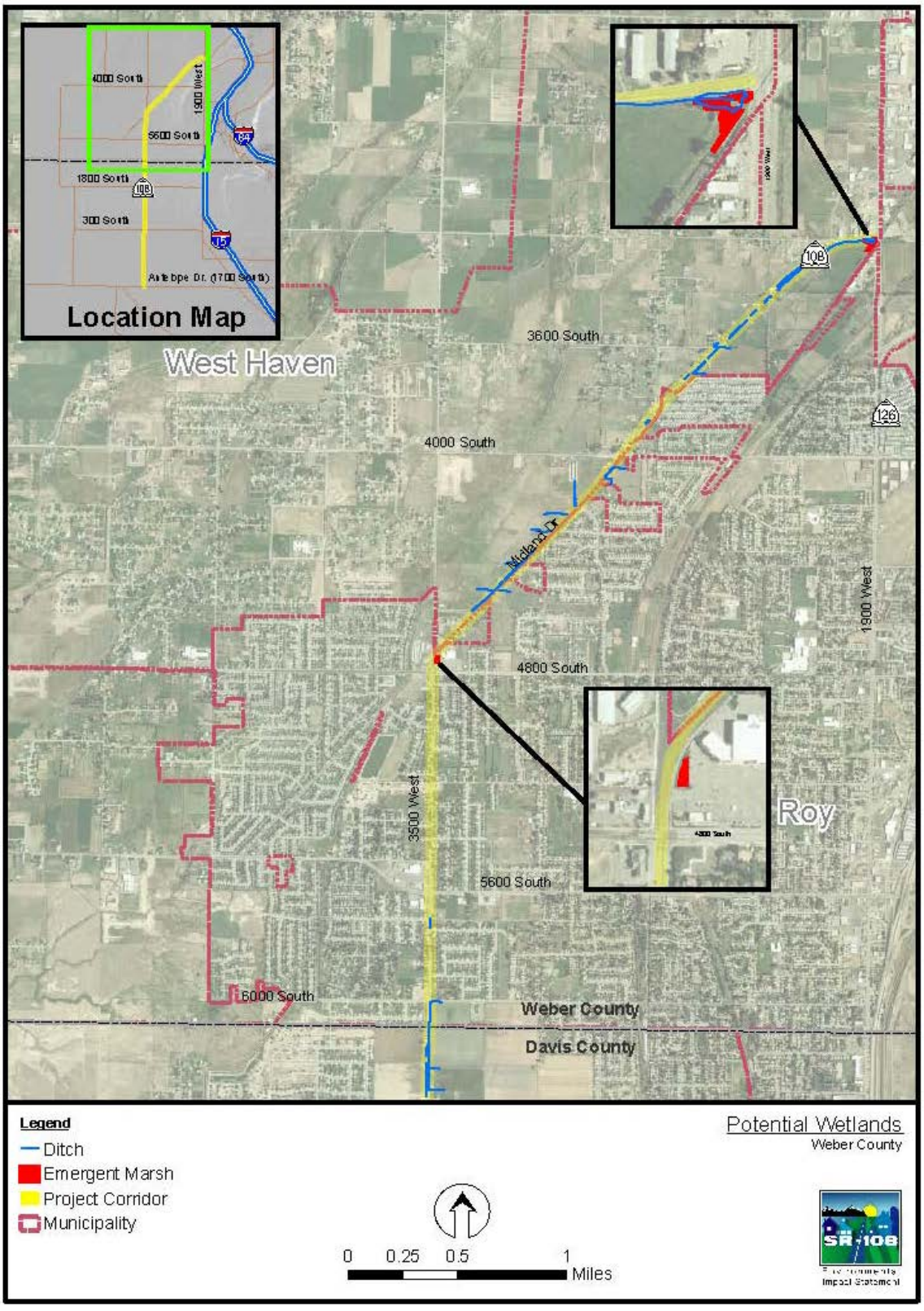
Forty-one human-made water conveyances were identified adjacent to S.R. 108. These conveyances were found throughout the impact analysis area and include many shallow ditches and a few larger, deeper ditches, cement-lined channels, and canals. Most of these conveyances run perpendicular to S.R. 108 and flow from east to west.

The main function of ditches is to convey irrigation water. A few channels also provide roadside drainage. Due to increasing development, several of these ditches are no longer used for irrigation. Most ditches are dominated by upland vegetation, while some ditches and roadside drainages contain riparian vegetation.

3.12.4.2 Jurisdictional Status

The jurisdictional wetland determination for the S.R. 108 project is being reviewed by USACE. The results of the final USACE jurisdictional determination will be used in obtaining any required permits for the project. For analysis purposes, the two wetlands identified in Section 3.12.4.1, Wetlands Inventories, have been considered jurisdictional wetlands.

Exhibit 3.12-2. Potential Wetlands – Weber County



3.13 Floodplains

There are no designated floodplains in the S.R. 108 study area.

3.14 Historic, Archaeological, and Paleontological Resources

This chapter describes the known historic, archaeological, and paleontological resources in the impact analysis area. The impact analysis area for the cultural resources analysis is the area likely to be directly or indirectly affected by the proposed alternatives.

Historic and archaeological resources are defined as those physical manifestations or remains of past human activity that are at least 50 years old. For the purpose of this EIS, and to account for the amount of time that would likely elapse between the identification of cultural resources as part of this EIS and the implementation of any project decision, the age for resources to be considered historic or archaeological was decreased to 45 years.

In this chapter, the term *historic resources* means architectural properties such as buildings. The term *archaeological resources* means sites, features, and structures that are at least 45 years old and are composed primarily of non-architectural elements. Such archaeological resources include everything from prehistoric campsites to historic railroads and canals. *Paleontological resources*, often referred to as fossils, are defined as the remains, traces, or imprints of ancient organisms preserved in or on the earth's crust that provide information about the history of life on earth.

What are historic resources, archaeological resources, and paleontological resources?

*Historic resource*s are architectural properties such as buildings. *Archaeological resources* are sites, features, and structures composed primarily of non-architectural elements. *Paleontological resources* are fossil resources.

3.14.1 Regulatory Basis for Cultural Resource Analysis

The cultural, historic, and paleontological resources inventory was completed to comply with the federal and state guidelines in Exhibit 3.14-1 below.

Exhibit 3.14-1. Antiquities Laws and Regulations Applicable to the S.R. 108 Project

Title	Implementing Regulation	Year Enacted and Amended
Mining Law Act	None	1872; amended 1962
Antiquities Act	43 CFR 3	1906
Historic Sites Act	None	1935
Reservoir Salvage Act amended as the Archaeological and Historic Preservation Act, Archaeological Data Preservation Act of 1974 or Moss-Bennett Act	None	1960; amended 1974
National Historic Preservation Act (NHPA)	36 CFR 65 36 CFR 800 36 CFR 801 36 CFR 63	1966; amended 1980, 1992
Department of Transportation Act, Section 4(f)	None	1966; amended 1983 (relevant for easements through Bureau of Land Management–administered public land)
Executive Order 11593: Protection and Enhancement of the Cultural Environment	None	1971; codified as part of the 1980 amendments to the National Historic Preservation Act
American Indian Religious Freedom Act (AIRFA)	None	1978
Archaeological Resources Protection Act (ARPA)	43 CFR 7	1979; amended 1988
Native American Graves Protection and Repatriation Act (NAGPRA)	43 CFR 10	1990
Archeological and Historic Preservation Act (AHPA) of 1974 (16 U.S.C. 469 to 469c-2)	None	1974
Utah Antiquities Protection Act (UAC 9-8-101; UAC 63-73-19)	None	1992
Executive Order 13007: Indian Sacred Sites	None	1996
Executive Order 13175: Consultation and Coordination with Indian Tribal Governments	None	2000
Executive Order 13287: Preserve America	None	2003
UDOT/Utah Geological Survey Memorandum of Understanding (UAC 63-73-19 compliance)	None	1999

3.14.2 Resource Identification

The identification of historic, archaeological, and paleontological resources that could be affected by any of the alternatives under consideration was carried out using several methods. These methods consisted of literature reviews, field inspections, and consultation with agency experts, city and county personnel, Native American tribes, and members of the general public with specific information about cultural and paleontological resources in the impact analysis area for cultural resources. These methods are described in greater

detail in the archaeological and architectural resource surveys technical report (SWCA 2006).

3.14.2.1 Literature Reviews

Literature reviews included examining the project, site, and historic architectural records of the Utah State Historic Preservation Office (SHPO). Copies of records for historic and archaeological sites known to be present within or directly adjacent to all proposed alternatives were obtained. The National Register of Historic Places (NRHP) and lists of state and local landmarks were consulted for information regarding resources that might be present within the boundaries of each alternative. Additionally, published literature regarding the prehistoric and historic uses and the known geological composition of the area was reviewed to determine whether paleontological resources would be affected by the proposed alternatives.

What is the National Register of Historic Places?

The *National Register of Historic Places*, or NRHP, is a listing of archaeological sites, buildings, and structures throughout the United States that have undergone thorough documentation and rigorous evaluation and have been determined to be important in local, national, or international prehistory or history.

3.14.2.2 Consultation

As part of the effort to identify historic, archaeological, and paleontological resources in the impact analysis area, Section 106 consultation was carried out between UDOT, FHWA, and several agencies. Among those agencies consulted are the Utah SHPO (both the Preservation and Antiquities Departments) and the Utah Geological Survey (UGS).

In addition to the agencies, consultation was undertaken with several other entities with direct interest in historic or archaeological resources that could be affected by the proposed alternatives. These entities included certified local governments (CLG) and historical societies and organizations. The Roy Historical Museum and the Syracuse CLG were contacted as part of this effort. No similar entities exist for Clinton, West Point, or West Haven, the three other communities along S.R. 108. None of the parties contacted during this consultation identified any properties of particular importance to the communities in question.

Several Native American tribes with patrimonial claims over the general project area were also consulted as part of efforts to identify cultural resources within the areas that could be affected by any of the proposed alternatives. These tribes were the Northwestern Band

of Shoshone Nation, the Shoshone-Bannock Tribes, and the Uintah and Ouray Ute Indian Tribe.

3.14.2.3 Field Inspections

Two types of field inspections were conducted in the summer of 2006 to identify historic, archaeological, and paleontological resources that could be affected by the proposed alternatives. The first type of inspection focused on identifying historic architectural properties (buildings), and the other type focused on identifying archaeological and paleontological resources that are visible on the ground surface. The technical report produced for the cultural resource surveys of the S.R. 108 impact analysis area contains greater detail about the procedures used to identify, document, and evaluate historic architectural properties and archaeological and paleontological resources (SWCA 2006).

3.14.3 Historic Architectural Properties

As part of the environmental analysis for the S.R. 108 project, an inventory of architectural resources along S.R. 108 was conducted. Each property was evaluated against the criteria shown in Exhibit 3.14-2 to determine whether it was eligible for the NRHP.

Exhibit 3.14-2: Criteria for Evaluating the Eligibility of Cultural Resources for the NRHP

NRHP Criterion	Characteristics of the Cultural Resource
A	Associated with events that have made a significant contribution to the broad patterns of our history
B	Associated with the lives of persons significant in our past
C	Embodies distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction
D	Yields, or may be likely to yield, information important in prehistory or history

Source: 36 CFR 60

When conducting this inventory, the Utah SHPO's Standard Operating Procedures for Utah Reconnaissance-Level Surveys was used to assess the integrity of architectural properties. These procedures require surveyors to evaluate the degree of integrity of

each architectural property when assessing whether the property is eligible for the NRHP. The degrees of integrity used by the Utah SHPO are listed in Exhibit 3.14-3.

Exhibit 3.14-3: Utah SHPO Degrees of Integrity for Architectural Properties

Degree of Integrity	Characteristics of the Architectural Property
A	**Eligible/Significant:** Built during the historic period and retains integrity; excellent example of a style or type; unaltered or only minor alterations or additions; individually eligible for the NRHP under Criterion C; also, buildings of known historical significance.
B	**Eligible:** Built during the historic period and retains integrity; good example of a style or type, but not as well-preserved or well-executed as "A" buildings; more substantial alterations or additions than "A" buildings, though overall integrity is retained; eligible for the NRHP as part of a potential historic district or primarily for historical rather than architectural reasons (which cannot be determined at this point).
C	**Ineligible:** Built during the historic period but has had major alterations or additions; no longer retains integrity.
D	**Ineligible:** Not built during the historic period; built during the modern era.

Source: SWCA 2006

Historic buildings are generally considered to be those 50 years old or older. As agreed by UDOT, FHWA, and the Utah SHPO, and in consideration of the expected duration of this project, buildings that were built in 1961 or earlier were considered potentially historic. A total of 109 architectural properties that were built within the historic period (that is, built in 1961 or earlier) within the S.R. 108 project's area of potential effect were identified.

A total of 109 historic architectural properties were identified within the impact analysis area (see Exhibit 3.14-4 below). These properties, almost all of which are residential, include properties from the late 1800s to the middle 20th century. Of the 109 historic architectural properties, 61 are considered to be eligible for the NRHP and 48 are considered to be ineligible. UDOT's and FHWA's NRHP eligibility determinations for these properties were made in consultation with the Utah SHPO.

What is the historic period?

The *historic period* is the period during which historic buildings were built. Historic buildings are generally considered to be those 50 years old or older. In consideration of the expected duration of the S.R. 108 project, buildings that were built in 1961 or earlier were considered potentially historic.

Exhibit 3.14-4: Historic Architectural Properties along S.R. 108

Address[a]	Construction Date (Estimated)	National Register Eligibility
1663 South 2000 West, Syracuse	1926	Eligible under Criterion A
1609 South 2000 West, Syracuse	1929	Eligible under Criterion C
?1451 South 2000 West, Syracuse	1903	Eligible under Criterion C
1449 South 2000 West, Syracuse	1920	Not eligible
1433 South 2000 West, Syracuse	1925	Not eligible
1419 South 2000 West, Syracuse	1940	Eligible under Criterion C
1401 South 2000 West, Syracuse	1930	Eligible under Criterion C
1373 South 2000 West, Syracuse	1955	Eligible under Criterion C
1317 South 2000 West, Syracuse	1923	Eligible under Criterion C
1275 South 2000 West, Syracuse	1925	Not eligible
1217 South 2000 West, Syracuse	1920	Eligible under Criterion C
1189 South 2000 West, Syracuse	1958	Eligible under Criterion C
1147 South 2000 West, Syracuse	1959	Eligible under Criterion C
1133 South 2000 West, Syracuse	1930	Eligible under Criterion C
1021 South 2000 West, Syracuse	1953	Not eligible
963 South 2000 West, Syracuse	1920	Eligible under Criterion C
850 South 2000 West, Syracuse	1924	Eligible under Criterion C
723 South 2000 West, Syracuse	1910	Eligible under Criterion C
478 South 2000 West, West Point	1950	Not eligible
460 South 2000 West, West Point	1955	Not eligible
446 South 2000 West, West Point	1950	Not eligible
422 South 2000 West, West Point	1950	Not eligible
193 South 2000 West, West Point	1955	Not eligible
169 South 2000 West, West Point	1950	Not eligible
150 South 2000 West, West Point	1955	Eligible under Criterion C
145 South 2000 West, West Point	1958	Eligible under Criterion C
58 South 2000 West, West Point	1935	Eligible under Criterion C
39 South 2000 West, West Point	1955	Eligible under Criterion C
25 South 2000 West, West Point	1955	Not eligible
?20 North 2000 West, West Point (agricultural outbuilding complex only)	1940	Eligible under Criterion C
310 North 2000 West, West Point	1955	Eligible under Criterion C
340 North 2000 West, West Point	1900	Not eligible
535 North 2000 West, West Point	1900	Not eligible
647 North 2000 West, West Point	1950	Eligible under Criterion C
667 North 2000 West, West Point	1950	Eligible under Criterion C

Address[a]	Construction Date (Estimated)	National Register Eligibility
714 North 2000 West, West Point	1910	Not eligible
755 North 2000 West, West Point	1945	Not eligible
783 North 2000 West, West Point	1900	Not eligible
796 North 2000 West, West Point	1945	Eligible under Criterion C
817 North 2000 West, Clinton	1950	Eligible under Criterion C
868 North 2000 West, Clinton	1950	Eligible under Criterion C
881 North 2000 West, Clinton	1955	Eligible under Criterion C
914 North 2000 West, Clinton	1955	Not eligible
1071 North 000 West, Clinton	1905	Eligible under Criterion C
1141 North 2000 West, Clinton	1955	Eligible under Criterion C
1193 North 2000 West, Clinton	1945	Not eligible
1197 North 2000 West, Clinton	1950	Eligible under Criterion C
1221 North 2000 West, Clinton	1925	Not eligible
1253 North 2000 West, Clinton	1955	Eligible under Criterion C
1277 North 2000 West, Clinton	1960	Not eligible
1289 North 2000 West, Clinton	1945	Not eligible
1318 North 2000 West, Clinton	1925	Eligible under Criterion C
1607 North 2000 West, Clinton	1925	Not eligible
1693 North 2000 West, Clinton	1945	Eligible under Criterion C
1969 North 2000 West, Clinton	1960	Eligible under Criterion C
1993 North 2000 West, Clinton	1955	Eligible under Criterion C
2019 North 2000 West, Clinton	1935	Not eligible
2047 North 2000 West, Clinton	1945	Not eligible
2056 North 2000 West, Clinton	1950	Not eligible
2084 North 2000 West, Clinton	1955	Not eligible
2118 North 2000 West, Clinton (garage only; out-of-period geodesic dome residence now on property; foundation evidence of former house)	1950	Not eligible
2133 North 2000 West, Clinton	1920	Eligible under Criterion C
2162 North 2000 West, Clinton	1955	Eligible under Criterion C
2184 North 2000 West, Clinton	1955	Eligible under Criterion C
2212 North 2000 West, Clinton	1960	Eligible under Criterion C
2273 North 2000 West, Clinton	1910	Not eligible
2282 North 2000 West, Clinton	1937	Eligible under Criterion C
1956 West 2300 North, Clinton	1950	Not eligible
1988 West 2300 North, Clinton	1935	Eligible under Criterion C
2342 North 2000 West, Clinton	1930	Eligible under Criterion C
2404 North 2000 West, Clinton	1955	Eligible under Criterion C
2422 North 2000 West, Clinton	1960	Eligible under Criterion C

Address[a]	Construction Date (Estimated)	National Register Eligibility
2466 North 2000 West, Clinton	1915	Not eligible
2541 North 2000 West, Clinton	1945	Eligible under Criterion C
2637 North 2000 West, Clinton	1920	Not eligible
2647 North 2000 West, Clinton	1925	Not eligible
3446 West 6000 South, Roy	1955	Not eligible
5986 South 2000 West, Roy	1945	Eligible under Criterion C
5975 South 3500 West, Roy	1955	Not eligible
5939 South 3500 West, Roy	1955	Eligible under Criterion C
5891 South 3500 West, Roy	1940	Not eligible
5867 South 3500 West, Roy	1960	Eligible under Criterion C
5859 South 3500 West, Roy	1955	Not eligible
5854 South 3500 West, Roy	1925	Not eligible
5844 South 3500 West, Roy	1945	Eligible under Criterion C
5839 South 3500 West, Roy	1955	Eligible under Criterion C
5823 South 3500 West, Roy	1955	Eligible under Criterion C
5809 South 3500 West, Roy	1950	Not eligible
5720 South 3500 West, Roy	1955	Eligible under Criterion C
5491 South 3500 West, Roy	1925	Not eligible
5373 South 3500 West, Roy	1925	Not eligible
5307 South 3500 West, Roy	1935	Not eligible
5190 South 3500 West, Roy	1935	Not eligible
4935 South 3500 West, Roy	1900	Not eligible
4905 South 3500 West, Roy	1935	Not eligible
4596 Midland Drive, West Haven	1920	Not eligible
4180 Midland Drive, West Haven	1925	Eligible under Criterion C
4148 Midland Drive, West Haven	1925	Eligible under Criterion C
3997 Midland Drive, West Haven	1939	Not eligible
3982 Midland Drive, West Haven	1960	Eligible under Criterion C
3966 Midland Drive, West Haven	1955	Not eligible
3964 Midland Drive, West Haven	1960	Eligible under Criterion C
3801 Midland Drive, West Haven	1955	Eligible under Criterion C
3713 Midland Drive, West Haven (outbuildings only)	1930	Eligible under Criterion C
3594 Midland Drive, West Haven	1950	Eligible under Criterion C
3575 Midland Drive, West Haven (outbuilding only)	1935	Eligible under Criterion C
3478 Midland Drive, West Haven	1960	Eligible under Criterion C
3315 Midland Drive, West Haven	1945	Not eligible
2008 West 3300 South, West Haven	1920	Eligible under Criterion C

See the archaeological and architectural resource surveys technical report (SWCA 2006) for a description of each property.

[a] A "?" in front of an address indicates an approximation.

3.14.4 Archaeological Sites

A total of four archaeological sites and segments of linear historic sites were identified within the impact analysis area along S.R. 108 (see Exhibit 3.14-5). These sites consist of the archaeological remains of a former residential complex, two historic ditch systems, and one historic railroad corridor. Of these sites, only one, the Denver & Rio Grande Western Railroad corridor, was determined to be eligible for the NRHP. The remaining three were determined to be ineligible. UDOT's and FHWA's determinations of eligibility were made in consultation with the Utah SHPO.

Exhibit 3.14-5: Archaeological Resources along S.R. 108

Site Number	Site Name (if applicable)	Site Type	National Register Eligibility
42Dv118	NA	Historic residential complex	Not eligible
42Wb345	NA	Historic ditch	Not eligible
42Wb346	NA	Historic ditch	Not eligible
42Wb352	Denver & Rio Grande Western Railroad	Historic railroad	Eligible under Criterion A

3.14.4.1 Traditional Cultural Properties

No traditional cultural properties were identified within the impact analysis area through either field inspections or consultation with Native American tribes or other groups.

3.14.4.2 Paleontological Resources

No known paleontological resources are present within the impact analysis area. Consultation with UGS confirmed that no fossil localities have been previously documented in or near the S.R. 108 project corridor and that the overall potential for such resources is low because of the area's geology. However, exposures of Lake Bonneville deposits could be present in the area, and these deposits have been known to yield significant vertebrate fossils elsewhere along the Wasatch Front.

3.15 Hazardous Waste Sites

This section discusses the known and potential hazardous waste sites in the hazardous waste impact analysis area. In addition, this section discusses the process used to evaluate the sites that have the greatest potential to affect or be affected by construction. The hazardous waste impact analysis area is the area within one-half mile on each side of the existing S.R. 108 centerline.

3.15.1 Potentially Hazardous Sites

Environmental Data Resources, Inc. (EDR) conducted a survey of 40 environmental databases for sites with known contamination and sites that are regulated according to state or federal laws. This search identified potential hazardous waste sites in the impact analysis area.

Sites identified through the EDR database search were supplemented with a review of the Utah Division of Environmental Response and Remediation (DERR) interactive map viewer on August 17, 2006. DERR also maintains information on several of the types of sites listed in Exhibit 3.15-1 below. Exhibit 3.15-1 shows the number of potentially hazardous waste sites in the impact analysis area that were identified by the database search and the review of the interactive map. A site can be listed in multiple databases.

Exhibit 3.15-1: Number of Potentially Hazardous Sites in the Hazardous Waste Impact Analysis Area

Database[a]	Sites[b]
Facility Index System (FINDS)	4
Leaking Underground Storage Tanks (LUST)	4
Underground Storage Tanks (UST)	7
Aboveground Storage Tanks (AST)	3

Source: EDR 2006

[a] The following databases were searched, but no sites were found:

- Comprehensive Environmental Response, Compensation, and Liability Information System – No Further Remedial Action Planned (CERCLIS-NFRAP)
- Resource Conservation and Recovery Information System – Large-Quantity Generators (RCRIS-LQG)
- SPILLS
- Voluntary Cleanup Program (VCP)
- DRYCLEANERS
- National Pollution Discharge Elimination System (NPDES)

[b] A site can be listed in multiple databases.

3.15.2 Site Screening

Hazardous waste–related incidents and facilities were screened to identify sites that are more likely to contain contaminated soil or groundwater and those located closer to the proposed project. The screening process identified the sites that have a reasonable chance of affecting or being affected by the proposed project. Site screening focuses on the types of sites that were identified in the EDR database search and found during the review of the DERR interactive map. The screening process entails:

- Identifying the type of site or event and its current status
- Comparing the site's location to the proposed project

3.15.2.1 Identify the Type of Site or Event and Its Current Status

The first step in evaluating sites of concern was to categorize the types of sites identified in the impact analysis area by the relative likelihood of finding contamination. Sites were categorized as having a high, moderate, or low probability of environmental degradation.

High Probability of Environmental Degradation. The following sites in the impact analysis area have a relatively high probability of environmental degradation:

- Open LUST sites

Open LUST sites have had known releases of hazardous chemicals. Open LUST sites are evaluated and monitored by DERR. The amount of hazardous chemical release and the potential threat to human health and the environment dictate the degree of cleanup required.

Moderate Probability of Environmental Degradation. The following sites in the impact analysis area have a moderate probability of environmental degradation:

- Closed LUST sites
- Active UST sites

Closed LUST sites can have residual contamination, or contamination might have been left in place if it did not pose a threat to human health or the environment. Active UST sites are also regulated by DERR but typically have not been thoroughly investigated for chemical releases.

Low Probability of Environmental Degradation. The following sites in the impact analysis area have a low probability of environmental degradation:

- Removed and closed USTs
- AST sites
- FINDS sites

Removed or closed USTs typically indicate a site that has been remediated or that did not require remediation at the time of UST removal or in-place closure. Due to increased visibility, evidence of a leaking AST is more easily detected compared to LUST sites. A large-quantity release at a FINDS site would show up in a separate database, most likely the Resource Conservation and Recovery Information System (RCRIS), Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), or other databases with more information.

3.15.2.2 Compare the Site's Location to the Proposed Project

The second step in evaluating sites of concern was to evaluate each site's location relative to the S.R. 108 alternatives. The inferred direction of groundwater flow (west) was also a consideration.

3.15.3 Sites of Greatest Concern

In general, the sites of greatest concern are sites with a moderate-to-high probability of environmental degradation that are within or near the right-of-way for an S.R. 108 alternative or are hydraulically up-gradient of an alternative. Sites of low concern are sites with a low-to-moderate probability of environmental degradation that are within about 1,000 feet of an alternative.

Two types of sites were eliminated from detailed evaluation: (1) sites with a low-to-moderate probability of contamination that are more than about 1,000 feet from the alternatives and (2) sites with a high probability of contamination that are within one-half mile of the alternatives but are hydraulically down-gradient from the alternatives.

The sites of greatest concern in the hazardous waste impact analysis area, based on a preliminary screening of site types and location, are listed in Exhibit 3.15-2 below and shown in Exhibit 3.15-3 below.

What is a hydraulic gradient?

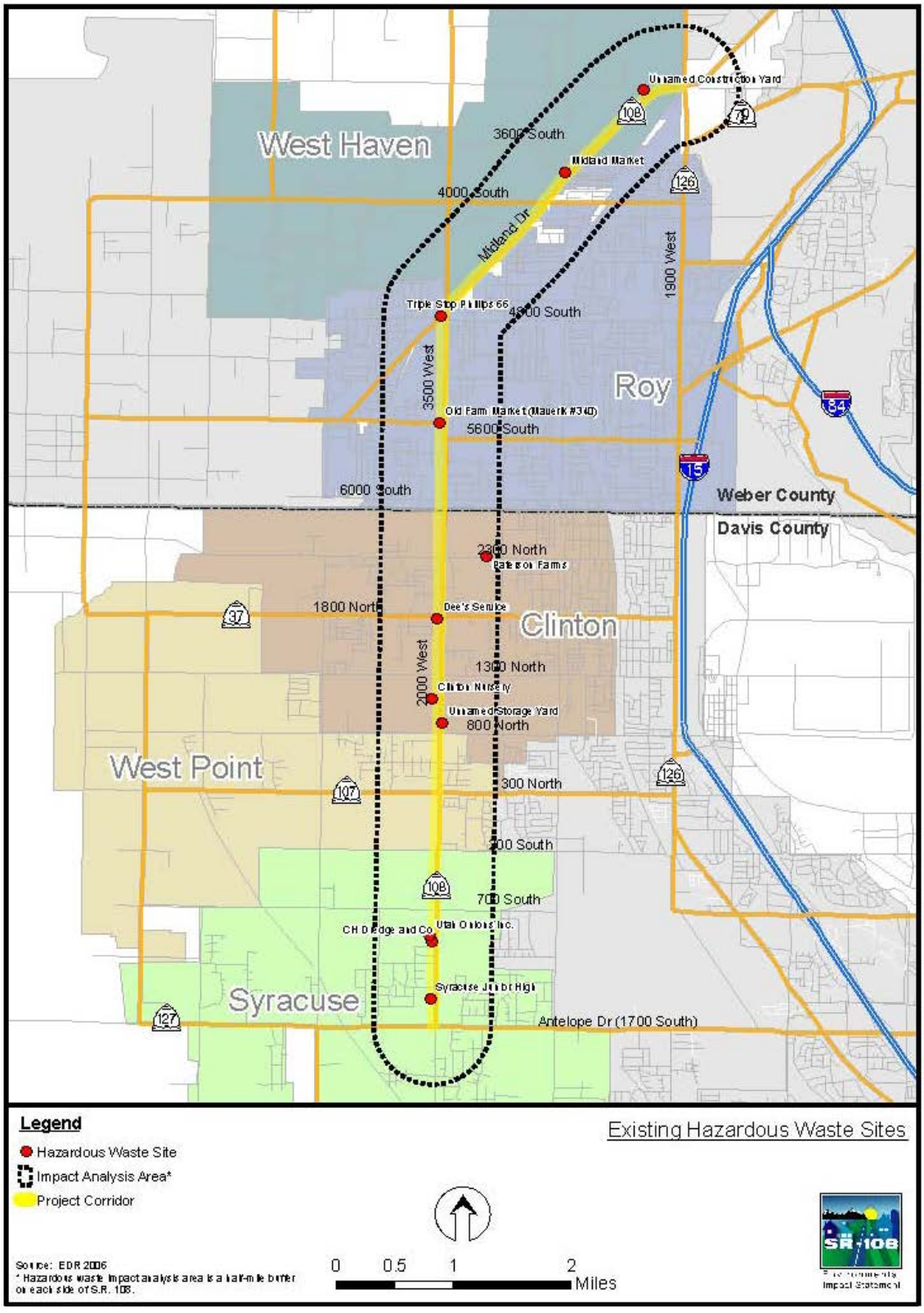
A *hydraulic gradient* is the slope of the water table or aquifer. The hydraulic gradient influences the direction and rate of groundwater flow. If an alternative is down-gradient from a hazardous waste site, then groundwater likely flows from the site in the direction of the alternative.

Exhibit 3.15-2: Potential Hazardous Waste Sites of Greatest Concern within One-Half Mile of S.R. 108

Site Name (Current Name, If Different)	Probability of Environmental Degradation	Location	Database/Site Description
Patterson Farms	Moderate	1613 West 2300 North, Clinton	LUST site closed in 1997, UST 2 of 2 tanks closed.
Old Farm Market (Maverik #340)	Low	5511 South 3500 West, Roy	FINDS, UST in operation.
Syracuse Junior High School	Low	1450 South 2000 West, Syracuse	FINDS.
Triple Stop Phillips 66	High	4795 South 3500 West, Roy	LUST currently monitored, UST in operation.
Dee's Service	Moderate	1793 North 2000 West, Clinton	LUST closed in 2002, UST 6 of 6 tanks closed, FINDS.
CH Dredge & Co. Inc (SCI)	Moderate	918 South 2000 West, Syracuse	LUST closed in 1996, UST 5 of 5 tanks closed, AST.
Utah Onions Inc.	Moderate	850 South 2000 West, Syracuse	UST 1 of 1 tank closed, FINDS.
Midland Market (Sinclair Gas)	Moderate	3805 S. Midland Drive, West Haven	UST 0 of 3 tanks closed.
Unnamed storage yard	Moderate	868 North 2000 West, Clinton	Farm storage yard with chemical storage tanks.
Unnamed construction yard	Moderate	2117 West 3300 South, Ogden	Construction company yard with AST.
Clinton Nursery	Moderate	1071 North 2000 West, Clinton	Gas AST identified during field survey.

Source: EDR 2006

Exhibit 3.15-3: Existing Hazardous Waste Sites



3.16 Visual Resources

The aesthetic quality of a community depends on its visual resources—the physical features that make up the visible landscape, including land, water, vegetation, and human-made features such as buildings and roads. This analysis considers the visual resources that are present along S.R. 108. The impact analysis area for visual resources includes the area between Antelope Drive (S.R. 127) in Syracuse and 1900 West (S.R. 126) in West Haven, a distance of about 9.5 miles.

What is the viewshed?

The *viewshed* is defined as all areas from which physical changes associated with the proposed alternatives could be seen.

The visual impact analysis area for the S.R. 108 visual resources analysis includes S.R. 108 and its viewshed. The viewshed is influenced by existing topography, vegetation, and structures and diminishes with hilly topography and tall vegetation or structures.

The following sections provide a summary of the existing visual impact analysis area environment in terms of its visual resources (land form, land cover, and human-made elements). This summary is addressed from both the roadway user and viewer perspectives.

3.16.1 Geographic Setting of the Visual Impact Analysis Area

The visual impact analysis area lies within northern Utah's Great Salt Lake Basin along the eastern edge of the Basin and Range topographic region, which is characterized by a series of north-south-trending, linear, fault-block mountain ranges. To the east, the Wasatch Range extends in a north-south direction and consists of uplifted, fault-block mountains that form the western edge of the Rocky Mountains and the dramatic, abrupt, wall-like Wasatch Front that rises over 6,000 feet above the eastern edge of the valley floor. The Great Salt Lake, a remnant of ancient Lake Bonneville which at one time occupied much of Utah's Great Basin, lies about 3 miles to the west of S.R. 108 along with the Oquirrh Mountains, another north-south mountain range that stops at the south shore of the Great Salt Lake.

The visual impact analysis area is located in Davis and Weber Counties within the jurisdictions of Syracuse, West Point, Clinton, Roy, and West Haven. As shown in Photo 3.16-1 and Photo 3.16-2 below, the project area is largely urbanized. The primary land uses

are residential and commercial, although some agricultural areas still exist. Most of these agricultural areas are planned for development in the cities' land use plans (see Section 3.1, Land Use).

Photo 3.16-1. S.R. 108 and 4800 South Intersection Looking South

Photo 3.16-2. S.R. 108 in Clinton Looking North

3.16.2 Background Views

Background views from S.R. 108 include the Wasatch Mountain Range to the east and distant views of the Great Salt Lake and Oquirrh Mountains to the west. Long-range views of the Wasatch Range include Mount Ogden, Thurston Peak, and Ogden Canyon to the east and Willard Peak to the northeast.

3.16.3 Foreground and Middle-Ground Views

The foreground and middle-ground views in all directions generally include urban and suburban development, although the northern end of the S.R. 108 project has a more rural feel than elsewhere along S.R. 108. The foreground views in all directions for the visual impact analysis area are generally those of an urban environment, but there are some agricultural parcels along S.R. 108 as well. Most of the 9.5-mile corridor is bordered by residential areas that range from large-lot, single-family residences to high-density manufactured-home communities. In fact, most middle-ground views are blocked by the houses that line S.R. 108 and the housing developments just off S.R. 108.

Vegetation along S.R. 108 is what one would expect to see in an urban and suburban environment. Landscaping typical of a residential environment is common. Some of the agricultural parcels are still being farmed, but many are idle. Pasture lands in the northern end of the S.R. 108 project are primarily flat, heavily disturbed saline playa cow pasture. These pastures have been heavily grazed.

Additional foreground views include a utility corridor, schools, and commercial retail developments including “big-box” stores such as Wal-Mart. Commercial and residential construction is occurring in several places along S.R. 108 resulting in typical construction views: cleared and graded parcels, construction equipment, construction fencing, and infrastructure materials such as water and sewer pipes. In some locations, new roadway infrastructure including curb, gutter, sidewalk, street lamps, and landscaping is visible (see Photo 3.16-3 and Photo 3.16-4 below).

Photo 3.16-3. S.R. 108 Just South of S.R. 127 (Antelope Drive) at the Southern Project Terminus Looking North

Photo 3.16-4. S.R. 108 in Syracuse near Syracuse Elementary School and Syracuse Junior High School Looking North

Chapter 4: Environmental Consequences

This chapter addresses the expected beneficial and adverse social, economic, and environmental impacts of the proposed S.R. 108 project alternatives. Impacts on resources and the measures to mitigate the impacts are presented in this chapter by alternative. If no mitigation measures are listed for a resource in this chapter, then none were required.

4.1 Land Use Impacts

This section describes the expected impacts to existing and future land use for each of the project alternatives. The discussion focuses on general land uses along the corridor (residential and nonresidential) rather than uses associated with specific zoning districts or land use designations. Because each city has its own designations for parcels in the land use impact analysis area, it is more meaningful to look at overall patterns of land use.

What is the land use impact analysis area?

The land use impact analysis area is the area within one-half mile of S.R. 108.

The cities' general plans address both the current land uses in the land use impact analysis area and the expected future land uses. To determine the impacts to land use, the cities' land use maps were converted into a single electronic map using geographic information systems (GIS) software. This map is shown in Exhibit 3.1-2, Land Use. The action alternatives were then overlaid onto the land use map to calculate the specific acreage of impacts.

4.1.1 No-Action Alternative

Under the No-Action Alternative, no improvements to S.R. 108 would be made except for routine maintenance.

4.1.1.1 Impacts on Existing Land Use

Representatives of the jurisdictions in the land use impact analysis area believe that the current types of land use and rates of development will continue with or without improvements to S.R. 108 (Anderson and Davis 2006; S. Anderson 2006a; Larson 2006a; Vinzant 2006; Worthen 2006). The cities along S.R. 108 expect full build-out within their current boundaries between 2020 and 2035.

What is build-out?

Build-out means that there is no more land available for development because any undeveloped land is already being used for its intended use of open space, agriculture, or other defined uses. However, build-out rarely means the end of development in a city, because parcels of land can be redeveloped and a city can add to its existing land base by annexing adjacent parcels.

The basis for assuming that the area will develop to full build-out with or without the S.R. 108 project is the following past and expected future trends:

- **Past Trends.** Over the past 3 years, the land adjacent to S.R. 108 has gone through rapid development with two new Wal-Mart stores and a major shopping center being constructed along with a new high school. In addition, representatives from the cities noted that some of the remaining undeveloped land is being sold to developers and platted.
- **Future Trends.** As shown in Exhibit 1.4-1: 2002 and 2035 Population, Households, and Employment, population growth rates in the next 30 years for the five cities would be between 18% and 376%, and employment growth would be between 43% and 264%. Given the small amount of available land, it is expected that the area would develop even without roadway improvements such as the proposed improvements to S.R. 108.

Given these trends, the No-Action Alternative would not affect the existing and anticipated land uses in the cities along S.R. 108.

4.1.1.2 Consistency with Plans and Policies

The general plans of Syracuse, Clinton, and West Haven identify the widening of S.R. 108 as an important future development. If S.R. 108 is not widened, the roadway would not be consistent with these general plans. West Point and Roy do not specify a width for S.R. 108 in their general plans. However, discussions with their planning staff indicate that both cities anticipate a wider road.

What is a general plan?

State law requires each city to prepare and adopt a comprehensive, long-range general plan. These plans are intended to identify the present and future land use needs of each city and to outline desired growth and development patterns.

General plans are typically accompanied by a land use or zoning ordinance, which details development standards—such as allowable building heights and required setbacks—and includes maps that show the desired development patterns.

4.1.2 Minimize 4(f) Impacts Alternative

4.1.2.1 Impacts on Existing Land Use

As noted in Section 4.1.1, No-Action Alternative, the current types of land use and rates of development in the land use impact analysis area are expected to continue with or without improvements to S.R. 108. As shown in Exhibit 4.1-1 below, the Minimize 4(f) Impacts Alternative would require a maximum of about 34 acres of new right-of-way at various points along the alignment. The additional right-of-way would extend the existing right-of-way so that it accommodates a 110-foot-wide roadway while minimizing

impacts to 4(f) properties. Converting these areas to transportation use would not affect the current patterns of residential, commercial, and public/government land use in the land use impact analysis area. However, acquiring the right-of-way needed for this alternative would affect individual landowners and businesses through partial takes or total relocation. See Section 4.3.2.6, Relocations, for a detailed discussion of relocation impacts.

Exhibit 4.1-1: Right-of-Way Impacts from the Action Alternatives

Alternative	Total Number of Properties Affected	Total Acres Affected[a]	Relocations[b]		Strip Takes		Potential Relocations[b]	
			Number	Acres	Number	Acres	Number	Acres
Minimize 4(f) Impacts	354	34	61	7.9	246	22.2	47	3.5
West	330	38	108	12.0	167	20.6	57	5.8

[a] Amount of land required for new right-of-way only. Acres of impacts are estimates only based on preliminary design.

[b] Includes residential and commercial relocations.

Most undeveloped parcels of land along S.R. 108 are planned for commercial or residential development. Development of these properties is expected to occur with or without improvements to S.R. 108, as discussed in Section 4.1.1.1, Impacts on Existing Land Use. Given these trends, the Minimize 4(f) Impacts Alternative itself would not cause further development along the corridor or in the region. In addition, based on discussions with city representatives, the Minimize 4(f) Impacts Alternative is not expected to cause regional growth and development beyond that already planned by the cities and counties in the land use impact analysis area. However, it is possible that an improved S.R. 108 could advance the timing of some developments along S.R. 108.

4.1.2.2 Consistency with Plans and Policies

The improvements proposed as part of the Minimize 4(f) Impacts Alternative are consistent with the future land use and transportation planning goals of all of the cities along S.R. 108. Exhibit 4.1-2 below summarizes the permanent land use impacts in the land use impacts analysis area by type of use.

Exhibit 4.1-2: Permanent Land Use Impacts from the Minimize 4(f) Impacts Alternative

Land Use Type	Percent of Land Use Type Affected[a]
Residential	0.9%
Commercial/industrial	2.5%
Mixed use	2.8%
Public/government land[b]	1.3%

[a] Because the jurisdictions do not all use the same type of mapping methodology, these percentages are an estimate only. For example, some jurisdictions apply land use designations to large expanses of land, including roads, while others apply designations to parcels only and do not include roads.

[b] Includes government land/facilities, quasi-government land/facilities, publicly owned spaces, open space, and private churches. These data do not summarize impacts to Section 4(f) properties.

As shown in Exhibit 4.1-2 above, the Minimize 4(f) Impacts Alternative would not directly affect a substantial amount of any particular land use classification in the impact analysis area. Most impacts would be in the form of strip takes along property frontages and would not affect the overall function of business, industrial, or government-owned/public properties. When considered in conjunction with information provided by the cities' planning and development professionals, this information indicates that the Minimize 4(f) Impacts Alternative would not affect future regional development patterns. However, it is possible that an improved S.R. 108 could advance the timing of some developments along S.R. 108.

An improved roadway is likely to better accommodate and serve anticipated development. The cities of Syracuse, Clinton, and West Haven make this connection in their general plans by specifying a desired future road width for S.R. 108. The Syracuse general plan identifies S.R. 108 as a 110-foot-wide major arterial, while Clinton's general plan calls for a five-lane roadway and the West Haven plan shows a 100-foot to 110-foot roadway. The 110-foot, five-lane roadway proposed as part of this alternative is consistent with those plans. The general plans of West Point and Roy do not specifically discuss the width or configuration of S.R. 108.

The Minimize 4(f) Impacts Alternative is consistent with the plans and polices of cities along S.R. 108.

4.1.3 West Alternative

4.1.3.1 Impacts on Existing Land Use

Exhibit 4.1-1: Right-of-Way Impacts from the Action Alternatives above summarizes the right-of-way needed for construction of the West Alternative. This alternative would require a maximum of about 38 acres of new right-of-way to extend the existing corridor to the west so that it accommodates the proposed 110-foot-wide roadway. As shown in Exhibit 4.1-1, the West Alternative would require more relocations and would affect a greater total area than the Minimize 4(f) Impacts Alternative would, though the total number of properties affected under the West Alternative would be slightly lower. As with the Minimize 4(f) Impacts Alternative, converting these areas to transportation use would not affect the current patterns of residential, commercial, and public/government land use in the impact analysis area.

Most undeveloped parcels of land along S.R. 108 are identified by the different cities for commercial or residential development. Development of these properties is expected to occur with or without improvements to S.R. 108. As with the Minimize 4(f) Impacts Alternative, the West Alternative is not expected to alter the anticipated development in the region.

What is mixed use?

The term *mixed use* is used to describe development that supports more than one type of use in a building or set of buildings. As areas become more urbanized, planners often consider building a mix of residential, commercial, institutional, and other uses in a single area to increase convenience and access.

For example, a developer might include a shopping center and park within the boundaries of a small housing development or might include housing units on the second floor above operating businesses.

4.1.3.2 Consistency with Plans and Policies

The improvements proposed as part of the West Alternative are consistent with the future land use and transportation planning goals of all of the cities along S.R. 108. Exhibit 4.1-3 below summarizes the permanent land use impacts in the land use impacts analysis area by type of use. As with the Minimize 4(f) Impacts Alternative, the land use impacts from the West Alternative would be minor. The West Alternative would affect slightly less residential and government land than the Minimize 4(f) Impacts Alternative would, but would affect more commercial/industrial and mixed-use land.

Exhibit 4.1-3: Permanent Land Use Impacts from the West Alternative

Land Use Type	Percent of Land Use Type Affected[a]
Residential	0.8%
Commercial/industrial	2.7%
Mixed use	2.9%
Public/government land[b]	0.8%

[a] Because the jurisdictions do not all use the same type of mapping methodology, these percentages are an estimate only. For example, some jurisdictions apply land use designations to large expanses of land, including roads, while others apply designations to parcels only and do not include roads.

[b] Includes government land/facilities, quasi-government land/facilities, publicly owned spaces, open space, and private churches. These data do not summarize impacts to Section 4(f) properties.

Under the West Alternative, most impacts to commercial and industrial land would be in the form of strip takes along property frontages and would not affect the overall function of business or industrial properties. When considered in conjunction with information provided by the cities' planning and development professionals, this information indicates that the West Alternative would not affect future development patterns.

Widening of the roadway on the west side only is consistent with the cities' plans and is not expected to affect future development patterns. As with the Minimize 4(f) Impacts Alternative, an improved roadway will better accommodate and serve planned development.

4.2 Farmland Impacts

This section addresses the impacts from the S.R. 108 alternatives on farmland trends, crops, and APAs. Farmland impacts were evaluated using information from several sources including field surveys along the project alternatives, information obtained from Utah Division of Water Resources water inventory mapping, reviews of project aerial maps, and parcel information (zoning classifications and acreage) obtained from the assessor's offices of Davis and Weber Counties.

As discussed in Section 3.2.2.1, Farmland Protection Policy Act, no analysis of prime, unique, or statewide or locally important farmland is required for the S.R. 108 project under the Farmland Protection Policy Act. However, an analysis of general cropland was completed.

The S.R. 108 action alternatives would directly affect cropland as well as farmland that is under APA status. Some farmland is within the proposed right-of-way and would be directly taken out of production (direct impacts). No farmland outside the right-of-way would be affected (indirect impacts). Indirect impacts from a project typically occur when farmland outside the right-of-way is no longer farmable due to small parcel size or lack of access. Indirect impacts can also occur if the farmland is developed at a faster rate as a result of the improved road. However, all farmland in the impact analysis area is expected to be developed by the end of the study period, even under the No-Action Alternative, due to the rapid development occurring in the area.

Acquiring farmland for roadway use is not considered a farm displacement unless the amount of farmland remaining is not enough to farm. UDOT and the landowner would determine the viability of each farming operation on a case-by-case basis.

What is the farmland impact analysis area?

The farmland impact analysis area is the area within one-half mile of S.R. 108.

What is the Farmland Protection Policy Act?

The Farmland Protection Policy Act was enacted to "minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses." All of the farmland in the S.R. 108 farmland impact analysis area is exempt from the Farmland Protection Policy Act.

4.2.1 No-Action Alternative

Under the No-Action Alternative, S.R. 108 would not be widened, so no direct impacts to farmland would occur as a result of the project. In addition, the No-Action Alternative would not cause any indirect impacts to farmland, although continued urban development in the impact analysis area would continue to convert existing farmland into residential and commercial uses. As discussed in Section 3.1, Land Use, city officials from the cities along S.R. 108 expect all of

the remaining farmland along S.R. 108 to be developed in the next 25 years.

4.2.2 Minimize 4(f) Impacts Alternative

The Minimize 4(f) Impacts Alternative would directly affect about 26.1 acres of irrigated cropland and a negligible amount (about 0.13 acre) of non-irrigated cropland. The impacts to cropland or farmland are shown in Exhibit 4.2-1.

Exhibit 4.2-1: Impacts to Cropland and Farmland

Shown in acres

Crop	Minimize 4(f) Impacts Alternative	West Alternative
Irrigated Crops or Farmland		
Pasture	15.4	16.0
Alfalfa	4.9	5.2
Grain	0.9	1.1
Corn	2.0	2.1
Onions	2.9	3.3
Grass hay	0	0.2
Other vegetables	0	0
Pasture, sub-irrigated	0	0
Grass/turf	0	0
Total irrigated	**26.1**	**27.9**
Non-irrigated Crops or Farmland		
Dry idle	0	0
Idle	0	0
Fallow	0.6	0.7
Dry pasture	0.7	0.7
Total non-irrigated	**0.13**	**0.14**

Locally important farmland in the impact analysis area includes one farm that has been operated continuously by the same family for over 100 years and is recognized as a Century Farm by the Century Farm and Ranch program administered by the Utah Department of Agriculture. The Minimize 4(f) Impacts Alternative would not affect the Century Farm.

As shown in Exhibit 4.2-2 and Exhibit 4.2-3 below, four individual APA parcels would be affected by the Minimize 4(f) Impacts Alternative. The combined affected acreage in the four APA parcels is about 3 acres. Three of the four parcels are owned by the Church of Jesus Christ of Latter-day Saints (LDS Church), and the fourth parcel was owned by the LDS Church but was recently sold to a developer.

What are Agriculture Protection Areas?

Agriculture Protection Areas (APAs) are geographic areas where agricultural activities are given special protections. APAs cannot be condemned for highway purposes unless certain conditions are met.

Exhibit 4.2-2: Impacts to Agriculture Protection Areas

Shown in acres

Agriculture Protection Area by Parcel ID	Minimize 4(f) Impacts Alternative	West Alternative	Location[a]
12-033-0054	1.5	1.5	269 North 2000 West, West Point
12-033-0037	0.06	0.07	Between 200 South and 300 North on the west side of S.R. 108, West Point
14-062-0007	0.1	0	Between 800 North and 1300 North on the east side of S.R. 108, Clinton
14-062-0018	1.3	0	Between 800 North and 1300 North on the east side of S.R. 108, Clinton
Total	**2.96**	**1.6**	

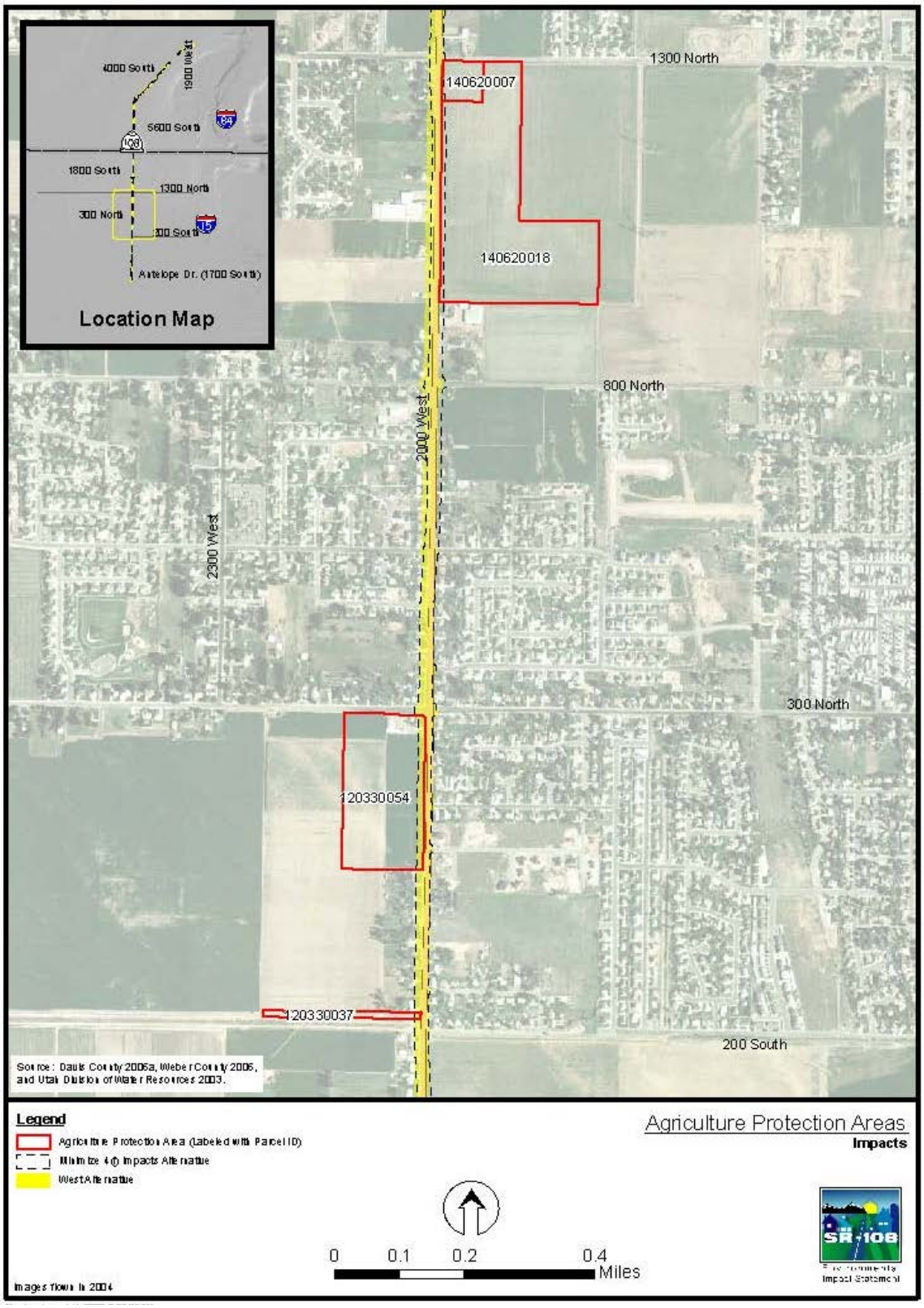
Sources: Utah Division of Water Resources 2003; Davis County 2006a; Weber County 2006

[a] Exact property addresses were not available for most parcels.

Although APAs are not completely protected from development, they are given special protections. The APA status of these parcels would need to be removed in order for the Minimize 4(f) Impacts Alternative to be built.

In response to previous UDOT projects that would affect APA parcels owned by the LDS Church, the church has stated that it expects the APA parcels to be developed eventually to accommodate growth in the area (see Appendix C, Pertinent Correspondence). Therefore, it is possible that the LDS Church might consider removing the APA status of the three church-owned parcels.

Exhibit 4.2-3: Agriculture Protection Areas – Impacts



Since a development company recently bought one APA parcel, it likely plans to develop it in the near future, and therefore the APA status will probably be removed. Additionally, because the amount of acreage required from these four APA parcels is relatively small, the owners might be willing to remove the APA status for the portion of land that is required to accommodate the roadway right-of-way. Removing the APA status would not be necessary until the right-of-way acquisition phase of the project, which occurs shortly before construction.

Lastly, if the owners of these parcels do not remove the APA status, the project could still be built using a provision in Utah state law that allows UDOT to condemn land for a highway purpose. According to Utah Code Section 17-41-405, Eminent Domain Restrictions:

> If the condemnation is for highway purposes or for the disposal of solid or liquid waste materials, the applicable legislative body and the advisory board may approve the condemnation only if there is no reasonable and prudent alternative to the use of the land within the Agriculture Protection Area for the project.

In other words, an APA parcel cannot be used for a highway purpose if there is a reasonable and prudent alternative to using the APA. However, all reasonable and prudent alternatives that are being considered for this project would affect these APAs or other APAs along S.R. 108.

Can land that is part of an APA be used for roadway purposes?

Although APAs are not completely protected from development, they are given special protections. The APA status of four parcels along S.R. 108 would need to be removed in order for the S.R. 108 project to be built.

In addition, if the owners of these parcels do not remove the APA status, the project could still be built using a provision in Utah state law that allows UDOT to condemn land for a highway purpose if there is no reasonable and prudent alternative to the use of the land within the APA for the project.

4.2.3 West Alternative

The West Alternative would affect about 27.9 acres of irrigated cropland and a negligible amount (about 0.14 acre) of non-irrigated cropland. The impacts to cropland or farmland are shown above in Exhibit 4.2-1: Impacts to Cropland and Farmland.

The West Alternative would not affect the Century Farm.

As shown above in Exhibit 4.2-2: Impacts to Agriculture Protection Areas, two individual APA parcels would be affected by the West Alternative. The combined affected acreage in the two APA parcels would be about 1.6 acres. One of the parcels is owned by the LDS Church, and the other parcel was owned by the LDS Church but was recently sold to a developer. Impacts to APA parcels are described in Section 4.2.2, Minimize 4(f) Impacts Alternative.

4.2.4 Mitigation Measures for Impacts to Farmland

UDOT will work with each farm owner on a case-by-case basis to determine the farm's eligibility for benefits under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and other state and federal guidelines. Generally, UDOT will provide compensation for the expense of re-establishing farm enterprises and for fair market value of the buildings and land.

4.3 Community Impact Assessment

This section describes the expected impacts to the S.R. 108 social environment and the communities along S.R. 108. The social environment is analyzed in terms of the following elements:

- Neighborhood and community cohesion
- Quality of life
- Recreation resources
- Community facilities
- Public health and safety
- Relocations
- Public services and utilities

Impacts to neighborhood and community cohesion and quality of life were determined using a qualitative approach. Specifically, the analysis considers how the project would affect the physical and social conditions that define the neighborhoods and communities along S.R. 108.

Impacts related to recreation resources, community facilities, and utilities were determined using a quantitative approach. The alternatives were evaluated to determine how they would directly affect properties that support recreation areas, community facilities, or utilities.

Impacts to public health and safety were determined by examining how the proposed roadway modifications would affect emergency response and the safety of pedestrians in the area. For the most part, health and safety impacts were analyzed qualitatively because limited amounts of data were available on emergency response and pedestrian safety.

What is the social environment impact analysis area?

The social impact analysis area includes parts of the cities of Syracuse, West Point, and Clinton in Davis County and Roy and West Haven in Weber County. The social impact analysis area focuses mainly on neighborhoods within one-half mile of the roadway centerline along the 9.5-mile S.R. 108 project corridor.

What are quantitative and qualitative analyses?

A *quantitative* analysis is one that produces specific numeric results, such as a reduction in vehicle-miles traveled or the exact number of properties that would require relocations.

A *qualitative* analysis looks at impacts in more general and comparative terms. For this EIS, qualitative analyses were performed when numeric data were not available.

Finally, relocation impacts were determined using a quantitative approach in much the same way as land use impacts. The alternatives were compared to existing property boundaries to determine the properties that would be subject to relocations, potential relocations, or strip takes. (For definitions of these terms, see Section 4.3.2.6, Relocations.)

4.3.1 No-Action Alternative

Under the No-Action Alternative, the social environment would continue to be affected by ongoing change and growth in the region. The area would probably remain cohesive without the proposed improvements to S.R. 108 because of the strong attachments within and between the existing communities. The availability of recreation resources, community facilities, housing, and public services would not change. Increases in services, such as the construction of new recreation or medical facilities, would be consistent with the cities' adopted plans and the anticipated growth in the region.

The No-Action Alternative would not require acquisition of right-of-way, so no residences or businesses would be subject to relocation. However, development would likely continue along the corridor with or without the S.R. 108 project, and residential properties would likely continue to be converted to commercial uses. Additionally, existing traffic, congestion, and associated roadway accessibility and mobility problems would continue to be a concern for residents in the area. These issues could adversely affect how residents feel about their safety and quality of life.

4.3.2 Minimize 4(f) Impacts Alternative

4.3.2.1 Neighborhood and Community Cohesion

Overall, the Minimize 4(f) Impacts Alternative would have no substantial direct or indirect effects on neighborhood and community cohesion.

As described in Section 3.3.2.2, Community Facilities and Groups, S.R. 108 is a barrier to interaction within and between communities along S.R. 108. Traffic and congestion affect how people move in and through their communities and therefore how they interact. In spite of this, residents still feel a strong attachment to their

neighborhoods and communities and find the social environment to be cohesive.

The Minimize 4(f) Impacts Alternative would address many of the current problems associated with traffic and congestion. Having four through-traffic lanes for the entire length of the project would ease congestion and improve overall mobility in the region. Access control through the use of raised medians and dedicated turn lanes would also contribute to better mobility. Improved pedestrian access should reduce perceived effects on cohesion that residents might associate with an expanded roadway. These roadway improvements could lead to increased neighborhood and community interaction and, therefore, improved cohesiveness.

Overall, it is unlikely that the proposed roadway improvements would affect other aspects of neighborhood and community cohesion such as the length of residency, the presence of families, or community leadership and activism in the cities along S.R. 108. The Minimize 4(f) Impacts Alternative could positively contribute to quality of life if families find the communities easier to navigate and want to stay in the area for many years. See Section 4.3.2.2, Quality of Life, for more discussion about quality of life in the impact analysis area.

About 55 residences would be subject to relocation along S.R. 108, while about 38 additional residences would potentially require relocation. This could affect local, or neighborhood, cohesion by altering both formal relationships, such as neighborhood associations, and informal relationships, such as friendships. However, because there is plenty of housing available in the communities for the relocated residents, the anticipated relocations are not expected to have long-term effects on local cohesiveness.

4.3.2.2 Quality of Life

The Minimize 4(f) Impacts Alternative would have no substantial direct or indirect effects on quality of life.

Quality of life in the impact analysis area is defined by how residents feel about safety, the accessibility of community resources such as shopping centers, the availability of community services such as city services, and the general living environment. As noted in Section 3.3, Social Environment, residents feel that their neighborhoods and communities are cohesive and generally safe. However, residents have concerns about roadway safety, how traffic and congestion affect their ability to move around and through the communities, and the effects of residential and commercial growth. These factors all affect quality of life.

According to the results of the Community Profile Survey (HDR 2006b), 60% of respondents do not feel safe while driving on S.R. 108. As described in Section 1.4.4, Safety on and Roadway Condition of S.R. 108, safety problems on S.R. 108 are a result of narrow shoulders, narrow setbacks, access conflicts, and skewed intersections. The Minimize 4(f) Impacts Alternative would address many of the residents' traffic safety concerns by providing dedicated turn lanes and by preventing vehicles from making left turns across traffic onto S.R. 108 in certain locations. Having four through-traffic lanes along the entire corridor would ease congestion, which could contribute to improved traffic safety. Pedestrian and bicycle safety would also be enhanced by dedicated bicycle lanes and sidewalks. See Section 4.8, Impacts to Pedestrian and Bicycle Resources, for more discussion of pedestrian and bicycle facilities.

The Minimize 4(f) Impacts Alternative would not affect residential and commercial growth. According to city planners, the cities are expected to continue growing with or without the proposed improvements to S.R. 108 (Anderson and Davis 2006; Vinzant 2006; Worthen 2006). Roadway improvements could affect the rate at which new development occurs during the study period, but the improvements would not affect the types and amounts of growth that are already anticipated.

4.3.2.3 Recreation Resources

The Minimize 4(f) Impacts Alternative would have no direct or indirect effects on any recreation resources.

As shown in Exhibit 3.3-1, Parks in the Social Impact Analysis Area, there are eight recreation resources in the impact analysis area. Two of these resources, Centennial Park and Founders Park, are accessed from S.R. 108 by secondary roads (the parks are not immediately adjacent to S.R. 108). The Minimize 4(f) Impacts Alternative is designed to avoid impacts to these resources. Construction would not require any right-of-way from either of the two parks.

The remaining six recreation resources within one-half mile of S.R. 108 do not front S.R. 108 or require access from the roadway. The Minimize 4(f) Impacts Alternative could have positive indirect effects by improving general access to these resources.

4.3.2.4 Community Facilities

The Minimize 4(f) Impacts Alternative would have no substantial direct or indirect effects on any community facilities.

As shown in Exhibit 3.3-3, Public Facilities in the Social Impact Analysis Area, and Exhibit 3.3-5, Law Enforcement and Fire Protection Facilities in the Social Impact Analysis Area, there are 16 community facilities in the impact analysis area. Of these, nine facilities are directly accessed from S.R. 108. These include the Syracuse City Hall, Syracuse Police Department, Syracuse Fire Station, Syracuse Junior High School, Syracuse Elementary School, Syracuse High School, a private preschool in Syracuse, a church in Syracuse, and a church in West Haven.

The Minimize 4(f) Impacts Alternative is designed to avoid impacts to facilities such as school grounds or parks that could be used for recreation. However, this alternative would have direct impacts to the following schools and community facilities:

- Syracuse Junior High School: strip take (frontage)
- Syracuse High School: strip take (frontage)
- Church at 1560 South 2000 West, Syracuse: strip take (frontage)
- Church at 4607 Midland Drive, West Haven: strip take (frontage)

All of the impacts would involve strip takes of property needed for roadway right-of-way. None of the facilities would need to be relocated, and the strip takes would not affect the day-to-day operation of the facilities or the portions of the facilities used for recreation. The impacts would not cause any long-term, permanent adverse effects to any of the facilities. (For more information about strip takes and relocations, see Section 4.3.2.6, Relocations.)

4.3.2.5 Public Health and Safety

The following discussion analyzes the expected effects of the Minimize 4(f) Impacts Alternative on emergency response and the safety of children who attend schools along S.R. 108. See Section 4.3.2.2, Quality of Life, for more information about residents' attitudes toward community safety and traffic safety.

Emergency Response

The Minimize 4(f) Impacts Alternative would have no substantial direct or indirect effects on emergency response in the impact analysis area.

As described in Section 3.3.6.1, Emergency Response and Law Enforcement, narrow lanes and traffic congestion affect emergency response along S.R. 108. Emergency service providers for the cities along S.R. 108 have stated that there is a need to widen the road and add passing and turning lanes to better facilitate emergency response (Chillson 2006; Peterson 2006; Ritchie 2006; Wallace 2006; Whinham 2006).

The addition of through-traffic lanes and dedicated turn lanes would address the emergency service providers' access and response concerns. Increased shoulder widths could also accommodate emergency response vehicles. If raised medians are incorporated into the final design, the sponsoring agencies will ensure that the locations of the medians do not interfere with emergency service providers' ability to respond to emergencies.

The Minimize 4(f) Impacts Alternative would have no substantial effects on emergency response times or on the ability of emergency service providers to respond to emergencies. In some cases, if an agency is better able to respond to emergencies in its own service area, agencies from other jurisdictions would not need to respond,

and this would keep the other agencies available to respond to emergencies in their own service areas.

School Safety

Two existing public schools are accessed by S.R. 108. The new Syracuse High School is currently under construction and will be operating by the time S.R. 108 would be widened under the proposed project. Another school, Midland Elementary School in Roy, is in the impact analysis area and serves students who live on the east side of S.R. 108 between about 4275 South and 5200 South. All of the students who attend Midland Elementary School live east of S.R. 108 and do not have to cross the road to walk to school (see Section 4.4.2.3, Midland Elementary School Service Area).

For the school locations in Syracuse (elementary, junior high, and high school), raised center medians would be provided at student crossing locations. The use of raised medians has been shown to reduce pedestrian-vehicle accidents by providing a relatively safe place for pedestrians to stop while crossing the road (FHWA 2001). Crossing guards would continue to guide students at the Syracuse Elementary School crosswalk (at about 1500 South) and at Antelope Drive (1700 South), and the speed limits for school safety zones would be maintained. A raised center median would also be installed at 550 North in West Point where students cross S.R. 108.

The Minimize 4(f) Impacts Alternative would require minor amounts of right-of-way from Syracuse Junior High School and the new Syracuse High School. However, the completed project would not affect any existing safety features associated with the school grounds such as sidewalks or access points.

This alternative would add sidewalks and bicycle lanes to S.R. 108, so the safety of children who walk to school on S.R. 108 would be improved in those areas that currently have narrow sidewalks or no sidewalks. The final design could incorporate raised medians, which could serve as a place of refuge for pedestrians who cross a street mid-block or at an intersection.

The anticipated growth in the region will increase the amount of traffic on S.R. 108, which could lead to more vehicle-pedestrian accidents. However, these increases will occur with or without the proposed roadway improvements.

During construction, equipment and excavations could pose a safety hazard for students who walk to school on S.R. 108. Before construction begins, the contractor will coordinate with the schools so that appropriate safety measures can be implemented. These measures could include avoiding construction during the morning and afternoon while students are walking to school and providing a safety monitor to watch students as they walk to school near the construction areas.

4.3.2.6 Relocations

Methodology for Determining Property Impacts

For this analysis, four types of impacts to residences and businesses were considered: direct impacts (relocations), proximity impacts (potential relocations), land-only impacts (strip takes), and construction easements. Only relocations and potential relocations are included in the exhibits for this section.

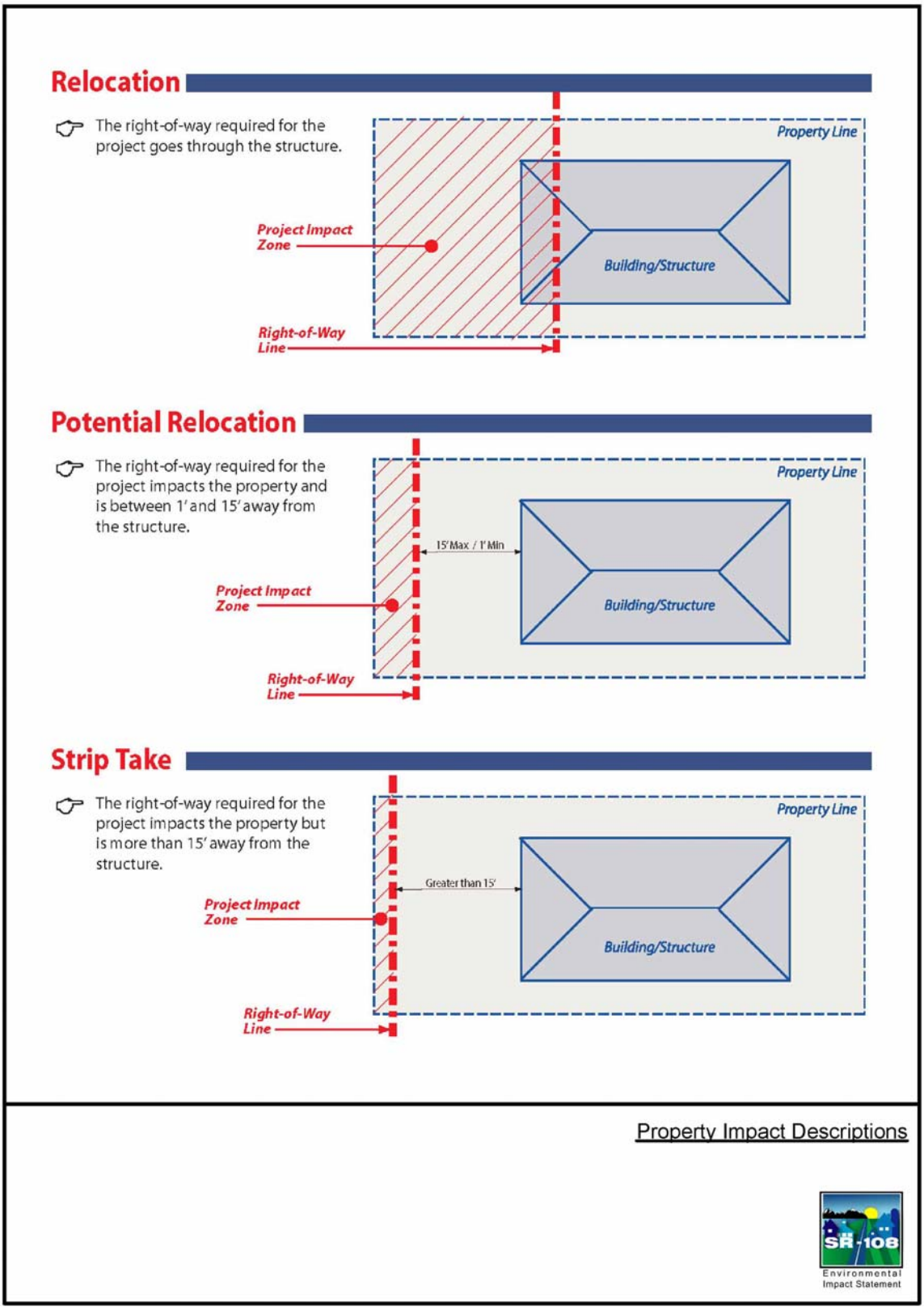
What is the relocations impact analysis area?

The relocations impact analysis area includes land adjacent to S.R. 108 that could be affected by the proposed right-of-way for the action alternatives.

Direct Impacts (Relocations). For the purpose of this analysis, a direct impact to a residence or business occurs when an existing structure is within the right-of-way of the proposed improvements (see Exhibit 4.3-1 below). These structures include not only the primary home or business structure but also garages, sheds, and other buildings that are not attached to the main building. This type of impact is referred to as a *relocation* because the entire property would need to be acquired and the residents or business would need to relocate. Note, however, that the original structure itself would not be relocated.

Proximity Impacts (Potential Relocations). For the purpose of this analysis, a proximity impact to a residence or business occurs when an existing structure (excluding porches and garages) is within 15 feet of the proposed right-of-way (see Exhibit 4.3-1 below). This type of impact is referred to as a *potential relocation* because it is not clear whether the entire property would need to be acquired. UDOT would make a final determination about the property during the right-of-way acquisition phase of the project, which occurs shortly before construction. By the end of the right-of-way acquisition phase, UDOT will determine whether each potential relocation is a full relocation or a strip take.

Exhibit 4.3-1: Property Impact Descriptions



Land-Only Impacts (Strip Takes). For the purpose of this analysis, a land-only impact occurs when a property is located within the proposed right-of-way but the right-of-way is more than 15 feet from an existing structure (see Exhibit 4.3-1 above). This type of impact is referred to as a *strip take* because only a strip of land would need to be acquired. Strip takes are not considered relocations and are not included in the exhibits for this section.

Construction Easements. Some properties outside the right-of-way might be affected by cuts or fills required during roadway construction. UDOT would temporarily acquire these properties with construction easements. Although these properties might be temporarily affected, construction easements are not considered relocations and are not included in the exhibits for this section. UDOT would compensate the property owners for the temporary use of the property, and the restored property would be returned to the owner when the use of the property is no longer needed.

Relocation Assistance for Displaced Residents and Businesses

Both action alternatives would require acquiring some property. As stated in Section 3.3.7, Housing and Relocations, UDOT would acquire the necessary right-of-way consistent with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601 et seq. as amended, 1989), and Title VI of the Civil Rights Act of 1964. These policies ensure the uniform and equitable treatment of all people displaced from their residences, businesses, and farms without discrimination on any basis.

Relocation resources are available to all residents and businesses that are relocated, and the process for acquiring replacement housing and other sites will be fair and open.

Residences

This section discusses the expected residential relocations and potential relocations. Strip takes are not discussed in this section.

Single-family housing is the predominant type of residence in the S.R. 108 study area. Most housing is clustered between commercial

areas along S.R. 108. Unless otherwise noted, the identified structures in the area that would be affected are occupied.

The Uniform Relocation Assistance Act requires UDOT to provide financial and practical relocation assistance for displaced residents. In addition, if housing of comparable size and value to that being displaced is not available, or is not available within UDOT's payment limits, then UDOT would invoke a process called "housing of last resort" (UDOT 1997). This process allows UDOT to provide necessary housing through any of several methods, including:

- Purchasing a comparable residential property and making it available to the relocated person in exchange for the acquired property
- Relocating and rehabilitating (if necessary) a dwelling purchased by UDOT and making it available to the relocated person in exchange for the acquired property
- Purchasing, rehabilitating, or constructing additions to an existing dwelling to make it comparable to a particular acquired property
- Purchasing land and constructing a new replacement dwelling comparable to a particular acquired property when comparable dwellings are not otherwise available
- Other measures that fairly compensate for the acquired property

Exhibit 4.3-2 below lists the residential properties that would be subject to relocation under the Minimize 4(f) Impacts Alternative.

Overall, the S.R. 108 region has a wide variety of available housing that is in good condition. The median home price in the cities along S.R. 108 ranges from about $131,000 to about $207,000 and varies by jurisdiction. As discussed in Section 3.3.7.1, Housing Market Conditions, there are ample available housing units within each county and along S.R. 108. These data indicate that displaced homeowners should be able to find affordable replacement housing in or near the communities in which they now live.

Exhibit 4.3-2: Residential Relocations

Address[a]	Parcel ID Number	City	Minimize 4(f) Impacts Alternative	West Alternative
NA	12-048-0061	Syracuse	Yes	Yes
1280 South 2000 West	12-048-0059	Syracuse	Yes	Yes
1256 South 2000 West	12-048-0060	Syracuse	Yes	Yes
1250 South 2000 West	12-048-0056	Syracuse	Yes	Yes
1232 South 2000 West	12-048-0057	Syracuse	Yes	Yes
1196 South 2000 West	12-048-0046	Syracuse	Yes	Yes
1184 South 2000 West	12-048-0047	Syracuse	Yes	Yes
1175 South 2003 West	12-172-0060	Syracuse	Yes	Yes
1164 South 2000 West	12-205-0007	Syracuse	Yes	Yes
1152 South 2000 West	12-205-0008	Syracuse	Yes	Yes
1140 South 2000 West	12-205-0009	Syracuse	Yes	Yes
1128 South 2000 West	12-205-0010	Syracuse	Yes	Yes
1116 South 2000 West	12-240-0031	Syracuse	Yes	Yes
1104 South 2000 West	12-240-0032	Syracuse	Yes	Yes
1100 South 2016 West	12-240-0033	Syracuse	Yes	Yes
~900 South 2000 West	12-048-0037	Syracuse	No	Yes
506 South 2000 West	12-035-0073	Syracuse	No	Yes
210 South 2000 West	12-035-0077	Syracuse	Yes	Yes
616 South 2000 West	12-035-0031	Syracuse	No	Yes
522 South 2000 West	12-035-0074	Syracuse	No	Yes
488 South 2000 West	12-035-0025	Syracuse	No	Yes
506 South 2000 West	12-035-0023	Syracuse	No	Yes
460 South 2000 West	12-035-0022	Syracuse	No	Yes
446 South 2000 West	12-035-0021	Syracuse	No	Yes
378 South 2000 West	12-035-0018	Syracuse	No	Yes
272 South 2000 West	12-035-0013	Syracuse	No	Yes
256 South 2000 West	12-035-0076	Syracuse	No	Yes
234 South 2000 West	12-035-0075	Syracuse	No	Yes
700 South 1903 West	12-050-0036	Syracuse	Yes	No
560 North 2000 West	14-369-0001	West Point	Yes	No
578 North 2000 West	14-064-0119	West Point	Yes	No
596 North 2000 West	14-064-0018	West Point	Yes	No
624 North 2000 West	14-064-0017	West Point	Yes	No
656 North 2000 West	14-064-0016	West Point	Yes	No
678 North 2000 West	14-064-0015	West Point	Yes	No
698 North 2000 West	14-064-0014	West Point	Yes	No
NA[b]	14-347-0001	West Point	Yes	No
734 North 2000 West	14-064-0071	West Point	Yes	No
796 North 2000 West[c]	14-064-0114	West Point	Yes	Yes
70 South 2000 West	12-033-0023	West Point	Yes	Yes

Address[a]	Parcel ID Number	City	Minimize 4(f) Impacts Alternative	West Alternative
58 South 2000 West	12-033-0017	West Point	Yes	Yes
14 South 2000 West	12-033-0016	West Point	Yes	Yes
12 South 2000 West	12-033-0013	West Point	Yes	Yes
10 South 2000 West	12-033-0015	West Point	No	Yes
15 North 2000 West	12-033-0012	West Point	No	Yes
37 North 2000 West	12-033-0011	West Point	Yes	Yes
45 North 2000 West	12-033-0010	West Point	Yes	Yes
NA[c]	12-033-0054	West Point	Yes	Yes
325 North 2000 West	14-055-0216	West Point	Yes	Yes
335 North 2000 West	14-055-0214	West Point	Yes	Yes
350 North 1994 West	14-055-0213	West Point	Yes	Yes
399 North 2000 West	14-055-0186	West Point	Yes	Yes
455 North 2000 West	14-055-0184	West Point	Yes	Yes
475 North 2000 West	14-055-0188	West Point	Yes	Yes
525 North 2000 West	14-055-0006	West Point	Yes	Yes
529 North 2000 West	14-055-0094	West Point	No	Yes
647 North 2000 West	14-055-0136	West Point	No	Yes
1283 North 2000 West	14-053-0094	West Point	Yes	No
607 North 2000 West	14-055-0189	West Point	No	Yes
607 North 2000 West[d]	14-055-0190	West Point	No	Yes
817 North 2000 West	14-053-0077	Clinton	No	Yes
881 North 2000 West	14-053-0065	Clinton	No	Yes
1141 North 2000 West	14-053-0098	Clinton	No	Yes
817 North 2000 West	14-053-0077	Clinton	No	Yes
1193 North 2000 West	14-053-0087	Clinton	No	Yes
2123 North 2000 West	14-019-0100	Clinton	Yes	Yes
1221 North 2000 West	14-053-0082	Clinton	No	Yes
1253 North 2000 West	14-053-0096	Clinton	No	Yes
1277 North 2000 West	14-053-0090	Clinton	No	Yes
1283 North 2000 West	14-053-0094	Clinton	No	Yes
1289 North 2000 West	14-053-0081	Clinton	Yes	Yes
NA[b]	14-021-0122	Clinton	No	Yes
NA[b]	14-317-0001	Clinton	No	Yes
1693 North 2000 West	14-021-0044	Clinton	No	Yes
1707 North 2000 West	14-021-0120	Clinton	No	Yes
1969 North 2000 West	14-019-0076	Clinton	No	Yes
1993 North 2000 West	14-019-0075	Clinton	No	Yes
2133 North 2000 West	14-019-0098	Clinton	Yes	Yes
2541 North 2000 West	13-049-0015	Clinton	No	Yes
2637 North 2000 West	13-049-0011	Clinton	No	Yes

Address[a]	Parcel ID Number	City	Minimize 4(f) Impacts Alternative	West Alternative
2647 North 2000 West	13-049-0001	Clinton	No	Yes
2657 North 2000 West	13-049-0002	Clinton	No	Yes
5976 South 3500 West	09-088-0004	Roy	Yes	Yes
5730 South 3500 West	09-088-0040	Roy	Yes	No
5491 South 3500 West	09-073-0012	Roy	Yes	Yes
5373 South 3500 West	09-073-0006	Roy	No	Yes
5307 South 3500 West	09-073-0009	Roy	Yes	Yes
5285 South 3500 West	09-073-0076	Roy	No	Yes
5269 South 3500 West	09-073-0051	Roy	No	Yes
~5225 South 3505 West	09-515-0011	Roy	No	Yes
~5225 South 3508 West	09-515-0001	Roy	No	Yes
5175 South 3510 West	09-198-0002	Roy	No	Yes
5137 South 3500 West	09-198-0003	Roy	No	Yes
5123 South 3500 West	09-198-0004	Roy	No	Yes
5093 South 3500 West	09-199-0002	Roy	No	Yes
5107 South 3500 West	09-199-0001	Roy	No	Yes
5077 South 3500 West	09-199-0003	Roy	No	Yes
5061 South 3500 West	09-199-0004	Roy	No	Yes
5041 South 3500 West	09-199-0005	Roy	No	Yes
4337 South 3100 West	08-303-0001	Roy	Yes	Yes
3515 West 5000 South	09-200-0001	Roy	No	Yes
3516 West 5000 South	09-200-0002	Roy	No	Yes
NA[b]	09-200-0003	Roy	No	Yes
3747 Midland Drive	08-022-0043	West Haven	Yes	Yes
3695 S. Midland Drive	08-022-0002	West Haven	Yes	Yes
3545 S. Midland Drive	08-028-0033	West Haven	Yes	Yes
3315 S. Midland Drive	08-006-0040	West Haven	Yes	Yes
1952 W. Midland Drive	15-094-0039	West Haven	Yes	Yes

[a] A tilde (~) in front of an address indicates an approximate address.

[b] Address not available

[c] Property vacant

[d] Combined single residence with parcel above

Exhibit 4.3-3 lists the residential properties that would be subject to potential relocation under the Minimize 4(f) Impacts Alternative.

Exhibit 4.3-3: Potential Residential Relocations

Address[a]	Parcel ID Number	City	Minimize 4(f) Impacts Alternative		West Alternative	
			Potential Relocation?	Distance (feet)[b]	Potential Relocation?	Distance (feet)[b]
1609 South 2000 West	12-052-0024	Syracuse	Yes	9.2	Yes	9.2
1220 South 2000 West	12-048-0051	Syracuse	Yes	1.8	Yes	1.8
1208 South 2000 West	12-048-0050	Syracuse	Yes	1.6	Yes	1.6
256 South 2000 West	12-035-0076	Syracuse	Yes	10.7	No	-
234 South 2000 West	12-035-0075	Syracuse	Yes	2.2	No	-
700 South 2018 West	12-035-0053	Syracuse	No	-	Yes	2.2
~650 South 2000 West	12-035-0049	Syracuse	No	-	Yes	6.3
636 South 2000 West	12-035-0032	Syracuse	No	-	Yes	4.1
602 South 2000 West	12-035-0030	Syracuse	No	-	Yes	14.8
572 South 2000 West	12-035-0029	Syracuse	No	-	Yes	14.9
554 South 2000 West	12-035-0028	Syracuse	No	-	Yes	6.5
368 South 2000 West	12-035-0017	Syracuse	No	-	Yes	12.0
334 South 2000 West	12-035-0050	Syracuse	No	-	Yes	10.1
322 South 2000 West	12-035-0016	Syracuse	No	-	Yes	13.1
320 South 2000 West	12-035-0014	Syracuse	No	-	Yes	12.5
150 South 2000 West	12-033-0018	West Point	Yes	8.0	Yes	8.0
10 South 2000 West	12-033-0015	West Point	Yes	1.1	No	-
15 North 2000 West	12-033-0012	West Point	Yes	1.4	No	-
49 North 2000 West	12-033-0009	West Point	Yes	3.6	Yes	3.6
300 North 2020 West	12-055-0218	West Point	Yes	9.6	Yes	9.6
389 North 2000 West	14-055-0063	West Point	Yes	4.8	Yes	4.4
463 North 2000 West	14-188-0023	West Point	Yes	3.4	Yes	2.3
529 North 2000 West	14-055-0094	West Point	Yes	7.0	No	-
535 North 2000 West	14-055-0146	West Point	No	-	Yes	8.0
561 North 2000 West	14-055-0221	West Point	No	-	Yes	5.5
581 North 2000 West	14-055-0091	West Point	No	-	Yes	3.1
667 North 2000 West	14-055-0109	West Point	No	-	Yes	7.1
685 North 2000 West	14-055-0039	West Point	No	-	Yes	6.8
695 North 2000 West	14-055-0038	West Point	No	-	Yes	9.0
750 North 2020 West	14-219-0015	West Point	No	-	Yes	12.6
755 North 2000 West	14-055-0195	West Point	No	-	Yes	3.4
783 North 2000 West	14-055-0220	West Point	No	-	Yes	7.6
1277 North 2000 West	14-053-0090	West Point	Yes	11.8	No	-
1071 North 2000 West	14-053-0066	Clinton	No	-	Yes	14.2
NA[c]	14-021-0122	Clinton	Yes	6.6	No	-

Address[a]	Parcel ID Number	City	Minimize 4(f) Impacts Alternative		West Alternative	
			Potential Relocation?	Distance (feet)[b]	Potential Relocation?	Distance (feet)[b]
1532 North 2030 West	14-311-0043	Clinton	No	-	Yes	13.1
1647 North 2000 West	14-317-0002	Clinton	No	-	No	-
NA[c]	14-317-0001	Clinton	Yes	11.8	No	-
1693 North 2000 West	14-021-0044	Clinton	Yes	4.3	No	-
1707 North 2000 West	14-021-0120	Clinton	Yes	5.2	No	-
1993 North 2000 West	14-019-0075	Clinton	Yes	10.3	No	-
2087 North 2000 West	14-264-0001	Clinton	Yes	12.1	Yes	6.6
2657 South 2000 West	13-049-0029	Clinton	No	-	Yes	5.3
2593 North 2000 West	13-049-0012	Clinton	No	-	Yes	7.8
5939 South 3500 West	09-084-0019	Roy	No	-	Yes	13.7
5859 South 3500 West	09-084-0016	Roy	No	-	Yes	9.4
5373 South 3500 West	09-073-0006	Roy	Yes	6.7	No	-
5345 South 3500 West	09-073-0052	Roy	No	-	Yes	7.2
5285 South 3500 West	09-073-0076	Roy	Yes	4.3	No	-
5269 South 3500 West	09-073-0051	Roy	Yes	3.3	No	-
5225 South ~3500 West	09-515-0011	Roy	Yes	12.6	No	-
5225 South ~3508 West	09-515-0001	Roy	Yes	12.6	No	-
4935 South 3500 West	09-072-0062	Roy	No	-	Yes	6.6
5041 South 3500 West	09-199-0005	Roy	Yes	12.7	No	-
3515 West 5000 South	09-200-0001	Roy	Yes	8.8	No	-
3516 West 5000 South	09-200-0002	Roy	Yes	11.1	Yes	-
2817 West 3965 South	08-444-0019	Roy	Yes	8.7	Yes	8.7
3801 South 2700 West	08-031-0002	Roy	Yes	11.8	Yes	8.4
3753 Midland Drive	08-180-0005	Roy	Yes	5.3	No	-
3675 Midland Drive	08-022-0001	West Haven	No	-	Yes	5.5
3889 Midland Drive	08-031-0007	West Haven	Yes	1.6	Yes	1.7
3883 Midland Drive	08-031-0009	West Haven	Yes	1.3	Yes	1.3
3860 S. Midland Drive	08-022-0024	West Haven	Yes	NA	Yes	-
3845 S. Midland Drive	08-031-0025	West Haven	Yes	2.0	Yes	2.0
3753 S. Midland Drive	08-180-0005	West Haven	Yes	5.3	Yes	5.3
3491 S. Midland Drive	08-028-0048	West Haven	Yes	2.2	Yes	2.2
2008 W. Midland Drive	15-094-0014	West Haven	Yes	9.4	Yes	9.4

[a] A tilde (~) in front of an address indicates an approximate address.

[b] This is the distance measured from the edge of the proposed right-of-way to the closest part of the structure located on the property.

[c] Address not available.

Businesses

This section discusses the expected business relocations and potential relocations. Strip takes are not discussed in this section.

The Minimize 4(f) Impacts Alternative would displace businesses within the right-of-way. Neither action alternative would displace public facilities along S.R. 108, although strip takes would be required from several facilities as discussed in Section 4.3.2.4, Community Facilities.

UDOT would be required by the Uniform Relocation Assistance Act to purchase the business properties at a fair market value. In addition, the Uniform Relocation Assistance Act provides payments, within limits, for certain moving and re-establishment expenses associated with relocating displaced businesses within the area. There is a large amount of undeveloped land along S.R. 108, and the potential for successfully relocating a displaced business is high.

Exhibit 4.3-4 below lists the locations of the six businesses that would be subject to relocation and the nine businesses that would be subject to potential relocation under the Minimize 4(f) Impacts Alternative. No public facilities would be subject to relocation or potential relocation.

Exhibit 4.3-4: Business Relocations and Potential Relocations

Address	Business/Public Facility	Type of Impact: Minimize 4(f) Impacts Alternative	Type of Impact: West Alternative
1566 South 2000 West	Checker Auto Parts	Potential relocation	Potential relocation
1663 South 2000 West	American Family Insurance	Relocation	Relocation
~880 North 2000 West (east side of road)	LDS Agricultural Business Accessory Building	Relocation	No impact
850 South 2000 West	Utah Onions, Inc.	Relocation	Relocation
1630 North 2017 West	Mark Higley Construction	No impact	Potential relocation
2019 North 2000 West	Swan Falls, Ponds & Waterfalls	Relocation	Relocation
2056 North 2000 West	Harris Feed & Seed/ Boarded-up business	Potential relocation	No impact
2300 North 2016 West	Patterson Excavation and Hauling	Potential relocation	Potential relocation
4800 South 3536 West	Phillips 66/Triple Stop	Relocation	Relocation
4795 South 3536 West	Triple Stop Auto Sales	Potential relocation	Relocation
3805 S. Midland Dr.	Midland Gas and Grocery	No impact	Relocation
4645 S. Midland Dr. #1	Professional Haven Office Building	No impact	Relocation
4815 S. Midland Drive	Summit One Credit Union/Packard Dental	No impact	Relocation
2201–2173 North 2000 West	Great Harvest	Potential relocation	Relocation
1800 North 2003 West	Boarded up business/for sale	No impact	Relocation
1829 North 2000 West	Albertson's Express	No impact	Potential relocation
1867 North 2000 West	Blockbuster Video	No impact	Potential relocation
6000 South 3500 West	Weber State Credit Union	No impact	Relocation
5975 South 3500 West	Weston's Glass and Hardware	No impact	Potential relocation
3997 Midland Drive	Wylde Hare Farms	Potential relocation	Potential relocation
~4100 S. Midland Drive	Mountain States Telephone	Potential relocation	Potential relocation
3441 S. Midland Drive	AR Aluminum, Inc.	Relocation	Relocation
3805 S. Midland Drive	Midland Gas & Grocery	Potential relocation	Potential relocation
1996 S. Midland Drive	Trace Minerals Research	Potential relocation	Potential relocation

Summary of Relocations and Potential Relocations under the Minimize 4(f) Impacts Alternative

Exhibit 4.3-5 summarizes the residential and business relocations and potential relocations under the Minimize 4(f) Impacts Alternative.

Exhibit 4.3-5: Summary of Relocations and Potential Relocations under the Minimize 4(f) Impacts Alternative

Type of Impact	Minimize 4(f) Impacts Alternative
Residential Properties	
Relocations	55
Potential relocations	38
Business Properties	
Relocations	6
Potential relocations	9
Total	108

4.3.2.7 Public Services and Utilities

Impacts to utilities and public services would be temporary and would occur during construction. The construction contractor would contact local businesses and residences if any loss of service is required during construction.

In general, utilities were considered to be affected if the utility would need to be relocated (that is, lowered farther into the ground). The alternative would cross some facilities (including water, sewer, canals, and storm drainage) perpendicularly, and the effects on these utilities would be determined by UDOT by working with local jurisdictions during the final design of the project once a Preferred Alternative is selected. Impacts to these facilities can often be avoided during final design. UDOT would continue to communicate with local jurisdictions throughout the development of the project.

The existing S.R. 108 pavement varies in depth from about 24 inches to 30 inches. The depth of the pavement over existing utilities varies from 18 inches to 36 inches, with some very deep utility lines 6 feet to 8 feet deep. If the existing pavement is totally removed and

replaced during construction, it is likely that most utilities would be exposed or barely covered. Therefore, most utilities would likely need to be relocated before the new roadway is constructed.

Building the proposed underpass in Clinton at 2050 North would affect irrigation, water, sewer, buried telephone, and buried fiber-optic utility services.

4.3.3 West Alternative

4.3.3.1 Neighborhood and Community Cohesion

The impacts to neighborhood and community cohesion from the West Alternative would be the same as those from the Minimize 4(f) Impacts Alternative. The West Alternative would have no substantial direct or indirect effects on neighborhood and community cohesion.

4.3.3.2 Quality of Life

The impacts to quality of life from the West Alternative would be the same as those from the Minimize 4(f) Impacts Alternative. The West Alternative would have no substantial direct or indirect effects on quality of life.

4.3.3.3 Recreation Resources

The West Alternative would have no direct or indirect effects on any recreation resources.

The West Alternative would not directly affect Centennial Park or Founders Park. This alternative would not require right-of-way from either park and would not affect access to the facilities.

4.3.3.4 Community Facilities

The West Alternative would have no substantial direct or indirect effects on any community facilities.

Nine community facilities front S.R. 108 or are accessed by S.R. 108. The West Alternative would have the following direct impacts:

- Syracuse Junior High School: strip take (frontage)
- Church at 1560 South 2000 West, Syracuse: strip take (frontage)
- Church at 4607 Midland Dr., West Haven: strip take (frontage)

All of the impacts would involve strip takes of property needed for roadway right-of-way. None of the facilities would need to be relocated, and the strip takes would not affect the day-to-day operation of the facilities or the portions of the facilities used for recreation. The impacts would not cause any long-term, permanent adverse effects to any of the facilities.

4.3.3.5 Public Health and Safety

Emergency Response

The West Alternative would have no direct or indirect effects on emergency facilities and would benefit emergency response times because there would be less congestion on S.R. 108.

The West Alternative would not directly affect any law enforcement or fire-protection facilities. Impacts to response times under the West Alternative would be the same as those under the Minimize 4(f) Impacts Alternative.

School Safety

The West Alternative would require right-of-way from the Syracuse Junior High School campus. This partial take would affect property frontage along S.R. 108 only and would not permanently affect the school parking lot or bus access points. No other school properties would be directly affected by this alternative.

The operational and construction-related impacts to school safety, and the use of raised medians, would be the same as those from the Minimize 4(f) Impacts Alternative.

4.3.3.6 Relocations

Impacts to Residences

Exhibit 4.3-2: Residential Relocations above lists the residential properties that would be subject to relocation under the West Alternative.

Overall, the S.R. 108 region has a wide variety of available housing that is in good condition. The median home price in the cities along S.R. 108 ranges from about $131,000 to about $207,000 and varies by jurisdiction. As discussed in Section 3.3.7.1, Housing Market

Conditions, there are ample available housing units within each county and along S.R. 108. These data indicate that displaced homeowners should be able to find affordable replacement housing in or near the communities in which they now live.

Exhibit 4.3-3: Potential Residential Relocations above lists the residential properties that would be subject to potential relocation under the West Alternative.

Businesses

Exhibit 4.3-4: Business Relocations and Potential Relocations above lists the locations of the 12 businesses that would be subject to relocation and the 10 businesses that would be subject to potential relocation under the West Alternative. No public facilities would be subject to relocation or potential relocation.

UDOT would be required by the Uniform Relocation Assistance Act to purchase the business properties at a fair market value. In addition, the Uniform Relocation Assistance Act provides payments, within limits, for certain moving and re-establishment expenses associated with relocating displaced businesses within the area. There is a large amount of undeveloped land along S.R. 108, and the potential for successfully relocating a displaced business is high.

Summary of Relocations and Potential Relocations under the West Alternative

Exhibit 4.3-6 summarizes the residential and business relocations and potential relocations under the West Alternative.

Exhibit 4.3-6: Summary of Relocations and Potential Relocations under the West Alternative

Type of Impact	West Alternative
Residential Properties	
Relocations	96
Potential relocations	47
Business Properties	
Relocations	12
Potential relocations	10
Total	165

4.3.3.7 Public Services and Utilities

The impacts to public services and utilities from the West Alternative would be the same as those from the Minimize 4(f) Impacts Alternative.

4.3.4 Mitigation Measures for Community Impacts

4.3.4.1 Public Health and Safety

If raised medians are incorporated into the final design, the sponsoring agencies will ensure that the locations of the medians will not interfere with emergency service providers' ability to respond to emergencies. Raised medians will also be placed near schools and busy commercial centers so that pedestrians have a relatively safe place to stop when crossing the road.

During the final design of the project, UDOT will coordinate modifications to the existing school crossing zones for Syracuse Junior High School, Syracuse Elementary School, and Syracuse High School with those schools to ensure that roadway improvements maintain student safety at those crossing locations.

During construction, equipment and excavations could pose a safety hazard for students who walk to school on S.R. 108. Before construction begins, the contractor will coordinate with the schools so that appropriate safety measures can be implemented. These measures could include avoiding construction during the morning and afternoon while students are walking to school and providing a safety monitor to watch students as they walk to school near the construction areas.

4.3.4.2 Relocations

The loss of residences or businesses due to either of the action alternatives will be mitigated according to federal, state, and local relocation policies. Assistance and re-establishment expenses will be provided to the displaced property owners and lease holders according to eligibility requirements and other requirements of the Uniform Relocation Assistance Act of 1970, as amended. Relocation resources will be available to each relocated resident and business without discrimination. UDOT will evaluate the need to provide early right-of-way acquisition for those property owners that demonstrate a hardship because of this project.

If housing of comparable size and value to that being acquired is not available (or is not available within the Uniform Relocation Assistance Act's payment limits), UDOT will invoke a process called "housing of last resort." This process allows necessary replacement housing for relocated homeowners through any of several methods, including:

- Purchasing a comparable residential property and making it available to the relocated person in exchange for the acquired property
- Relocating and rehabilitating (if necessary) a dwelling purchased by UDOT and making it available to the relocated person in exchange for the acquired property
- Purchasing, rehabilitating, and/or constructing additions to an existing dwelling to make it comparable to a particular acquired property
- Purchasing land and constructing a new replacement dwelling comparable to a particular acquired property when comparable dwellings are not otherwise available
- Other measures that fairly compensate for the acquired property

The Uniform Relocation Assistance Act also contains allowances for renters. A one-time rental assistance payment is available that is intended to cover 42 months of rent in a decent, sanitary, safe dwelling. This period could be increased if necessary to fully mitigate affected households. Extensions are considered on a case-by-case basis depending on individual circumstances.

What assistance and compensation are available for relocated residents and business owners?

UDOT would acquire the necessary right-of-way consistent with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and Title VI of the Civil Rights Act of 1964. These policies ensure the uniform and equitable treatment of all people displaced from their homes, businesses, and farms without discrimination on any basis. Relocation resources are available to all residents and businesses that are relocated, and the process for acquiring replacement housing and other sites will be fair and open.

4.3.4.3 Public Services and Utilities

The UDOT document Accommodation of Utilities and the Control and Protection of State Highway Rights-of-Way, Utah Administrative Code Rule 930-6, will be followed. The construction contractor will contact local businesses and residences if any loss of service is required during construction.

4.4 Impacts to Environmental Justice Populations

Executive Order 12898, Federal Actions To Address Environmental Justice in Minority and Low-Income Populations, mandates that all federal actions be reviewed for possible disproportionate effects on minority or low-income populations, also known as environmental justice (EJ) populations. This section considers whether the community, economic, noise, air quality, safety, and construction impacts of the S.R. 108 action alternatives would disproportionately affect environmental justice populations. This analysis is based on the improvements to S.R. 108, public input, and meetings with city and county planning officials, school districts, and low-income-housing providers. A disproportionately high and adverse effect on an environmental justice population would occur if:

- The adverse effect is predominantly borne by the environmental justice population.
- The adverse effect on the environmental justice population is appreciably more severe or greater in magnitude than the adverse effect on the non–environmental justice population.
- The project affects a resource that is especially important to an environmental justice population.

What is the environmental justice impact analysis area?

The environmental justice impact analysis area is the area within one-half mile of S.R. 108.

The expected impacts to EJ populations were determined by overlaying the project alternatives on an aerial photograph of S.R. 108. The alternatives were examined for direct land-based impacts and for potential indirect impacts related to accessibility and mobility. The impact analysis considers the following EJ groups:

- **Contiguous block groups 125304-2, 125305-1, 125501-3, 125501-4, and 125503-5 on the east side of S.R. 108 in Davis County** (see Exhibit 3.4-1: Census Tract and Block Groups). These block groups have a percentage of racial and ethnic minority residents that is higher than the county averages (1.2 and 1.5 percentage points higher, respectively). Block groups 125304-2 and 125503-5 also have higher percentages of persons living below poverty level than the county as a whole (an average of 6.9 percentage points higher).
- **Syracuse Junior High School Service Area, Davis School District, Davis County.** This school service area has a percentage of minority students that is 4.2 percentage points higher than the district average. The service area overlaps with block groups 125501-4 and 125503-5.
- **Midland Elementary School Service Area, Weber School District, Weber County.** This school service area has a percentage of minority students that is 8.8 percentage points higher than the district average and a percentage of students who are eligible for free or reduced-price lunches (an indicator of poverty) that is 3.1 percentage points higher than the county average.

There are 13 HCVP housing units (also known as Section 8 units) scattered throughout the impact analysis area (see Exhibit 3.4-5: Indicators of Environmental Justice Populations). The S.R. 108 action alternatives would not directly affect any of the HCVP units.

Block group 201900-1 at the northern end of the impact analysis area in Weber County has very high percentages of ethnic and racial minorities and of persons living below the poverty level. However, this block group is not included in the analysis because the area of the block group close to the project terminus is used mainly for light industry and there is no housing nearby. Any EJ populations in this block group are probably living farther east in Ogden. See Section

What are accessibility and mobility?

Accessibility refers to the ability of residents to access goods and services. For example, an accessible city hall is one that is easy to find and get to.

Mobility refers to the ease with which residents can move through their communities. For example, an area with good mobility is one that provides numerous ways to physically access a particular good or service.

What is a block group?

Census data are reported by larger geographical areas called *census tracts* and smaller areas within the census tracts called *block groups*. A census tract–block group number such as 125501-3 indicates both the census tract (125501) and the block group (3). For simplicity, census tract–block groups are referred to as block groups in this EIS.

3.4.4.1, Census Data for Minority Populations, for more information about block group 201900-1.

As described in Section 3.4.3, Public Outreach, this EIS was developed using a broad-based citizen participation program. In addition to the activities described in Section 3.4.3, the public also had an opportunity to participate through community meetings and updates given to city councils. Meeting invitations and the community survey described in Section 3.4.3 were provided to all residents along S.R. 108. The survey responses did not identify any specific EJ issues or important physical locations, such as gathering places or EJ communities, along S.R. 108.

4.4.1 No-Action Alternative

Under the No-Action Alternative, no capacity or safety improvements would be made to S.R. 108. The existing traffic and congestion conditions would continue to affect the communities along S.R. 108, including areas with EJ populations. Such effects are not expected to disproportionately affect EJ populations because all communities would experience the effects of traffic and congestion equally.

Under the No-Action Alternative, there would be no project construction, so there would be no construction-related dust, noise, access, or other nuisance impacts on people in the impact analysis area.

4.4.2 Minimize 4(f) Impacts Alternative

In general, the Minimize 4(f) Impacts Alternative would have beneficial effects on all populations in the impact analysis area, including environmental justice populations. All communities would benefit from improvements to roadway safety, roadway mobility, and traffic flow. The following discussion focuses on how the Minimize 4(f) Impacts Alternative would specifically affect the identified EJ communities.

4.4.2.1 Block Groups on the East Side of S.R. 108 in Davis County

The Minimize 4(f) Impacts Alternative would require nine residential relocations in block group 125501-3 and two potential residential relocations in block group 125503-5.

As noted in Section 4.3.2.6, Relocations, the Minimize 4(f) Impacts Alternative would result in a total of 55 residential relocations. The potential relocations in block group 125503-5 are over 2 miles from the nine relocations in block group 125501-3. These isolated potential relocations would not cause disproportionate effects to minority or low-income populations.

Block group 125501-3 has a percentage of minority residents that is higher than the Davis County average. The Minimize 4(f) Impacts Alternative would require residential relocations for east-side properties from about 560 North to 800 North. This stretch of the alternative alignment is designed to avoid relocation impacts to two Section 4(f) properties on the west side of S.R. 108. Avoiding relocation impacts to block group 125501-3 would cause impacts to two Section 4(f) properties as well as relocation impacts to up to eight other non-4(f) properties on the west side of S.R. 108.

Block group 125501-3 includes much more area than just the properties that front S.R. 108. Neither the overall population nor the racial and ethnic composition of the block group would be affected by the loss of these nine properties. The residential relocations in this block group are a portion of the total number of relocations required by this alternative (55 relocations and 38 potential relocations), and other non-EJ communities would experience similar relocation effects as a result of this alternative. Given that the affected area is a small fraction of the overall block group and that relocations for this alternative would be distributed throughout the cities regardless of race, the Minimize 4(f) Impacts Alternative would not cause disproportionate effects to the block groups on the east side of S.R. 108 in Davis County.

What impacts would the Minimize 4(f) Impacts Alternative have on block groups 125501-3 and 125503-5?

The Minimize 4(f) Impacts Alternative would not cause disproportionate effects to these block groups.

4.4.2.2 Syracuse Junior High School Service Area

Syracuse Junior High School is on the west side of S.R. 108 near Antelope Drive at the southern end of the project. The project could affect how students who live east of S.R. 108 access the school.

The Minimize 4(f) Impacts Alternative would require a partial (strip) take of land from the school's frontage. This take would not affect access to or operation of the school and would not cause disproportionate effects to minority and low-income students.

Construction-related impacts could also affect students walking to school. The Syracuse Junior High Child Access Routing Plan for the 2006–2007 school year states that about 195 students access the school by walking from areas in block groups on the east side of S.R. 108 that have EJ populations (block groups 125501-4 and 125503-5). These students use sidewalks along residential streets between their homes and S.R. 108 (2000 West). Students must currently walk to the traffic light at Antelope Drive (1700 South) or to the school crossing zone at Syracuse Elementary School at about 1500 South to cross S.R. 108 safely. See Section 3.3.6.2, School Safety, for more information about school safety.

According to Syracuse Junior High School Principal Dr. Robin Bowden, racial and ethnic minority students are distributed throughout the school service area and make up a very small percentage of the student body. Dr. Bowden confirmed that there are generally more minorities east of S.R. 108, but she does not believe that construction-related activities would disproportionately affect minority students walking to school from east of S.R. 108 (Bowden 2007).

4.4.2.3 Midland Elementary School Service Area

Midland Elementary School is east of S.R. 108 at 4800 South 3100 West in Roy. The school's western boundary is S.R. 108, so most students come from neighborhoods east of S.R. 108 that are not directly accessed by S.R. 108. The Midland Elementary Child Access Routing Plan for the 2006–2007 school year states that there are about 85 students in the triangular area bounded by S.R. 108 (Midland Drive), 4800 South, and 3100 West. Students walking to school from this area travel from their homes to a crossing zone at the 4800 South/3100 West intersection and do not have to cross S.R. 108, so no impacts are expected.

4.4.2.4 Overall Community Impacts

Social and Economic Conditions. As described in Section 3.3, Social Environment, and Section 3.6, Economic Conditions, the Minimize 4(f) Impacts Alternative would not cause any community cohesion or economic impacts to the local communities overall, so there would be no community cohesion or economic impacts to EJ communities.

Noise. As described in Section 4.10, Noise Impacts, the Minimize 4(f) Impacts Alternative would increase noise levels by about 1 dBA to 7 dBA at residences close to S.R. 108. An increase in noise levels of 1 dBA to 2 dBA would not be discernible by humans. There would be no disproportionate noise impacts to EJ communities.

Air Quality. As noted in Section 3.9.5, Current Air Quality Status, the S.R. 108 project corridor is in attainment for all priority pollutants with the exception of O_3. O_3, which is formed by a reaction of NO_x and volatile organic compounds, irritates the eyes and respiratory tract and increases the risk of respiratory and heart diseases. Section 4.9.3, Minimize 4(f) Impacts Alternative, describes the long-term air quality impacts of the Minimize 4(f) Impacts Alternative. The project would not cause the NAAQS to be exceeded.

Safety. As described in Section 3.3.3.1, Safety, people living along S.R. 108 generally feel that their communities are safe places to live. However, residents have concerns about traffic safety along the corridor; most concerns are related to congestion and unsafe driving conditions such as the difficulty of making turns onto and off of S.R. 108. Local emergency service providers have noted that existing traffic conditions can affect emergency response. As described in Section 3.3.6.2, School Safety, the safety of students walking to schools located on S.R. 108 is also an important consideration.

The Minimize 4(f) Impacts Alternative would improve traffic safety along S.R. 108. These improvements would apply to all communities along S.R. 108 regardless of race, ethnicity, or income. It is likely that project improvements would also lead to corridor-wide improvements in emergency response times and pedestrian safety. The benefits would be experienced by all persons living along S.R. 108.

Construction Impacts. Short-term, temporary construction-related noise, air quality, community, and safety impacts from the project would affect all communities along S.R. 108 (see Section 4.20, Construction Impacts). Since all residents would experience impacts equally, construction-related impacts would not disproportionately affect minority or low-income persons.

4.4.2.5 Summary

As a whole, most persons living in the project region are Caucasian and are living above the poverty level. Minority and low-income populations are present in Ogden to the northeast, but both Davis and Weber Counties are dominated by Caucasian, moderate-income families. The proposed changes to S.R. 108 would improve corridor accessibility for all residents of the region regardless of race, ethnicity, or income. The Minimize 4(f) Impacts Alternative would not cause disproportionately high and adverse effects on any environmental justice populations along S.R. 108.

4.4.3 West Alternative

As with the Minimize 4(f) Impacts Alternative, the West Alternative would have beneficial effects on all populations in the impact analysis area, including EJ populations. The West Alternative includes similar improvements to roadway safety, roadway mobility, and traffic flow. The following discussion focuses on how the West Alternative would specifically affect the identified EJ communities.

4.4.3.1 Block Groups on the East Side of S.R. 108 in Davis County

Because the West Alternative would widen the roadway only to the west side of S.R. 108, impacts to properties in the Davis County block groups east of S.R. 108 would be minor. The West Alternative would cause two relocations, one in block group 125501-3 and one in block group 125503-5, and one potential relocation in block group 125503-5. The relocations and potential relocation are not concentrated in any one area and collectively would not cause disproportionate effects to minority or low-income populations living in the impact analysis area.

What impacts would the West Alternative have on block groups 125501-3 and 125503-5?

The West Alternative would not cause disproportionate effects to these block groups.

4.4.3.2 Syracuse Junior High School Service Area

The West Alternative would affect the same physical area of the Syracuse Junior High School grounds as the Minimize 4(f) Impacts Alternative would. The West Alternative would have the same impacts on minority students who attend Syracuse Junior High School as the Minimize 4(f) Impacts Alternative would.

4.4.3.3 Midland Elementary School Service Area

The West Alternative would have the same impacts to minority and low-income students who attend Midland Elementary School as the Minimize 4(f) Impacts Alternative would.

4.4.3.4 Overall Community Impacts

The West Alternative would have the same impacts on community cohesion, economic conditions, noise, air quality, and safety and the same construction-related impacts as the Minimize 4(f) Impacts Alternative would.

4.4.3.5 Summary

The West Alternative would not indirectly affect any populations of a specific race, ethnicity, or income. The West Alternative would not cause disproportionately high and adverse effects on any EJ populations along S.R. 108.

4.5 Transportation Impacts

This section discusses how the roads that intersect or are adjacent to S.R. 108 would operate under the No-Action and action alternatives in 2030. The year 2030 was used because that is the current planning horizon of the WFRC's travel demand model.

What is the transportation impact analysis area?

The transportation impact analysis area includes the roads that intersect S.R. 108 and the transit that currently operates on S.R. 108.

4.5.1 No-Action Alternative

Under the No-Action Alternative, S.R. 108 would continue to operate at LOS F between Antelope Drive and 1900 West. Exhibit 4.5-1 below shows the expected congestion on the parallel north-south and intersecting east-west roads in 2030 compared to current conditions in 2005. The level of service on five of the east-west roads is expected to improve under the No-Action Alternative compared to existing conditions because these roads would be improved as specified in the Wasatch Front Regional Council's Long-Range Transportation Plan. Of the 16 roads evaluated, six would operate at a decreased level of service compared to existing conditions, and five would not change. (See Section 1.4.3, Current and Future Traffic Congestion, for more information about level of service.)

What is the Wasatch Front Regional Council's travel demand model?

The Wasatch Front Regional Council's travel demand model is a tool for predicting future traffic and level of service conditions on regional roadways including S.R. 108.

The regional transit system would be affected by the increased congestion levels on S.R. 108 under the No-Action Alternative as buses are delayed by the heavy traffic. In addition, without improvements to S.R. 108, buses would not be able to pull out of traffic, which would further increase congestion. The existing UTA Route 626 would experience regular congestion as S.R. 108 operates at LOS F. The congestion on this bus route could lead to problems such as the bus consistently operating behind schedule. In addition, east-west feeder routes that serve UTA's planned commuter rail line into Salt Lake City would also experience congestion where they cross S.R. 108, particularly along 4000 South in Roy and 700 South in Clearfield where commuter-rail stations are planned.

Exhibit 4.5-1: Level of Service in 2030 on Roadways Intersecting or Paralleling S.R. 108

Road (County)	Number of Travel Lanes in 2030	Level of Service		
		Existing Conditions (2005)	No-Action Alternative (2030)	Action Alternatives (2030)
North-South Roads				
I-15	8	E	F	E
S.R. 126	4	E	F	F
1000 West (Davis)	2	D	E	E
2700 West (Weber)	2	A	A	A
4500 West (Davis)	2	A	F	F
5900 West (Weber)	2	A	A	A
Bluff Road	2	A	A	A
East-West Roads				
Antelope Drive	4	F	C	C
200 South (Davis)	4	A	C	C
300 North (Davis)	2	D	C	C
800 North (Davis)	2	D	D	D
1800 North (Davis)	4	D	C	C
2300 North (Davis)	2	A	A	A
5500 South (Weber)	2	E	F	F
4800 South (Weber)	2	E	B	B
4000 South (Weber)	4	C	A	A

4.5.2 Minimize 4(f) Impacts Alternative

Under the Minimize 4(f) Impacts Alternative, the level of service on S.R. 108 would improve to LOS E or better on all segments in 2030. As shown above in Exhibit 4.5-1, improving S.R. 108 to five lanes would not decrease the level of service on other intersecting or parallel roads compared to the No-Action Alternative. Improving S.R. 108 would help reduce congestion on I-15 from LOS F to LOS E in 2030 by providing an alternate north-south road for local traffic.

The S.R. 108 roadway improvements should improve access to businesses along the corridor so that residents can shop locally instead of traveling to the main commercial corridor, S.R. 126, which is about 2 miles to the east. Less congestion on S.R. 108 would allow more commercial development and improved access to

businesses, which would encourage local residents to shop closer to home. This would reduce regional travel times and distances compared to the No-Action Alternative.

The Minimize 4(f) Impacts Alternative would be consistent with general transit service plans along S.R. 108. Because this alternative would include shoulders to allow buses to pull out of traffic and would reduce congestion on S.R. 108, Bus Route 626 would operate more efficiently than it would under the No-Action Alternative. Although this alternative would reduce localized congestion, this improvement would not increase or decrease transit ridership in the area.

4.5.3 West Alternative

The transportation and transit impacts from the West Alternative would be the same as those from the Minimize 4(f) Impacts Alternative.

4.6 Economic Impacts

This section discusses the expected economic impacts from the No-Action and action alternatives. Roadway widening and access changes could affect local businesses and employment, the tax base, and overall investment in the project area.

What is the economic impact analysis area?

The economic impact analysis area includes Weber and Davis Counties, the cities along S.R. 108, and the businesses adjacent to the roadway that could experience adverse or beneficial impacts from construction and operation of an improved S.R. 108.

Aerial photographs, county assessor property data, and the results of a drive-through survey of the S.R. 108 corridor were used to verify the businesses along S.R. 108. For this analysis, two types of impacts to business properties were considered: direct impacts (relocations) and proximity impacts (potential relocations). Land-only impacts (strip takes) are not discussed in this section.

A **direct impact (relocation)** to a business occurs when an existing structure is within the proposed right-of-way of the proposed improvements. These structures include not only the primary business structure but also other buildings that are not attached to the main building. This type of impact is referred to as a *relocation* because the entire property would need to be acquired and the business would need to relocate.

A **proximity impact (potential relocation)** occurs when a business is not directly affected by the proposed improvements, but there is an

impact to the property and the structure is within 15 feet of the proposed right-of-way. Structures that are potentially affected would not likely require relocation, but part of the surrounding property might be acquired. In cases where the partial acquisition of a property would hinder access to or the functionality of a business (such as with a loss of parking), the entire property might be acquired, and this would be considered a direct impact.

Land-only impacts (strip takes) that don't affect the access or functionality of a business are not included in the exhibits for this section.

Acquisition of property for right-of-way along S.R. 108 would convert taxable land to a nontaxable transportation use. To evaluate impacts to property tax revenue, current property tax rates were applied to the total market value for the right-of-way that would be acquired. Impacts to retail sales taxes are also considered in this section.

4.6.1 No-Action Alternative

The No-Action Alternative would not require the acquisition of land for additional right-of-way and so would not result in the relocation of businesses or loss of sales tax revenues. However, as congestion increases and safety decreases on S.R. 108 under the No-Action Alternative, businesses could lose revenue as the public uses alternate, less-congested commercial districts in the region.

4.6.2 Minimize 4(f) Impacts Alternative

The proposed improvements to S.R. 108 would change the local economic conditions along S.R. 108 and in the cities along S.R. 108. Although there would be some minor economic impacts from the loss of some businesses and the resulting loss of sales tax, the roadway improvements overall would benefit the local economy by reducing congestion, improving safety, and making businesses more accessible. The cities along S.R. 108 are planning to make the corridor either a primary or secondary commercial area and have included in their plans a widened S.R. 108 to help support the proposed economic development.

4.6.2.1 Business Access and Relocation Impacts

Widening S.R. 108 would affect some of the businesses along S.R. 108. The acquisition of right-of-way would require some businesses to be relocated, and proximity impacts would cause some loss of property. In addition, changes in accessibility along S.R. 108 could affect businesses adjacent to S.R. 108 as the public uses alternate, less-congested commercial districts in the region.

All property acquisitions resulting from the project would comply with the Uniform Relocation Assistance Act, as amended; Title VI of the Civil Rights Act of 1964; and 49 CFR 24, Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs.

Exhibit 4.6-1 summarizes the business impacts from the Minimize 4(f) Impacts Alternative. This alternative would require the relocation of six businesses: American Family Insurance; Swan Falls, Ponds & Waterfalls; Phillips 66/Triple Stop; an accessory structure at an LDS agricultural business; Utah Onions, Inc.; and AR Aluminum, Inc. These relocations would result in the loss of about 127 to 212 employees, although the employees of the LDS agricultural business are seasonal. These businesses could likely be relocated along S.R. 108 given the availability of commercial and vacant property and the conversion of residential properties to commercial uses.

Exhibit 4.6-1: Business Relocations under the Minimize 4(f) Impacts Alternative

Business	Business Type	Address	Estimated Employees	Type of Impact
American Family Insurance	Insurance	1663 South 2000 West	1–19	Relocation
Swan Falls, Ponds & Waterfalls	Retail lawn and garden	2019 North 2000 West	3–8	Relocation
Phillips 66/Triple Stop	Gas station/food mart	3536 West 4800 South	10–15	Relocation
LDS agricultural business	Agriculture	About 880 North 2000 West (east side of road)	5–20[a]	Relocation
Utah Onions, Inc.	Wholesale onions	850 South 2000 West	8–50[a]	Relocation
AR Aluminum, Inc.	Manufacturing	3441 S. Midland Drive	100	Relocation

Sources: U.S. Census Bureau 2002b; U.S. Department of Agriculture 2002; HDR 2006c

[a] Seasonal employees

Proximity impacts to some businesses along S.R. 108 would involve the acquisition of part of their lot, mainly lot frontage or parking areas. These businesses, which are shown in Exhibit 4.6-2, would not likely require relocation. However, the proposed right-of-way for S.R. 108 would be closer to each structure and could affect traffic circulation or parking in the lot.

Exhibit 4.6-2: Potential Business Relocations under the Minimize 4(f) Impacts Alternative

Business	Business Type	Address
Checker Auto Parts	Auto parts	1566 South 2000 West
Triple Stop Auto Sales	Auto sales, storage	3500 West 4785 South
Patterson Excavation and Hauling	Construction	2300 North 2016 West
Great Harvest	Bakery	2201–2173 North 2000 West
Harris Feed & Seed	Farm and garden	2056 North 2000 West
Wylde Hare Farms	Home business	3997 S. Midland Drive
Mountain States Telephone	Telephone infrastructure	~4100 S. Midland Drive
Midland Gas & Grocery	Gas station	3805 S. Midland Drive
Trace Minerals Research	Minerals testing and research	1996 S. Midland Drive

4.6.2.2 Property Tax Impacts

Property tax impacts can be analyzed at two jurisdictional levels: the county level and the municipality level. The county level includes the sum of all land in unincorporated areas and municipalities inside the county, while the municipal level includes only land within the municipality. The tax rates were obtained for each jurisdiction and applied to the total value of land in the respective taxing area.

Exhibit 4.6-3 below shows the impacts to property tax revenues as a result of acquiring private land under the Minimize 4(f) Impacts Alternative in Davis and Weber Counties and the affected municipalities. Overall, less than 1% of the property tax base of Davis and Weber Counties would be removed.

Exhibit 4.6-3: Property Tax Impacts to Counties and Municipalities from the Minimize 4(f) Impacts Alternative

Area	Property Tax Impact	Property Tax Revenues (2004)	Percent of Total Tax Revenues
Davis County	$61,171	$23,824,600	0.3%
Syracuse	$13,922	$582,100	2.4%
West Point	$13,060	$1,006,700	1.3%
Clinton	$14,584	$904,000	1.6%
Weber County	$88,644	$28,303,700	0.3%
Roy	$26,054	$2,007,000	1.3%
West Haven[a]	—	—	—

Sources: Utah State Tax Commission 2006; Utah State Auditor's Office 2006

[a] The Town of West Haven has no property tax levy and would be unaffected.

In the affected municipalities, the largest impact as a percent of total property tax revenues would occur in Syracuse, where about 2.4% of the $582,100 tax base would be lost. Overall, the impact to the property tax base of the counties and municipalities from the Minimize 4(f) Impacts Alternative would be small. There would not be substantial impacts to the property tax bases for either the counties or the municipalities. The anticipated growth in the communities would likely overcome this impact with continued development, which would add revenues to the tax base and offset the loss of property taxes from this alternative.

4.6.2.3 Sales Tax Impacts

In the long term, the Minimize 4(f) Impacts Alternative would have a positive impact on local option use taxes within the municipalities. Sales taxes are collected on products produced by the commercial and industrial sectors and are sold to end users. Negative impacts to sales tax revenues occur when a business is displaced or removed from a taxing jurisdiction, which removes the business's contribution to the local jurisdiction's tax base. Positive impacts to sales tax revenues occur when more businesses open in a taxing jurisdiction.

Of the businesses that would be displaced by the Minimize 4(f) Impacts Alternative, only three generate sales taxes: Swan Falls, Ponds & Waterfalls; Phillips 66/Triple Stop; and AR Aluminum, Inc. The displacement of these three businesses would result in the loss of

retail sales taxes; however, compared to total sales taxes generated within the jurisdictions, the impact of these losses would be minor. The resulting impact would likely be less than 1% of the overall tax revenues shown in Exhibit 3.6-7: Local Option Sales Tax Revenues.

Furthermore, gas stations and food marts tend to be located close to other similar businesses. Displacing one gas station might shift the sales tax revenue to another gas station within the same jurisdiction, which would offset the impact to the sales tax base. Additionally, because the cities anticipate that S.R. 108 will become more of a commercial corridor, the amount of sales tax generated could increase due to new businesses, which would ultimately increase the sales tax revenue in the area.

4.6.3 West Alternative

The economic impacts from the West Alternative would be the same as those from the Minimize 4(f) Impacts Alternative.

4.6.3.1 Business Access and Relocation Impacts

Exhibit 4.6-4 below summarizes the business impacts from the West Alternative. This alternative would require the relocation of 12 businesses: American Family Insurance; Swan Falls, Ponds & Waterfalls; Phillips 66/Triple Stop; Triple Stop Auto Sales; Midland Gas and Groceries; the Professional Haven Office Building; Great Harvest; Weber State Credit Union; Summit One Credit Union/ Packard Dental; Utah Onions, Inc.; AR Aluminum, Inc.; and a business that is not currently operating and is for sale. These relocations would result in the loss of about 182 to 337 employees along S.R. 108. These businesses could likely be relocated along S.R. 108 given the availability of commercial and vacant property and the conversion of residential properties to commercial use.

Exhibit 4.6-4: Business Relocations under the West Alternative

Business	Business Type	Address	Estimated Employees	Type of Impact
American Family Insurance	Insurance	1663 South 2000 West	1–19	Relocation
Swan Falls, Ponds & Waterfalls	Retail lawn and garden	2019 North 2000 West	3–8	Relocation
Phillips 66/Triple Stop	Gas station/food mart	3536 West 4800 South	10–15	Relocation
Triple Stop Auto Sales	Used auto sales	3536 West 4795 South	5–10	Relocation
Midland Gas and Groceries	Grocery store/gas	3805 S. Midland Drive	10–15	Relocation
Professional Haven Office Building	Professional offices	4645 S. Midland Drive	20–75	Relocation
Great Harvest	Bakery	2201–2173 North 2000 West	10–15	Relocation
Weber State Credit Union	Credit union	3500 West 6000 South	15–20	Relocation
Utah Onions, Inc.	Wholesale onions	850 South 2000 West	8–50[a]	Relocation
Summit One Credit Union/Packard Dental	Credit union and dental office	4815 S. Midland Drive	Unknown	Relocation
Closed business/for sale	Unknown	1800 North 2003 West	NA	Relocation
AR Aluminum, Inc.	Manufacturing	3441 S. Midland Drive	100	Relocation

Sources: U.S. Census Bureau 2002b; U.S. Department of Agriculture 2002; HDR 2006c

[a] Seasonal employees

Proximity impacts to some businesses along S.R. 108 would involve the acquisition of part of their lot, mainly lot frontage or parking areas. These businesses, which are shown in Exhibit 4.6-5, would not likely require relocation. However, the proposed right-of-way for S.R. 108 would be closer to each structure and could affect traffic circulation or parking in the lot.

Exhibit 4.6-5: Potential Business Relocations under the West Alternative

Business	Business Type	Address
Checker Auto Parts	Auto parts	1566 South 2000 West
Mark Higley Construction	Construction	1630 North 2017 West
Albertson's Express	Gas station	1829 North 2000 West
Blockbuster Video	Video rental	1867 North 2000 West
Patterson Excavation and Hauling	Construction	2300 North 2016 West
Weston's Glass and Hardware	Hardware retail	5975 South 3500 West
Wylde Hare Farms	Home business	3997 S. Midland Drive
Mountain States Telephone	Telephone infrastructure	~4100 S. Midland Drive
Midland Gas & Grocery	Gas station	3805 S. Midland Drive
Trace Minerals Research	Minerals testing and research	1996 S. Midland Drive

4.6.3.2 Property Tax Impacts

Exhibit 4.6-6 shows the impacts to property tax revenues as a result of acquiring private land under the West Alternative in Davis and Weber Counties and the affected municipalities. Overall, less than 1% of the property tax base of Davis and Weber Counties would be removed.

In the affected municipalities, the largest impacts as a percent of total property tax revenues occur in Syracuse and Clinton, where about 3.1% and 3.2%, respectively, of their respective tax bases would be affected. Overall, the impact to the property tax base of the counties and municipalities from the West Alternative would be small. The anticipated growth in the communities would likely overcome this impact with continued development, which would add additional revenues to the tax base and offset the loss of property taxes from the alternative.

Exhibit 4.6-6: Property Tax Impacts to Counties and Municipalities from the West Alternative

Area	Property Tax Impact	Property Tax Revenues (2004)	Percent of Total Tax Revenues
Davis County	$73,559	$23,824,600	0.3%
Syracuse	$17,753	$582,100	3.1%
West Point	$9,734	$1,006,700	1.0%
Clinton	$28,482	$904,000	3.2%
Weber County	$130,151	$28,303,700	0.5%
Roy	$37,843	$2,007,000	1.9%
West Haven[a]	—	—	—

Sources: Utah State Tax Commission 2006; Utah State Auditor's Office 2006

[a] The Town of West Haven has no property tax levy and would be unaffected.

4.6.3.3 Sales Tax Impacts

The West Alternative would have a long-term positive impact on local option use taxes within the municipalities. Of the businesses that would be displaced by the West Alternative, six generate sales taxes: Swan Falls, Ponds & Waterfalls; Phillips 66/Triple Stop; Triple Stop Auto Sales; Midland Gas and Groceries; AR Aluminum, Inc.; and Great Harvest. The displacement of these businesses would result in the loss of retail sales taxes; however, compared to total

sales taxes generated within the jurisdictions, the impact of these losses would be minor. The resulting impact would likely be less than 1% of the overall tax revenues shown in Exhibit 3.6-7: Local Option Sales Tax Revenues. Additionally, because the cities anticipate that S.R. 108 will become more of a commercial corridor, the amount of sales tax generated could increase due to new businesses, which would ultimately increase the sales tax revenue in the area.

4.6.4 Mitigation Measures for Economic Impacts

Although the acquisition of commercial properties could cause an adverse impact on a given business, this impact would not necessarily cause an adverse impact to the area economy. Acquired businesses would be relocated by UDOT according to the Uniform Relocation Assistance Act, as amended; Title VI of the Civil Rights Act of 1964; and 49 CFR 24, Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs. If shoppers continue to want the services provided by a relocated business, the business should be successful at its new location, especially if it is reasonably close to the current location.

4.7 Joint Development Impacts

Section 3.7, Joint Development, describes opportunities for projects that might be developed jointly in the S.R. 108 study area. This section analyzes the proposed project's impacts on joint development.

What is joint development?

Joint development is a term used by FHWA which, in this context, encompasses opportunities and expected impacts that are also addressed elsewhere in this EIS (for example, opportunities to construct pedestrian and bicycle trails).

4.7.1 No-Action Alternative

Because no major roadway improvements would be made to S.R. 108 under the No-Action Alternative, there would be no joint development opportunities.

4.7.2 Minimize 4(f) Impacts Alternative

Under the Minimize 4(f) Impacts Alternative, the pedestrian underpass would be constructed at about 1150 North in Clinton.

UDOT would coordinate with the City of Clinton to include the underpass in the S.R. 108 improvements and construction schedule.

4.7.3 West Alternative

The joint development opportunities for the West Alternative would be the same as those for the Minimize 4(f) Impacts Alternative.

4.8 Impacts to Pedestrian and Bicycle Resources

This section addresses impacts to existing and proposed pedestrian and bicycle facilities in the pedestrian and bicyclist impact analysis area. This analysis was performed using information collected through interviews with city and county planning staff and reviews of local and regional land use master plans.

What is the pedestrian and bicyclist impact analysis area?

The pedestrian and bicyclist impact analysis area is the area within one-half mile of S.R. 108.

4.8.1 No-Action Alternative

Under the No-Action Alternative, no improvements to S.R. 108 would be made except for routine maintenance. There would be no impacts to existing facilities, and S.R. 108 would continue to lack continuous sidewalk facilities and bicycle routes.

4.8.2 Minimize 4(f) Impacts Alternative

The Minimize 4(f) Impacts Alternative includes 8-foot shoulders with a 4-foot Class II bicycle lane, 2.5-foot curb and gutter, and 4-foot sidewalks. These roadway improvements would increase pedestrian safety by providing continuous sidewalks. The roadway shoulder would provide a buffer between the travel lanes and pedestrians on the sidewalk. The proposed pedestrian and bicycle facilities on S.R. 108 would be consistent with local and regional plans, which recommend that sidewalks and bicycle accommodations should be provided on S.R. 108. The proposed improvements would be consistent with WFRC's recommendation for a bicycle facility on S.R. 108.

What are Class II and Class III bicycle facilities?

A *Class II bicycle facility* is a bicycle-only lane on each side of the road for one-way bicycle travel.

A *Class III bicycle facility* is a bicycle lane that is shared with vehicle or pedestrian traffic.

4.8.2.1 Impacts on Existing Pedestrian and Bicyclist Resources

Currently, there are no bicycle lanes on S.R. 108, and the existing sidewalks are not continuous. The proposed road improvements under the Minimize 4(f) Impacts Alternative would improve pedestrian and bicyclist resources.

The Minimize 4(f) Impacts Alternative would not the affect use of the Clinton Creek Trail at 2050 North and S.R. 108 in Clinton. This alternative would not interfere with construction of the proposed pedestrian and bicycle underpass at this location.

4.8.2.2 Impacts on Future Pedestrian and Bicyclist Resources

West Haven is planning to develop the Power Line Corridor Trail along the power line corridor that runs parallel to S.R. 108 but is outside the impact analysis area. The trail will connect to the improved pedestrian and bicycle facilities on S.R. 108 at about 4500 South (see Exhibit 3.8-1: Proposed Facilities in the Pedestrian and Bicyclist Impact Analysis Area). Three other potential future facilities would connect to S.R. 108: two in Syracuse at about 1200 South and 1700 South and one in West Point at 200 South. These facilities would connect to the improved pedestrian and bicycle facilities on S.R. 108 and are planned within the S.R. 108 right-of-way. The Minimize 4(f) Impacts Alternative would not affect the use of these facilities.

4.8.3 West Alternative

The impacts from the West Alternative would be the same as those from the Minimize 4(f) Impacts Alternative.

4.9 Air Quality Impacts

This section describes the expected air quality impacts from the S.R. 108 project. Air quality impacts were evaluated using models and methodologies approved by FHWA and UDOT.

What is the air quality impacts analysis area?

Because the S.R. 108 project would be located in Davis and Weber Counties, these counties make up the impact analysis area for the air quality analysis.

4.9.1 Methodology for Evaluating Air Quality Impacts

4.9.1.1 Methodology for Evaluating CO Impacts

Impacts to CO were assessed using the CAL3QHC line source dispersion model. The CAL3QHC model considers free-flow and idling vehicle emissions in conjunction with intersection geometry, wind direction, and other meteorological factors. This model was used to calculate peak 1-hour CO concentrations near selected intersections along S.R. 108. Eight-hour CO concentrations were estimated by applying a persistence factor of 0.7 to the 1-hour concentration as recommended by EPA.

What is mixing height?

Mixing height is the height at which vertical mixing of air takes place. In unstable air, the mixing height is higher, and in stable air, the mixing height is lower. High mixing heights allow better dispersion of pollutants.

Assumptions and Parameters. Consistent with recommendations provided in UDOT's Air Quality "Hot-Spot" Manual (UDOT 2003), the critical assumptions and configuration parameters used in the CAL3QHC modeling included a 1,000-meter mixing height, low wind speed (1 meter per second), a 1-hour background CO concentration of 8.0 ppm, an 8-hour background CO concentration of 5.0 ppm, and an analysis year of 2035. In addition, the modeling assumed a very stable (Class E) atmosphere to simulate adverse wintertime air quality conditions when CO violations are more likely to occur.

The modeling evaluated 36 wind directions to ensure that the worst-case condition was considered for each receptor location (see the section below titled Sensitive Receptors). Intersection configurations and traffic movements, as well as traffic volumes and travel speeds, were provided from the traffic models. Vehicle emission rates were obtained from the Air Quality "Hot-Spot" Manual.

The CO concentrations predicted under worst-case meteorological conditions represent the highest CO levels that could be caused by vehicle emissions. This approach is consistent with the objective of the ambient air quality standards to prevent human exposure to unsafe levels of air pollution.

Sensitive Receptors. CO concentrations were estimated at locations referred to as *sensitive receptors*. In the S.R. 108 corridor, most individual exposure to CO emissions would be at locations adjacent to the roadway, including along individual segments of S.R. 108 and at intersections where people would be likely to spend more time. For each selected intersection, 15 to 18 receptors were modeled at sidewalk locations around the intersection. For each segment of S.R. 108, 10 receptors were modeled at sidewalks or other locations (for example, lawns) near the proposed alignment.

Impact Criteria. For this project, the following criteria were applied to the air quality modeling results to determine if an air quality impact would occur:

- If the modeled 1-hour CO concentration was greater than the 1-hour CO standard (35 ppm) at a receptor location, then an air quality impact would occur.
- For the 8-hour CO concentrations, an air quality impact would occur if either of the following criteria are met:
  - If the modeled 8-hour CO concentration was greater than the 8-hour CO standard (9 ppm) at a receptor location, then an air quality impact would occur.
  - For those locations with existing violations of the 8-hour standard under the No-Action Alternative, if the proposed project would increase the severity or frequency of the modeled impact compared to the No-Action Alternative, then an air quality impact would occur.

What is a sensitive receptor?

Sensitive receptors are locations where the maximum total CO concentration is likely to occur and where the general public is likely to have continuous access and exposure to vehicle emissions.

4.9.1.2 Methodology for Evaluating PM_{10} Impacts

A qualitative PM_{10} air quality impact assessment was prepared according to EPA's guidance, Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Non-attainment and Maintenance Areas (EPA 2006).

There are two categories of particulate emissions from mobile sources: primary and secondary.

- **Primary particulate emissions** are those emitted from vehicle tailpipes, brake wear, decomposition of rubber tires, and road dust stirred up by moving vehicles.
- **Secondary particulate emissions** result from chemical reactions in the atmosphere and include oxides of sulfur (SO_x) and oxides of nitrogen (NO_x) that are emitted from vehicle tailpipes as gaseous pollutants.

What are attainment, non-attainment, and maintenance areas?

An *attainment area* is an area that meets (or "attains") the NAAQS for a given pollutant. A *non-attainment area* is an area that does not meet the NAAQS for a given pollutant. A *maintenance area* is a non-attainment area that has not had a recorded violation of the NAAQS in several years and is on its way to being redesignated as an attainment area.

4.9.1.3 Methodology for Evaluating MSAT Impacts

MSATs were not quantitatively evaluated for this project because the relatively low traffic volumes on S.R. 108 would not meet FHWA's threshold of about 140,000 vehicles per day for conducting a quantitative MSAT analysis. The average annual daily traffic volumes on S.R. 108 with the proposed project are expected to be about 30,000 to 40,000 vehicles per day. However, a qualitative MSAT assessment was conducted (see Section 4.9.5, Mobile-Source Air Toxics).

4.9.2 No-Action Alternative

Under the No-Action Alternative, no improvements to S.R. 108 would be made. Under this alternative, air quality at all intersections and segments along S.R. 108 would improve over existing conditions because vehicle emission rates would be lower in 2035 than under existing conditions. Under the No-Action Alternative, the 1-hour and 8-hour NAAQS for CO would not be exceeded.

4.9.3 Minimize 4(f) Impacts Alternative

Under this alternative, S.R. 108 would be widened in a way that minimizes impacts to Section 4(f) properties.

The S.R. 108 project is consistent with WFRC's most recent Congestion Management System and was identified as a high-priority project in that document (WFRC 2004). These congestion management strategies serve to reduce air quality impacts.

The S.R. 108 project is designed to reduce congestion in a rapidly developing and high-growth area by adding general-purpose lanes on S.R. 108. Other congestion-management strategies that are designed to reduce congestion include traffic-signal coordination and intersection improvements such as dual left-turn lanes that will reduce traffic delays and improve vehicle speeds along S.R. 108.

These and other transportation demand management strategies in WFRC's Congestion Management System such as encouraging ride-sharing, growth planning, and transit improvements will all improve long-term air quality along S.R. 108.

4.9.3.1 CO Impacts

The CO impacts shown in Exhibit 4.9-1 below are operational impacts that would occur after the S.R. 108 project is completed. As shown in Exhibit 4.9-1, the modeled 1-hour CO concentrations at intersections and segments along S.R. 108 ranged from 8.9 ppm to 9.6 ppm and were below the 35-ppm NAAQS. The modeled 8-hour concentrations ranged from 5.6 ppm to 6.1 ppm and were below the 8-hour NAAQS of 9 ppm. There would be no impacts to CO under this alternative.

Exhibit 4.9-1: Modeled CO Impacts from the No-Action and Action Alternatives

Location on S.R. 108	1-Hour Concentration (ppm)				8-Hour Concentration (ppm)			
	Existing Conditions[a,c]	No-Action Alternative[a,c] (2035)	Action Alternatives[a,c] (2035)	NAAQS	Existing Conditions[b,c]	No-Action Alternative[b,c] (2035)	Action Alternatives[b,c] (2035)	NAAQS
Intersections								
300 North	9.6	8.9	9.2	35	6.1	5.6	5.8	9
1800 North	9.7	9.1	9.2	35	6.2	5.8	5.8	9
6000 South	9.4	8.8	9.1	35	6.0	5.6	5.8	9
5600 South	9.7	9.2	9.6	35	6.2	5.8	6.1	9
4800 South	9.4	9.0	9.3	35	6.0	5.7	5.9	9
4000 South	9.7	9.2	9.3	35	6.2	5.8	5.9	9
Segments								
1800 North – 2300 North	11.7	9.8	8.9	35	7.6	6.3	5.6	9
6000 South – 5600 South	10.3	9.2	9.0	35	6.6	5.8	5.7	9
5600 South – 4800 South	9.6	9.2	9.0	35	6.1	5.8	5.7	9

ppm = parts per million

[a] Includes 1-hour background concentration of 8.0 ppm.

[b] Includes 8-hour background concentration of 5.0 ppm.

[c] Highest modeled CO concentration shown for all scenarios.

4.9.3.2 PM_{10} Impacts

With the exception of the city of Ogden, Davis and Weber Counties are attainment areas for PM_{10}, so a project-level determination of whether the Minimize 4(f) Impacts Alternative would conform to the provisions of the Clean Air Act is not required. Instead, this section qualitatively describes the PM_{10} impacts from the Minimize 4(f) Impacts Alternative. Although there would be PM_{10} emissions associated with this alternative, the emissions are not expected to cause substantial impacts.

As discussed in Section 3.9, Air Quality, the Ogden urban area is currently a non-attainment area for PM_{10}, although the area is in the process of being redesignated as a maintenance area. Since the Minimize 4(f) Impacts Alternative would not be located in Ogden, there would be no PM_{10} impacts in that non-attainment area. Microscale traffic patterns in Ogden are not expected to change as a result of the Minimize 4(f) Impacts Alternative, so no impacts to the PM_{10} non-attainment area in Ogden are expected.

There are two major categories of PM_{10} emissions associated with the Minimize 4(f) Impacts Alternative: construction emissions and operational emissions.

Construction-Related PM_{10} Emissions

Construction-related PM_{10} emissions would be localized and short-term, lasting only for the duration of the construction period. Construction emissions would be minimized through good construction practices such as watering exposed surfaces, minimizing the amount of exposed and disturbed surfaces, minimizing construction equipment and vehicle speeds, and properly maintaining construction and vehicle engines.

Operational PM_{10} Emissions

Operational PM_{10} emissions, which would occur after the S.R. 108 project is completed, would have a greater range and duration than construction-related emissions.

PM_{10} monitors are generally located in or near areas with known PM_{10} problems. The nearest PM_{10} monitors to S.R. 108 are in North Salt Lake and Ogden. The North Salt Lake monitoring station is

about 350 feet from I-15 and reflects the typical PM_{10} contributions from high-volume roadways.

The ambient PM_{10} monitoring data for the North Salt Lake monitoring station show that there have been no violations of the PM_{10} standards at this monitoring station since 1999, and annual average concentrations of PM_{10} have declined since 2000. According to the Utah traffic volume data for 2000, 2001, and 2002 (UDOT 2004), average annual daily traffic volumes on I-15 near the North Salt Lake monitoring station were measured at about 99,700 vehicles per day (vpd), 115,700 vpd, and 121,600 vpd, respectively. These trends illustrate that, as annual traffic volumes increase, average annual PM_{10} concentrations have declined.

Average annual daily traffic volumes on S.R. 108 are expected to range from about 30,000 to 40,000 vehicles per day. This volume would be about 33% of the daily volume currently experienced on I-15 near the North Salt Lake monitoring station. Since the existing traffic volumes on I-15 are much higher than those expected on S.R. 108 and do not cause violations of the PM_{10} standard at the North Salt Lake monitoring station, it is unlikely that traffic volumes associated with the Minimize 4(f) Impacts Alternative would cause violations of the PM_{10} standard.

Non-tailpipe emissions include emissions from tire and brake wear and resuspended dust. Depending on the condition of the roadway, resuspended dust emissions are usually a greater source of particulates than tire and brake wear emissions. Resuspended dust emissions can be minimized through street sweeping, natural precipitation events, scavenging of dust due to high-speed traffic, and other mitigation measures.

4.9.4 West Alternative

The intersection configurations and segments of S.R. 108 under the West Alternative would be the same as those for the Minimize 4(f) Impacts Alternative, so the air quality impacts from the West Alternative would be the same as those from the Minimize 4(f) Impacts Alternative. There would be no air quality impacts under the West Alternative.

4.9.5 Mobile-Source Air Toxics (MSATs)

4.9.5.1 Project-Level MSATs

In addition to the criteria air pollutants for which there are NAAQS, EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (for example, airplanes), area sources (for example, dry cleaners), and stationary sources (for example, factories or refineries).

MSATs are a subset of the 188 air toxics defined by the Clean Air Act. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other air toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

EPA is the lead agency for administering the Clean Air Act and has some responsibilities concerning the health effects of MSATs. EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources, 66 *Federal Register* 17229 (March 29, 2001). In the rule, EPA evaluated the effects of existing and newly promulgated mobile-source control programs, including the reformulated gasoline (RFG) program, the national low-emission vehicle (NLEV) standards, the Tier 2 motor vehicle emissions standards and gasoline sulfur-control requirements, and the proposed heavy-duty engine and vehicle standards. Between 2000 and 2020, even with a 64% increase in vehicle-miles traveled (VMT), these ongoing programs should reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57% to 65% and on-highway diesel particulate matter emissions by 87%.

As a result, EPA has concluded that no additional motor vehicle emissions standards or fuel standards are necessary to further control MSATs. The agency is preparing another rule under the authority of Clean Air Act Section 202(l) that will address these issues and could make adjustments to the full list of 21 MSATs and the six primary MSATs.

Unavailable Information for Project-Specific MSAT Impact Analysis

This MSAT assessment includes a basic analysis of the likely MSAT emission impacts of the proposed project. However, available technical tools do not allow for estimates of the project-specific health impacts of the emission changes associated with the proposed alternatives. Because of these limitations, the following discussion is included in accordance with Council on Environmental Quality (CEQ) regulations (40 CFR 1502.22(b)) concerning incomplete or unavailable information.

Information That Is Unavailable or Incomplete. Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several activities, including emissions and dispersion modeling, estimating ambient MSAT concentrations resulting from the estimated emissions, exposure modeling to estimate human exposure to the estimated concentrations, and a final determination of the health impacts based on the estimated exposure. Each of these requirements has technical issues that prevent a more complete determination of the MSAT health impacts of this project.

- **Emissions Modeling.** Modeling tools to estimate MSAT emissions from motor vehicles are not sensitive to the key variables that determine MSAT emissions for highway projects. While the MOBILE 6.2 model is used to predict emissions at a regional level, it has limited applicability at the project level. MOBILE 6.2 does not have the ability to predict specific emission factors for specific vehicle operating conditions at a specific location at a specific time. Because of this limitation, MOBILE 6.2 only approximates the operating speeds and levels of congestion likely to be present on the largest-scale projects and cannot adequately capture emissions from smaller projects. For particulate matter, the model results are not sensitive to average trip speed, although the other MSAT emission rates do change with changes in trip speed. Also, the emissions rates used in MOBILE 6.2 for both particulate matter and MSATs are based on a limited number of validation tests based on older-technology vehicles.

These limitations limit the ability of MOBILE 6.2 to estimate MSAT emissions. As a result, MOBILE 6.2 is adequate for estimating emissions trends and performing relative analyses between alternatives for very large projects, but is not sensitive enough to capture the effects of travel changes associated with smaller projects or to estimate emissions near specific roadside locations.

- **Dispersion Modeling.** Available tools to predict how MSATs disperse in the environment are also limited. CAL3QHC and other line-source dispersion models were developed and validated more than 10 years ago for predicting worst-case CO concentrations to determine compliance with the NAAQS. The performance of dispersion models such as CAL3QHC is more accurate for estimating the maximum concentrations that can occur at a given time and location. This limitation makes it difficult to predict accurate exposure patterns at specific times at specific locations throughout an urban area to assess potential health risks. The National Cooperative Highway Research Program (NCHRP) is conducting research on best practices in applying models and other technical methods in the analysis of MSATs. This research also will focus on identifying appropriate methods of documenting and communicating MSAT impacts in the NEPA process and to the general public. Along with these general limitations of dispersion models, there is also a lack of site-specific monitoring data for use in establishing project-specific MSAT background concentrations.
- **Exposure Levels and Health Effects.** Finally, even if emission levels and concentrations of MSATs could be accurately predicted, limitations in current techniques for exposure assessment and risk analysis preclude meaningful conclusions about project-specific health impacts associated with MSATs. Exposure assessments are difficult because it is difficult to accurately calculate annual concentrations of MSATs near roadways and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are further compounded for 70-year cancer assessments, especially because unsupportable assumptions would have to be made concerning changes in travel patterns and vehicle technology (which affects emissions rates) over a

70-year period. There are also considerable uncertainties associated with the existing estimates of toxicity for the MSATs and translating occupational exposure data to the general population. Because of these uncertainties, any estimated difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with calculating the impacts. The conclusions resulting from such assessments would not be useful to decision-makers, who would need to weigh this information against other project impacts that are better suited for quantitative analysis.

Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSATs. Research into the health impacts of MSATs is ongoing. For different emission types, there are a number of studies indicating statistical associations with adverse health outcomes through epidemiological studies (frequently based on emission levels found in occupational settings) or that demonstrate adverse health outcomes in laboratory animals when exposed to large doses.

Exposure to toxics has been a focus of a number of EPA efforts. Most notably, the agency conducted the National Air Toxics Assessment (NATA) in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or state level.

EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System (IRIS) is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at www.epa.gov/iris. The following toxicity information for the six prioritized MSATs was taken from the IRIS database *Weight of Evidence Characterization* summaries. This information represents EPA's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- **Benzene** is characterized as a known human carcinogen.
- **Acrolein's** carcinogenicity cannot be determined because the existing data are inadequate for an assessment of human

carcinogenic potential for either the oral or inhalation route of exposure.

- **Formaldehyde** is a probable human carcinogen based on limited evidence in humans and sufficient evidence in animals.
- **1,3-butadiene** is characterized as carcinogenic to humans by inhalation.
- **Acetaldehyde** is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.
- **Diesel exhaust** is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this EIS is the combination of diesel particulate matter and diesel exhaust organic gases.

  Diesel exhaust is also associated with chronic respiratory effects, possibly the primary noncancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.

There have been other studies that address MSAT health impacts in proximity to roadways. The Health Effects Institute, a nonprofit organization funded by EPA, FHWA, and industry, has undertaken a series of studies to research near-roadway MSAT hot spots, the health implications of the entire mix of mobile-source pollutants, and other topics. The final summary of the series is not expected for several years.

Some recent studies have reported that proximity to roadways is related to adverse health outcomes, particularly respiratory problems. Much of this research is not specific to MSATs, but instead surveys the full spectrum of criteria and other pollutants. FHWA cannot evaluate the validity of these studies nor provide information that would be useful to alleviate the uncertainties associated with the health effects of MSATs.

Relevance of Unavailable or Incomplete Information to Evaluating Reasonably Foreseeable Significant Adverse Impacts on the Environment, and Evaluation of Impacts Based on Theoretical Approaches or Research Methods Generally Accepted in the Scientific Community. Because of the uncertainties discussed above, a quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the project level for the S.R. 108 project. While some analytical tools do allow for reasonable predictions of relative emissions changes between alternatives for larger projects, the MSAT emissions from each of the project alternatives and MSAT concentrations or exposures created by each of the project alternatives cannot be predicted with sufficient accuracy to be useful in estimating health impacts. Therefore, the relevance of the unavailable or incomplete information leads to the conclusion that it is not possible to make a determination of whether any of the alternatives would have significant adverse impacts on the human environment.

Therefore, the S.R. 108 project could result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain. Because of this uncertainty, the health effects from these emissions cannot be estimated.

4.9.5.2 MSAT Impacts (Action Alternatives)

For the action alternatives, the amount of MSATs emitted would be proportional to the VMT, assuming that other variables such as fleet mix are similar for each alternative. The VMT estimated for each of the action alternatives (about 96 million VMT per year) is higher than for the No-Action Alternative (about 65 million VMT per year) because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. The increase in VMT over the No-Action Alternative would lead to higher MSAT emissions along S.R. 108 (primarily during peak traffic hours in the morning and evening) along with a corresponding decrease in MSAT emissions along parallel routes. A comparison of regional VMT shows no appreciable differences between the No-Action and action alternatives. The emission increases along S.R. 108 would be offset by lower MSAT emission rates due to increased speeds. According to EPA's

MOBILE 6.2 emissions model, emissions of all priority MSATs except for diesel particulate matter decrease as speed increases. The extent to which these speed-related emission decreases will offset VMT-related emission increases cannot be reliably projected due to the inherent deficiencies of existing technical models.

Because the estimated VMT under each of the action alternatives are nearly the same, there would be no appreciable difference in overall MSAT emissions between the two alternatives. In addition, vehicle emissions would likely be lower in the future as a result of EPA's national control programs that are expected to reduce MSAT emissions by 57% to 87% between 2000 and 2020. Local conditions along S.R. 108 might differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures, but the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The additional travel lanes resulting from either of the action alternatives could move some traffic closer to nearby homes, schools, and businesses, so under each alternative there might be localized areas where ambient concentrations of MSATs could be higher than under the No-Action Alternative. However, as discussed above, the magnitude and the duration of these potential increases compared to the No-Action Alternative cannot be accurately quantified due to the limitations of current models. Therefore, under either of the action alternatives, the localized level of MSAT emissions could be higher relative to the No-Action Alternative, but this could be offset due to increases in vehicle speeds and reduced congestion along the roadway. Also, MSATs will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with vehicle fleet turnover, will, over time, result in substantial MSAT emission reductions that, in almost all cases, will cause region-wide MSAT levels to be substantially lower than they are under existing conditions.

4.9.6 Mitigation Measures for Impacts to Air Quality

Because there were no CO impacts associated with either alternative, no mitigation for impacts to CO is required.

For PM_{10}, several mitigation measures will be implemented as part of the proposed project. These measures will include minimizing construction emissions through best management practices and maintaining construction equipment engines.

4.10 Noise Impacts

This section describes noise impacts associated with the S.R. 108 project. Traffic noise impacts were evaluated using noise models and methodologies approved by FHWA and UDOT. Noise impacts were identified at residential and commercial locations within about 500 feet of the proposed alignments. Where appropriate, noise walls or other abatement measures were evaluated to mitigate noise impacts, and recommendations were made for considering whether to construct noise walls.

What is the noise impact analysis area?

The impact analysis area for the noise analysis is the land adjacent to the proposed alignments that could be affected by an increase in noise from construction and operation of the proposed alternatives.

4.10.1 Methodology for Evaluating Noise Impacts

4.10.1.1 Traffic Noise Impact Methodology

The following methods were used to assess traffic noise impacts associated with the proposed project:

- Field surveys and aerial photographs were used to identify existing activities, developed lands, and undeveloped lands for which development is planned, designed, or programmed and that could be affected by noise from the S.R. 108 alternatives.
- Short-term (15-minute) sound-level measurements typical of existing conditions at residences, parks, and churches (as described in Section 3.10.3, Existing Noise Levels) were taken throughout the project area and were used to characterize the existing noise environment.
- Project-related traffic noise levels were predicted using the FHWA Traffic Noise Model, Version 2.5 (February 2004).
- Project-related traffic noise impacts were identified using the criteria specified in UDOT's Noise Policy.
- Mitigation measures for reducing noise impacts were evaluated using UDOT's guidelines for determining feasibility, reasonableness, and cost-effectiveness.

What is noise?

Noise is defined as unwanted sound. This EIS uses the A-weighted decibel scale (dBA) for measuring noise levels.

4.10.1.2 The Traffic Noise Model

Traffic noise levels were modeled using the FHWA Traffic Noise Model (TNM), Version 2.5. TNM estimates acoustic intensity at receiver locations based on the level of sound energy generated from a series of straight-line roadway segments. The effects of factors that shield residences from traffic noise, such as existing structures, vegetation, or terrain, can be included in the model to provide a higher level of detail and accuracy.

Because the S.R. 108 improvements would extend over about 9.5 miles, the project corridor was divided into nine segments to facilitate the noise modeling (see Exhibit 2.1-4: Corridor Segments). In addition, the analysis focused on areas with residential developments where noise walls might be warranted.

Noise levels were modeled to reflect the expected traffic conditions in 2035 after the project is completed. Under either of the action alternatives, the level of service along S.R. 108 would range from LOS B to LOS E. In those segments where the level of service was LOS D or E, LOS C was used for volumes and vehicle speeds in order to maximize noise levels and generate a worst-case scenario. As a result, the modeled noise levels were nearly the same for both alternatives.

Under the action alternatives, some residences along S.R. 108 would be subject to residential relocations. For the noise analysis, the number of affected residences does not include any residences that are subject to potential or confirmed relocations.

4.10.2 No-Action Alternative

Land uses along S.R. 108 are a mix of residential, commercial, and agricultural uses on both sides of the existing alignment. Most residences and businesses have direct access to S.R. 108.

Under the No-Action Alternative, no improvements to S.R. 108 would be made, so no noise impacts would occur due to the project. Under the No-Action Alternative, all nine segments of S.R. 108 would operate at LOS F with very slow traffic speeds (about 13 mph). As a result of increased traffic operating at slower speeds, noise levels along S.R. 108 would increase by about 1 dBA over existing conditions, which would not be detectable by humans. Under the No-Action Alternative, the residential noise-abatement criterion would be approached or exceeded at 347 residences (see Exhibit 4.10-1 through Exhibit 4.10-9, Modeled Noise Levels, beginning on page 4-87).

What is the residential noise-abatement criterion?

The residential noise-abatement criterion is the noise level (66 dBA) at which UDOT would consider building noise walls that would abate, or reduce, noise impacts from the project on residences near S.R. 108.

4.10.3 Minimize 4(f) Impacts Alternative

Under this alternative, S.R. 108 would be widened to minimize impacts to Section 4(f) properties. The impact analysis area and receptor locations for this alternative are shown in Exhibit 4.10-10 through Exhibit 4.10-18, Noise Receptor Locations, beginning on page 4-97. All churches, public parks, playgrounds, and recreation facilities are located well over 500 feet from S.R. 108 and, in most instances, the noise from S.R. 108 is screened by several rows of intervening residences or other buildings. At such distances there

would be no discernible increase in noise levels due to the project improvements on S.R. 108. As discussed in more detail below, project-related improvements would increase existing noise levels by about 1 dBA to 2 dBA at churches, parks, playgrounds, and recreational facilities nearest the road. Since all of the public parks and playgrounds are located well away from the road, noise impacts due to the project would not be discernible to humans. In addition, the parks and playgrounds are active recreation areas where very low noise levels are not an important feature of the facility.

The goal of the noise analysis was to determine if the predicted noise levels under this alternative would approach or exceed the applicable noise-abatement criterion (66 dBA for residential locations) or would result in a 10-dBA increase over existing noise levels (which is considered a substantial exceedance according to UDOT criteria). Under this alternative, the residential noise-abatement criterion would be approached or exceeded at about 300 residences.

4.10.3.1 Segment 1 (Antelope Drive to 700 South)

Modeled noise levels and project-related impacts at noise receptors in Segment 1 are shown in Exhibit 4.10-1: Modeled Noise Levels (dBA): Segment 1 – Antelope Drive to 700 South on page 4-87. Under existing conditions, the residential noise-abatement criterion is exceeded at 13 noise receptors representing about 34 residences.

Under the Minimize 4(f) Impacts Alternative, noise levels in Segment 1 would increase by 1 dBA to 2 dBA at residences near the roadway. Excluding potential or confirmed relocations, the residential noise-abatement criterion would be approached or exceeded at eight receptor locations representing about 19 residences.

4.10.3.2 Segment 2 (700 South to 300 North)

Modeled noise levels and project-related impacts at noise receptors in Segment 2 are shown in Exhibit 4.10-2: Modeled Noise Levels (dBA): Segment 2 – 700 South to 300 North on page 4-88. Under existing conditions, the residential noise-abatement criterion is exceeded at 13 noise receptors representing about 50 residences.

Under the Minimize 4(f) Impacts Alternative, noise levels in Segment 2 would increase by 1 dBA to 2 dBA at residences near the

roadway. Excluding potential or confirmed relocations, the residential noise-abatement criterion would be approached or exceeded at 10 receptor locations representing about 39 residences.

4.10.3.3 Segment 3 (300 North to 1300 North)

Modeled noise levels and project-related impacts at noise receptors in Segment 3 are shown in Exhibit 4.10-3: Modeled Noise Levels (dBA): Segment 3 – 300 North to 1300 North on page 4-89. Under existing conditions, the residential noise-abatement criterion is exceeded at 20 noise receptors representing about 53 residences.

Under the Minimize 4(f) Impacts Alternative, noise levels in Segment 3 would increase by 1 dBA to 2 dBA at residences near the roadway. Excluding potential or confirmed relocations, the residential noise-abatement criterion would be approached or exceeded at 12 receptor locations representing about 28 residences.

4.10.3.4 Segment 4 (1300 North to 2300 North)

Modeled noise levels and project-related impacts at noise receptors in Segment 4 are shown in Exhibit 4.10-4: Modeled Noise Levels (dBA): Segment 4 – 1300 North to 2300 North on page 4-90. Under existing conditions, the residential noise-abatement criterion is exceeded at 10 noise receptors representing about 29 residences.

Under the Minimize 4(f) Impacts Alternative, noise levels in Segment 4 would decrease by 1 dBA at one location, stay the same, or increase by 1 dBA to 2 dBA. Excluding potential or confirmed relocations, the residential noise-abatement criterion would be approached or exceeded at six receptor locations representing about 18 residences.

4.10.3.5 Segment 5 (2300 North to 5600 South)

Modeled noise levels and project-related impacts at noise receptors in Segment 5 are shown in Exhibit 4.10-5: Modeled Noise Levels (dBA): Segment 5 – 2300 North to 5600 South on page 4-91. Under existing conditions, the residential noise-abatement criterion is exceeded at 16 noise receptors representing about 42 residences.

Under the Minimize 4(f) Impacts Alternative, noise levels in Segment 5 would decrease by 1 dBA at some locations, stay the

same, or increase by 1 dBA. The residential noise-abatement criterion would be approached or exceeded at 16 receptor locations representing about 42 residences (there would be no potential or confirmed residential relocations in Segment 5).

4.10.3.6 Segment 6 (5600 South to 4800 South)

Modeled noise levels and project-related impacts at noise receptors in Segment 6 are shown in Exhibit 4.10-6: Modeled Noise Levels (dBA): Segment 6 – 5600 South to 4800 South on page 4-92. Under existing conditions, the residential noise-abatement criterion is exceeded at 15 noise receptors representing about 53 residences.

Under the Minimize 4(f) Impacts Alternative, noise levels in Segment 6 would increase by 1 dBA to 3 dBA at residences near the roadway. The residential noise-abatement criterion would be approached or exceeded at 16 receptor locations representing about 56 residences (there would be no potential or confirmed residential relocations in Segment 6).

4.10.3.7 Segment 7 (4800 South to 4000 South)

Modeled noise levels and project-related impacts at noise receptors in Segment 7 are shown in Exhibit 4.10-7: Modeled Noise Levels (dBA): Segment 7 – 4800 South to 4000 South on page 4-93. Under existing conditions, the residential noise-abatement criterion is exceeded at 10 noise receptors representing about 26 residences.

Under the Minimize 4(f) Impacts Alternative, noise levels in Segment 7 would increase by 1 dBA to 4 dBA at residences near the roadway. The residential noise-abatement criterion would be approached or exceeded at 14 receptor locations representing about 33 residences (there would be no potential or confirmed residential relocations in Segment 7).

4.10.3.8 Segment 8 (4000 South to 3600 South)

Modeled noise levels and project-related impacts at noise receptors in Segment 8 are shown in Exhibit 4.10-8: Modeled Noise Levels (dBA): Segment 8 – 4000 South to 3600 South on page 4-94. Under existing conditions, the residential noise-abatement criterion is exceeded at 16 noise receptors representing about 26 residences.

Under the Minimize 4(f) Impacts Alternative, noise levels in Segment 8 would increase by 2 dBA to 6 dBA at residences near the roadway. Excluding potential or confirmed relocations, the residential noise-abatement criterion would be approached or exceeded at 15 receptor locations representing about 30 residences.

4.10.3.9 Segment 9 (3600 South to 1900 West)

Modeled noise levels and project-related impacts at noise receptors in Segment 9 are shown in Exhibit 4.10-9: Modeled Noise Levels (dBA): Segment 9 – 3600 South to 1900 West on page 4-96. Under existing conditions, the residential noise-abatement criterion is exceeded at nine noise receptors representing about four residences and 20 townhomes next to Midland Drive.

Under the Minimize 4(f) Impacts Alternative, noise levels in Segment 9 would increase by 4 dBA to 7 dBA at residences near the roadway. Excluding potential or confirmed relocations, the residential noise-abatement criterion would be approached or exceeded at 10 receptor locations representing about four to five residences and 20 or more townhomes, some of which are under construction.

4.10.4 West Alternative

The absolute noise impact under the West Alternative (that is, the increase in noise levels over existing conditions) would be generally the same as that under the Minimize 4(f) Impacts Alternative (an increase of 1 dBA to 6 dBA over existing conditions). The biggest difference between the two action alternatives is the number of residences that would be affected after potential and confirmed residential relocations are excluded in each segment. Under this alternative, the residential noise-abatement criterion would be approached or exceeded at about 250 residences.

4.10.4.1 Segment 1 (Antelope Drive to 700 South)

Modeled noise levels and project-related impacts at noise receptors in Segment 1 are shown in Exhibit 4.10-1: Modeled Noise Levels (dBA): Segment 1 – Antelope Drive to 700 South on page 4-87. Under existing conditions, the residential noise-abatement criterion is exceeded at 13 noise receptors representing about 34 residences.

Under the West Alternative, noise levels in Segment 1 would increase by 1 dBA to 2 dBA at residences near the roadway. Excluding potential or confirmed relocations, the residential noise-abatement criterion would be approached or exceeded at eight receptor locations representing about 19 residences (the same as for the Minimize 4(f) Impacts Alternative).

4.10.4.2 Segment 2 (700 South to 300 North)

Modeled noise levels and project-related impacts at noise receptors in Segment 2 are shown in Exhibit 4.10-2: Modeled Noise Levels (dBA): Segment 2 – 700 South to 300 North on page 4-88. Under existing conditions, the residential noise-abatement criterion is exceeded at 13 noise receptors representing about 50 residences.

Under the West Alternative, noise levels in Segment 2 would increase by 1 dBA to 2 dBA at residences near the roadway. Excluding potential or confirmed relocations, the residential noise-abatement criterion would be approached or exceeded at six receptor locations representing about 19 residences.

4.10.4.3 Segment 3 (300 North to 1300 North)

Modeled noise levels and project-related impacts at noise receptors in Segment 3 are shown in Exhibit 4.10-3: Modeled Noise Levels (dBA): Segment 3 – 300 North to 1300 North on page 4-89. Under existing conditions, the residential noise-abatement criterion is exceeded at 20 noise receptors representing about 53 residences.

Under the West Alternative, noise levels in Segment 3 would increase by 1 dBA to 7 dBA at residences near the roadway. Excluding potential or confirmed relocations, the residential noise-abatement criterion would be approached or exceeded at nine receptor locations representing about 22 residences.

4.10.4.4 Segment 4 (1300 North to 2300 North)

Modeled noise levels and project-related impacts at noise receptors in Segment 4 are shown in Exhibit 4.10-4: Modeled Noise Levels (dBA): Segment 4 – 1300 North to 2300 North on page 4-90. Under existing conditions, the residential noise-abatement criterion is exceeded at 10 noise receptors representing about 29 residences.

Under the West Alternative, noise levels in Segment 4 would decrease by 1 dBA at some locations, stay the same, or increase by 1 dBA to 2 dBA. Excluding potential or confirmed relocations, the residential noise-abatement criterion would be approached or exceeded at six receptor locations representing about 18 residences.

4.10.4.5 Segment 5 (2300 North to 5600 South)

Modeled noise levels and project-related impacts at noise receptors in Segment 5 are shown in Exhibit 4.10-5: Modeled Noise Levels (dBA): Segment 5 – 2300 North to 5600 South on page 4-91. Under existing conditions, the residential noise-abatement criterion is exceeded at 16 noise receptors representing about 42 residences.

Under the West Alternative, noise levels in Segment 5 would decrease by 1 dBA at some locations, stay the same, or increase by 1 dBA to 2 dBA. Excluding potential or confirmed relocations, the residential noise-abatement criterion would be approached or exceeded at 15 receptor locations representing about 38 residences.

4.10.4.6 Segment 6 (5600 South to 4800 South)

Modeled noise levels and project-related impacts at noise receptors in Segment 6 are shown in Exhibit 4.10-6: Modeled Noise Levels (dBA): Segment 6 – 5600 South to 4800 South on page 4-92. Under existing conditions, the residential noise-abatement criterion is exceeded at 15 noise receptors representing about 53 residences.

Under the West Alternative, noise levels in Segment 6 would increase by 1 dBA to 3 dBA at residences near the roadway. Excluding potential or confirmed relocations, the residential noise-abatement criterion would be approached or exceeded at 11 receptor locations representing about 39 residences.

4.10.4.7 Segment 7 (4800 South to 4000 South)

Modeled noise levels and project-related impacts at noise receptors in Segment 7 are shown in Exhibit 4.10-7: Modeled Noise Levels (dBA): Segment 7 – 4800 South to 4000 South on page 4-93. Under existing conditions, the residential noise-abatement criterion is exceeded at 10 noise receptors representing about 26 residences.

Under the West Alternative, noise levels in Segment 7 would increase by 1 dBA to 3 dBA at residences near the roadway. The residential noise-abatement criterion would be approached or exceeded at 12 receptor locations representing about 29 residences (there would be no potential or confirmed residential relocations in Segment 7).

4.10.4.8 Segment 8 (4000 South to 3600 South)

Modeled noise levels and project-related impacts at noise receptors in Segment 8 are shown in Exhibit 4.10-8: Modeled Noise Levels (dBA): Segment 8 – 4000 South to 3600 South on page 4-94. Under existing conditions, the residential noise-abatement criterion is exceeded at 16 noise receptors representing about 26 residences.

Under the West Alternative, noise levels in Segment 8 would increase by 2 dBA to 6 dBA at residences near the roadway. Excluding potential or confirmed relocations, the residential noise-abatement criterion would be approached or exceeded at 14 receptor locations representing about 28 residences.

4.10.4.9 Segment 9 (3600 South to 1900 West)

Modeled noise levels and project-related impacts at noise receptors in Segment 9 are shown in Exhibit 4.10-9: Modeled Noise Levels (dBA): Segment 9 – 3600 South to 1900 West on page 4-96. Under existing conditions, the residential noise-abatement criterion is exceeded at nine noise receptors representing about four residences and 20 townhomes next to Midland Drive.

Under the West Alternative, noise levels in Segment 9 would increase by 4 dBA to 7 dBA at residences near the roadway. Excluding potential or confirmed relocations, the residential noise-abatement criterion would be approached or exceeded at 10 receptor locations representing about four to five residences and 20 or more townhomes, some of which are under construction.

4.10.5 Mitigation Measures for Noise Impacts

4.10.5.1 UDOT's Noise-Abatement Criteria

This section discusses methods for abating, or reducing, the traffic noise impacts from S.R. 108 that were identified in the previous sections.

According to UDOT's Noise-Abatement Policy (UDOT 08A2-1), noise abatement will be considered for roadway construction projects where noise impacts are identified. Both of the S.R. 108 action alternatives would add additional lanes of travel, so noise-abatement measures can be considered. The goal of noise abatement is to substantially reduce noise levels, although this noise reduction might or might not result in noise levels that are below the applicable noise-abatement criterion (66 dBA for residential locations).

The two relevant criteria to consider when identifying and evaluating noise-abatement measures are feasibility and reasonableness. Noise abatement will be provided by UDOT only if the noise-abatement measures are *both* feasible and reasonable.

Feasibility

Noise-abatement feasibility deals primarily with construction and engineering considerations. (For example, can noise be substantially reduced at a specific location? Is noise abatement limited by factors such as topography, access requirements, the presence of local cross streets, or other noise sources in the area?)

Under the UDOT noise policy, a noise wall (or other abatement measure) that will not reduce noise by at least 5 dBA for at least 75% of the first-row residences (those closest to the roadway) is not considered feasible.

Reasonableness

Reasonableness is a more subjective criterion than feasibility. Reasonableness suggests that common sense and good judgment have been applied in arriving at a decision to recommend a noise-abatement measure. (For example, does the noise-abatement measure satisfy the cost criterion established by the noise policy?) As a result, a noise wall could be feasible (that is, provide the minimum required

5 dBA of noise reduction at a majority of the first-row residences), but not be reasonable (for example, by not meeting UDOT's cost criterion).

4.10.5.2 Feasibility and Reasonableness Factors

UDOT considers the following factors, among others, when determining the feasibility and reasonableness of noise-abatement measures:

- **Noise-Abatement Benefits.** Reasonable efforts will be made to substantially reduce noise. UDOT defines a substantial noise reduction as a 10-dBA noise reduction at one first-row receiver adjacent to the proposed alignment. Under the UDOT noise policy, noise walls are considered feasible if they reduce noise by at least 5 dBA at the majority of first-row receivers.
- **Land Use and Zoning.** The existing zoning and land uses adjacent to the transportation facility will be reviewed. In general, noise walls are not consistent with commercial or industrial zoning because businesses usually attract customers by being visible to drivers on the road.
- **Engineering, Safety, and Maintenance.** Engineering, safety, and maintenance issues must be considered to determine the constructability of a noise-abatement measure. If any of these issues are substantial enough to preclude good safety and maintenance practices, then the noise wall might not be feasible.
- **Cost of Abatement.** In residential areas, all residences affected by the proposed project must be considered in determining a noise wall's cost effectiveness. Under UDOT policy, a benefiting residence is one at which noise is reduced by at least 5 dBA as a result of the noise wall. The maximum cost used to determine the reasonableness of a noise-abatement measure is $30,000 per benefiting receiver based on a noise wall cost of $20 per square foot.
- **Public Involvement and Balloting.** The UDOT Project Manager, Public Involvement Coordinator, and Environmental Engineer/Manager will decide on the appropriate level of public involvement. The purpose of the public involvement process is to ensure that the concerns of the affected communities are

known and that every effort is made to provide noise abatement to an affected community.

- **Abatement Design.** A noise-abatement measure must be designed with the following considerations in mind: (1) good design practice, (2) optimal performance, and (3) current highway safety technology. UDOT will consider aesthetics treatment, graffiti deterrence, and landscaping where appropriate in relation to design standard specifications, cost efficiency, maintenance, and the regulations of local municipalities.

Once a noise wall has been determined to be feasible, UDOT will determine whether its construction is reasonable by thoroughly considering the range of factors described above, including the cost-effectiveness of the measure. UDOT will construct noise walls only if they have been determined to be both feasible and reasonable. The decision to recommend or not recommend a noise wall is the responsibility of the UDOT Environmental Engineer/Manager with concurrence from the Project Manager and the Preconstruction Engineer. For projects with federal involvement, FHWA will have final approval for noise-abatement measures.

4.10.5.3 Noise-Abatement Methodology

The effectiveness of noise walls is generally limited to areas within about 500 feet of the proposed right-of-way. Beyond this distance, noise walls do not effectively reduce noise levels at individual residences. In addition, noise walls are most effective where they are continuous and block a number of individual residences. The short spacing between individual residences and driveways, as well as the need to maintain access along S.R. 108, make noise walls infeasible in Segments 1 through 7 of S.R. 108.

Noise walls were considered for two mobile-home parks in Segment 8 and for townhomes adjacent to the alignment in Segment 9. Four noise walls were considered adjacent to Karol's Mobile Estates and the Country Meadows Estates, and two noise walls were constructed adjacent to the townhomes in Segment 9. The results of the evaluation are summarized below. Beginning on page 4-106, Exhibit 4.10-19 through Exhibit 4.10-24, Noise Mitigation Analysis, show the abatement evaluation for each noise wall that was considered. The locations of potential noise walls are shown in Exhibit 4.10-17: Noise Receptor Locations – Segment 8, R8-1 to R8-41 and Exhibit 4.10-18: Noise Receptor Locations – Segment 9, R9-1 to R9-13 on pages 4-104 and 4-105.

For each noise wall considered, the feasibility and reasonableness of wall heights between 6 feet and 18 feet were evaluated to determine the following:

- The number of noise-impacted residences that would benefit from the noise wall (those at which noise would be reduced by at least 5 dBA)
- The maximum noise level reduction from the noise wall (the degree to which a noise wall could reduce noise by at least 10 dBA as required by UDOT's Noise Policy)
- Whether at least 75% of first-row residences would benefit from the noise wall
- The cost-effectiveness of the noise wall (cost per benefiting residence)
- An overall determination of whether the noise wall is both feasible and reasonable (cost-effective)

4.10.5.4 Noise-Abatement Measures

Segment 8 (4000 South to 3600 South)

Four noise walls were considered in Segment 8, and all four were considered feasible and reasonable. Residents who are adjacent to the proposed noise walls will be able to vote on whether they want the noise walls to be built. If residents are in favor of noise walls, they will be constructed.

- **Wall 1** (about 550 feet long) was located on the southeast side of Karol's Mobile Estates. A noise wall 16 feet high at this location would reduce noise by 4 dBA to 12 dBA at the majority of first-row residences and would be feasible and reasonable according to UDOT's noise-abatement criteria. For more information, see Exhibit 4.10-19: Noise Mitigation Analysis – Wall 1 on page 4-106.
- **Wall 2** (about 300 feet long) was located on the northeast side of Karol's Mobile Estates. A noise wall between 12 feet and 18 feet high would reduce noise by up to 6 dBA at the majority of first-row residences. A noise wall in this location would be feasible and reasonable according to UDOT's noise-abatement criteria. For more information, see Exhibit 4.10-20: Noise Mitigation Analysis – Wall 2 on page 4-107.
- **Wall 3** (about 400 feet long) was located on the south end of the Country Meadows Estates. A noise wall between 12 feet and 18 feet high would reduce noise by 9 dBA to 12 dBA at first-row residences and would be feasible and reasonable according to UDOT's noise-abatement criteria. For more information, see Exhibit 4.10-21: Noise Mitigation Analysis – Wall 3 on page 4-108.
- **Wall 4** (about 425 feet long) was located on the north end of the Country Meadows Estates. A noise wall between 12 feet and 18 feet high would reduce noise by 7 dBA to 13 dBA at first-row residences and would be feasible and reasonable according to UDOT's noise-abatement criteria. For more information, see Exhibit 4.10-22: Noise Mitigation Analysis – Wall 4 on page 4-109.

Segment 9 (3600 South to 1900 West)

Two noise walls were considered in Segment 9, and both were considered feasible and reasonable. Residents who are adjacent to the proposed noise walls will be able to vote on whether they want the noise walls to be built. If residents are in favor of noise walls, they will be constructed.

- **Wall 5** (about 360 feet long) was located adjacent to the relatively new townhome development on the south side of the alignment. A noise wall 8 feet high at this location would reduce noise by about 5 dBA to 9 dBA at the majority of first-row residences and would be feasible and reasonable according to UDOT's noise-abatement criteria. For more information, see Exhibit 4.10-23: Noise Mitigation Analysis – Wall 5 on page 4-110.
- **Wall 6** (about 950 feet long) was located on the south side of the alignment adjacent to the townhome development. Similar to Wall 5 described above, a noise wall 8 feet high would reduce noise by 6 dBA to 10 dBA at the majority of first-row residences. A noise wall in this location would be feasible and reasonable according to UDOT's noise-abatement criteria. For more information, see Exhibit 4.10-24: Noise Mitigation Analysis – Wall 6 on page 4-111.

Exhibit 4.10-1: Modeled Noise Levels (dBA): Segment 1 – Antelope Drive to 700 South

				Minimize 4(f) Impacts Alternative			West Alternative		
Receptor	Number of Dwelling Units	Existing Sound Level (L_{eq})	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?
R1-1	1	68	Yes	70	2	Yes	70	2	Yes
R1-2	5	59	No	60	1	No	60	1	No
R1-3	5	60	No	61	1	No	61	1	No
R1-4	5	56	No	57	1	No	56	0	No
R1-5	5	57	No	58	1	No	57	0	No
R1-6	2	68	Yes	69	1	Yes	69	1	Yes
R1-7	2	69	Yes	70	1	Yes	70	1	Yes
R1-8	2	57	No	57	0	No	57	0	No
R1-9	2	57	No	59	2	No	59	2	No
R1-10[a]	2	63	No	64	1	No	64	1	No
R1-11	3	59	No	59	0	No	59	0	No
R1-12	2	57	No	59	2	No	59	2	No
R1-13	2	63	No	63	0	No	63	0	No
R1-14	3	68	Yes	69	1	Yes	69	1	Yes
R1-15[a]	4	67	Yes	68	1	Yes	68	1	Yes
R1-16	3	68	Yes	69	1	Yes	69	1	Yes
R1-17[a]	3	67	Yes	68	1	Yes	68	1	Yes
R1-18	2	69	Yes	69	0	Yes	69	0	Yes
R1-19[a]	2	66	Yes	68	2	Yes	68	2	Yes
R1-20	3	68	Yes	69	1	Yes	69	1	Yes
R1-21[a]	3	67	Yes	68	1	Yes	68	1	Yes
R1-22[a]	3	67	Yes	68	1	Yes	68	1	Yes
R1-23	3	68	Yes	69	1	Yes	69	1	Yes
R1-24	3	64	No	65	1	No	65	1	No
R1-25	3	63	No	63	0	No	63	0	No

See Exhibit 4.10-10: Noise Receptor Locations – Segment 1, R1-1 to R1-25 on page 4-97 for receptor locations.

[a] Potential or confirmed relocations under both alternatives.

Exhibit 4.10-2: Modeled Noise Levels (dBA): Segment 2 – 700 South to 300 North

				Minimize 4(f) Impacts Alternative			West Alternative		
Receptor	Number of Dwelling Units	Existing Sound Level (L_{eq})	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?
R2-1[b]	3	71	Yes	72	1	Yes	77	6	Yes
R2-2[b]	6	71	Yes	72	1	Yes	76	5	Yes
R2-3[b]	6	71	Yes	72	1	Yes	77	6	Yes
R2-4[b]	5	70	Yes	71	1	Yes	74	4	Yes
R2-5[a]	5	71	Yes	75	4	Yes	78	7	Yes
R2-6	3	72	Yes	72	0	Yes	72	0	Yes
R2-7	4	59	No	61	2	No	61	2	No
R2-8	3	55	No	56	1	No	56	1	No
R2-9	3	59	No	61	2	No	61	2	No
R2-10	3	56	No	57	1	No	57	1	No
R2-11[a]	3	71	Yes	76	5	Yes	76	5	Yes
R2-12	4	61	No	62	1	No	62	1	No
R2-13	3	54	No	55	1	No	55	1	No
R2-14	3	73	Yes	73	0	Yes	73	0	Yes
R2-15[a]	3	71	Yes	77	6	Yes	77	6	Yes
R2-16[a]	3	71	Yes	77	6	Yes	77	6	Yes
R2-17	3	65	No	66	1	Yes	66	1	Yes
R2-18	3	55	No	56	1	No	56	1	No
R2-19	3	68	Yes	69	1	Yes	69	1	Yes
R2-20	3	58	No	60	2	No	60	2	No
R2-21	3	56	No	58	2	No	58	2	No
R2-22	3	71	Yes	72	1	Yes	72	1	Yes
R2-23	4	60	No	61	1	No	61	1	No
R2-24	3	61	No	62	1	No	62	1	No
R2-25	4	70	Yes	70	0	Yes	70	0	Yes
R2-26	3	57	No	59	2	No	59	2	No
R2-27	3	53	No	54	1	No	54	1	No
R2-28	2	61	No	62	1	No	62	1	No
R2-29	2	56	No	58	2	No	58	2	No

See Exhibit 4.10-11: Noise Receptor Locations – Segment 2, R2-1 to R2-29 on page 4-98 for receptor locations.

[a] Potential or confirmed relocations under both alternatives.

[b] Potential or confirmed relocations under the West Alternative.

Exhibit 4.10-3: Modeled Noise Levels (dBA): Segment 3 – 300 North to 1300 North

				Minimize 4(f) Impacts Alternative			West Alternative		
Receptor	Number of Dwelling Units	Existing Sound Level (L_{eq})	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?
R3-1[a]	4	70	Yes	77	7	Yes	77	7	Yes
R3-2	3	68	Yes	69	1	Yes	69	1	Yes
R3-3	2	60	No	61	1	No	61	1	No
R3-4	2	70	Yes	71	1	Yes	71	1	Yes
R3-5[a]	4	72	Yes	77	5	Yes	77	5	Yes
R3-6	3	70	Yes	71	1	Yes	71	1	Yes
R3-7	2	61	No	63	2	No	64	3	No
R3-8[a]	3	67	Yes	70	3	Yes	70	3	Yes
R3-9	3	71	Yes	72	1	Yes	72	1	Yes
R3-10[a]	3	71	Yes	74	3	Yes	75	4	Yes
R3-11	2	71	Yes	73	2	Yes	72	1	Yes
R3-12	2	63	No	64	1	No	65	2	No
R3-13[b]	3	71	Yes	72	1	Yes	75	4	Yes
R3-14[c]	3	70	Yes	73	3	Yes	71	1	Yes
R3-15	3	60	No	62	2	No	61	1	No
R3-16[b]	4	71	Yes	72	1	Yes	76	5	Yes
R3-17[c]	3	71	Yes	75	4	Yes	71	0	Yes
R3-18[b]	2	69	Yes	69	0	Yes	72	3	Yes
R3-19[c]	2	71	Yes	77	6	Yes	72	1	Yes
R3-20	3	61	No	62	1	No	63	2	No
R3-21[b]	3	70	Yes	71	1	Yes	74	4	Yes
R3-22	1	70	Yes	70	0	Yes	74	4	Yes
R3-23[b]	1	71	Yes	72	1	Yes	76	5	Yes
R3-24[b]	1	71	Yes	72	1	Yes	76	5	Yes
R3-25[a]	3	70	Yes	72	2	Yes	74	4	Yes

See Exhibit 4.10-12: Noise Receptor Locations – Segment 3, R3-1 to R3-25 on page 4-99 for receptor locations.

[a] Potential or confirmed relocations under both alternatives.

[b] Potential or confirmed relocations under the West Alternative.

[c] Potential or confirmed relocations under the Minimize 4(f) Impacts Alternative.

Exhibit 4.10-4: Modeled Noise Levels (dBA): Segment 4 – 1300 North to 2300 North

				Minimize 4(f) Impacts Alternative			West Alternative		
Receptor	Number of Dwelling Units	Existing Sound Level (L_{eq})	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?
R4-1	3	73	Yes	74	1	Yes	72	–1	Yes
R4-2	8	60	No	60	0	No	61	1	No
R4-3	4	59	No	59	0	No	59	0	No
R4-4	3	58	No	59	1	No	58	0	No
R4-5	2	62	No	62	0	No	63	1	No
R4-6	4	70	Yes	71	1	Yes	72	2	Yes
R4-7[a]	1	70	Yes	71	1	Yes	72	2	Yes
R4-8	3	66	Yes	66	0	Yes	67	1	Yes
R4-9	4	61	No	61	0	No	62	1	No
R4-10[a]	3	73	Yes	74	1	Yes	77	4	Yes
R4-11[a]	4	73	Yes	74	1	Yes	76	3	Yes
R4-12	3	73	Yes	73	0	Yes	72	–1	Yes
R4-13[a]	3	71	Yes	72	1	Yes	73	2	Yes
R4-14	4	59	No	59	0	No	59	0	No
R4-15	4	59	No	59	0	No	59	0	No
R4-16	4	72	Yes	71	-1	Yes	71	–1	Yes
R4-17	4	62	No	63	1	No	63	1	No
R4-18	1	69	Yes	71	2	Yes	71	2	Yes

See Exhibit 4.10-13: Noise Receptor Locations – Segment 4, R4-1 to R4-18 on page 4-100 for receptor locations.

[a] Potential or confirmed relocations under both alternatives.

Exhibit 4.10-5: Modeled Noise Levels (dBA): Segment 5 – 2300 North to 5600 South

				Minimize 4(f) Impacts Alternative			West Alternative		
Receptor	Number of Dwelling Units	Existing Sound Level (L_{eq})	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?
R5-1	2	59	No	60	1	No	60	1	No
R5-2	2	59	No	59	0	No	59	0	No
R5-3	2	72	Yes	71	–1	Yes	71	–1	Yes
R5-4	1	64	No	63	–1	No	63	–1	No
R5-5	3	74	Yes	73	–1	Yes	73	–1	Yes
R5-6	3	73	Yes	72	–1	Yes	72	–1	Yes
R5-7	1	72	Yes	72	0	Yes	75	3	Yes
R5-8[a]	4	73	Yes	72	–1	Yes	77	4	Yes
R5-9	2	67	Yes	67	0	Yes	69	2	Yes
R5-10	2	67	Yes	67	0	Yes	69	2	Yes
R5-11	3	59	No	60	1	No	59	0	No
R5-12	2	72	Yes	72	0	Yes	71	–1	Yes
R5-13	2	71	Yes	71	0	Yes	70	–1	Yes
R5-14	3	63	No	63	0	No	62	–1	No
R5-15	3	72	Yes	73	1	Yes	71	–1	Yes
R5-16	5	62	No	62	0	No	62	0	No
R5-17	4	72	Yes	73	1	Yes	71	–1	Yes
R5-18	4	71	Yes	71	0	Yes	73	2	Yes
R5-19	3	71	Yes	71	0	Yes	72	1	Yes
R5-20	2	72	Yes	73	1	Yes	72	0	Yes
R5-21	2	71	Yes	71	0	Yes	71	0	Yes
R5-22	3	72	Yes	72	0	Yes	72	0	Yes

See Exhibit 4.10-14: Noise Receptor Locations – Segment 5, R5-1 to R5-22 on page 4-101 for receptor locations.

[a] Potential or confirmed relocations under the West Alternative.

Exhibit 4.10-6: Modeled Noise Levels (dBA): Segment 6 – 5600 South to 4800 South

				Minimize 4(f) Impacts Alternative			West Alternative		
Receptor	Number of Dwelling Units	Existing Sound Level (L_{eq})	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?
R6-1	4	54	No	56	2	No	56	2	No
R6-2	4	68	Yes	71	3	Yes	71	3	Yes
R6-3	4	59	No	61	2	No	61	2	No
R6-4	5	70	Yes	72	2	Yes	72	2	Yes
R6-5[a]	3	70	Yes	73	3	Yes	74	4	Yes
R6-6	3	70	Yes	71	1	Yes	70	0	Yes
R6-7	4	59	No	61	2	No	61	2	No
R6-8	3	70	Yes	72	2	Yes	70	0	Yes
R6-9	3	61	No	63	2	No	62	1	No
R6-10[a]	4	67	Yes	69	2	Yes	70	3	Yes
R6-11	2	61	No	62	1	No	62	1	No
R6-12	3	70	Yes	72	2	Yes	71	1	Yes
R6-13[a]	4	70	Yes	72	2	Yes	73	3	Yes
R6-14	2	70	Yes	72	2	Yes	71	1	Yes
R6-15	4	61	No	62	1	No	62	1	No
R6-16	3	71	Yes	73	2	Yes	71	0	Yes
R6-17[a]	3	70	Yes	72	2	Yes	73	3	Yes
R6-18[a]	3	65	No	66	1	Yes	68	3	Yes
R6-19	4	71	Yes	73	2	Yes	71	0	Yes
R6-20	4	56	No	57	1	No	57	1	No
R6-21	5	70	Yes	72	2	Yes	71	1	Yes
R6-22	4	64	No	65	1	No	64	0	No
R6-23	4	73	Yes	73	0	Yes	72	–1	Yes
R6-24	3	67	Yes	68	1	Yes	67	0	Yes

See Exhibit 4.10-15: Noise Receptor Locations – Segment 6, R6-1 to R6-24 on page 4-102 for receptor locations.

[a] Potential or confirmed relocations under the West Alternative.

Exhibit 4.10-7: Modeled Noise Levels (dBA): Segment 7 – 4800 South to 4000 South

				Minimize 4(f) Impacts Alternative			West Alternative		
Receptor	Number of Dwelling Units	Existing Sound Level (L_{eq})	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?
R7-1	3	69	Yes	73	4	Yes	71	2	Yes
R7-2	3	69	Yes	72	3	Yes	71	2	Yes
R7-3	3	69	Yes	72	3	Yes	71	2	Yes
R7-4	2	64	No	67	3	Yes	65	1	No
R7-5	2	56	No	59	3	No	59	3	No
R7-6	3	60	No	64	4	No	63	3	No
R7-7	2	59	No	63	4	No	62	3	No
R7-8	2	69	Yes	73	4	Yes	71	2	Yes
R7-9	3	60	No	63	3	No	63	3	No
R7-10	2	65	No	69	4	Yes	67	2	Yes
R7-11	3	69	Yes	72	3	Yes	71	2	Yes
R7-12	4	59	No	63	4	No	62	3	No
R7-13	2	69	Yes	72	3	Yes	71	2	Yes
R7-14	2	68	Yes	71	3	Yes	69	1	Yes
R7-15	3	61	No	64	3	No	63	2	No
R7-16	3	69	Yes	73	4	Yes	71	2	Yes
R7-17	3	62	No	65	3	No	64	2	No
R7-18	4	69	Yes	72	3	Yes	71	2	Yes
R7-19	2	63	No	66	3	Yes	65	2	No
R7-20	1	64	No	66	2	Yes	66	2	Yes
R7-21	1	69	Yes	70	1	Yes	70	1	Yes

See Exhibit 4.10-16: Noise Receptor Locations – Segment 7, R7-1 to R7-21 on page 4-103 for receptor locations.

Exhibit 4.10-8: Modeled Noise Levels (dBA): Segment 8 – 4000 South to 3600 South

				Minimize 4(f) Impacts Alternative			West Alternative		
Receptor	Number of Dwelling Units	Existing Sound Level (L_{eq})	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?
R8-1	3	56	No	59	3	No	59	3	No
R8-2	2	66	Yes	68	2	Yes	68	2	Yes
R8-3	4	64	No	70	6	Yes	70	6	Yes
R8-4	1	67	Yes	69	2	Yes	69	2	Yes
R8-5	2	60	No	64	4	No	64	4	No
R8-6	2	64	No	69	5	Yes	69	5	Yes
R8-7	1	68	Yes	70	2	Yes	70	2	Yes
R8-8	3	54	No	57	3	No	57	3	No
R8-9	2	56	No	59	3	No	59	3	No
R8-10	2	57	No	61	4	No	61	4	No
R8-11	2	57	No	61	4	No	61	4	No
R8-12[a]	1	67	Yes	73	6	Yes	73	6	Yes
R8-13	4	55	No	58	3	No	58	3	No
R8-14	2	63	No	65	2	No	65	2	No
R8-15	2	58	No	62	4	No	61	3	No
R8-16	3	56	No	59	3	No	59	3	No
R8-17	2	60	No	63	3	No	63	3	No
R8-18	3	57	No	61	4	No	61	4	No
R8-19	2	69	Yes	71	2	Yes	71	2	Yes
R8-20[a]	2	64	No	70	6	Yes	70	6	Yes
R8-21[a]	1	69	Yes	75	6	Yes	76	7	Yes
R8-22[a]	2	66	Yes	71	5	Yes	72	6	Yes
R8-23	3	62	No	65	3	No	65	3	No
R8-24	3	58	No	62	4	No	62	4	No
R8-25	3	61	No	64	3	No	64	3	No
R8-26	3	67	Yes	70	3	Yes	69	2	Yes
R8-27	3	59	No	62	3	No	62	3	No
R8-28	3	57	No	61	4	No	61	4	No
R8-29	2	67	Yes	71	4	Yes	69	2	Yes
R8-30	3	68	Yes	71	3	Yes	70	2	Yes

Receptor	Number of Dwelling Units	Existing Sound Level (L_{eq})	Exceeds Standard?	Minimize 4(f) Impacts Alternative			West Alternative		
				Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?
R8-31	3	60	No	63	3	No	63	3	No
R8-32	2	68	Yes	71	3	Yes	70	2	Yes
R8-33	3	59	No	63	4	No	62	3	No
R8-34	2	68	Yes	72	4	Yes	71	3	Yes
R8-35	3	64	No	67	3	Yes	66	2	Yes
R8-36	3	57	No	61	4	No	61	4	No
R8-37[a]	1	69	Yes	73	4	Yes	75	6	Yes
R8-38[a]	1	69	Yes	73	4	Yes	75	6	Yes
R8-39	1	67	Yes	70	3	Yes	69	2	Yes
R8-40[b]	1	69	Yes	74	5	Yes	75	6	Yes
R8-41	1	62	No	68	6	Yes	68	6	Yes

See Exhibit 4.10-17: Noise Receptor Locations – Segment 8, R8-1 to R8-41 on page 4-104 for receptor locations.

[a] Potential or confirmed relocations under both alternatives.

[b] Potential or confirmed relocations under the West Alternative.

Exhibit 4.10-9: Modeled Noise Levels (dBA): Segment 9 – 3600 South to 1900 West

				Minimize 4(f) Impacts Alternative			West Alternative		
Receptor	Number of Dwelling Units	Existing Sound Level (L_{eq})	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?	Modeled Sound Level (L_{eq})	Change From Existing	Exceeds Standard?
R9-1	1	67	Yes	74	7	Yes	74	7	Yes
R9-2	1	69	Yes	74	5	Yes	74	5	Yes
R9-3	1	69	Yes	74	5	Yes	74	5	Yes
R9-4[a]	1	67	Yes	73	6	Yes	73	6	Yes
R9-5[a]	1	68	Yes	74	6	Yes	74	6	Yes
R9-6	1	67	Yes	71	4	Yes	71	4	Yes
R9-7	4	70	Yes	74	4	Yes	74	4	Yes
R9-8	4	68	Yes	74	6	Yes	74	6	Yes
R9-9	4	67	Yes	73	6	Yes	73	6	Yes
R9-10	4	68	Yes	74	6	Yes	74	6	Yes
R9-11	4	68	Yes	73	5	Yes	73	5	Yes
R9-12[a]	1	68	Yes	73	5	Yes	73	5	Yes
R9-13[b]	Unknown	66	Yes	71	5	Yes	71	5	Yes

See Exhibit 4.10-18: Noise Receptor Locations – Segment 9, R9-1 to R9-13 on page 4-105 for receptor locations.

[a] Potential or confirmed relocations under both alternatives.

[b] Future apartments/townhomes.

Exhibit 4.10-10: Noise Receptor Locations – Segment 1, R1-1 to R1-25

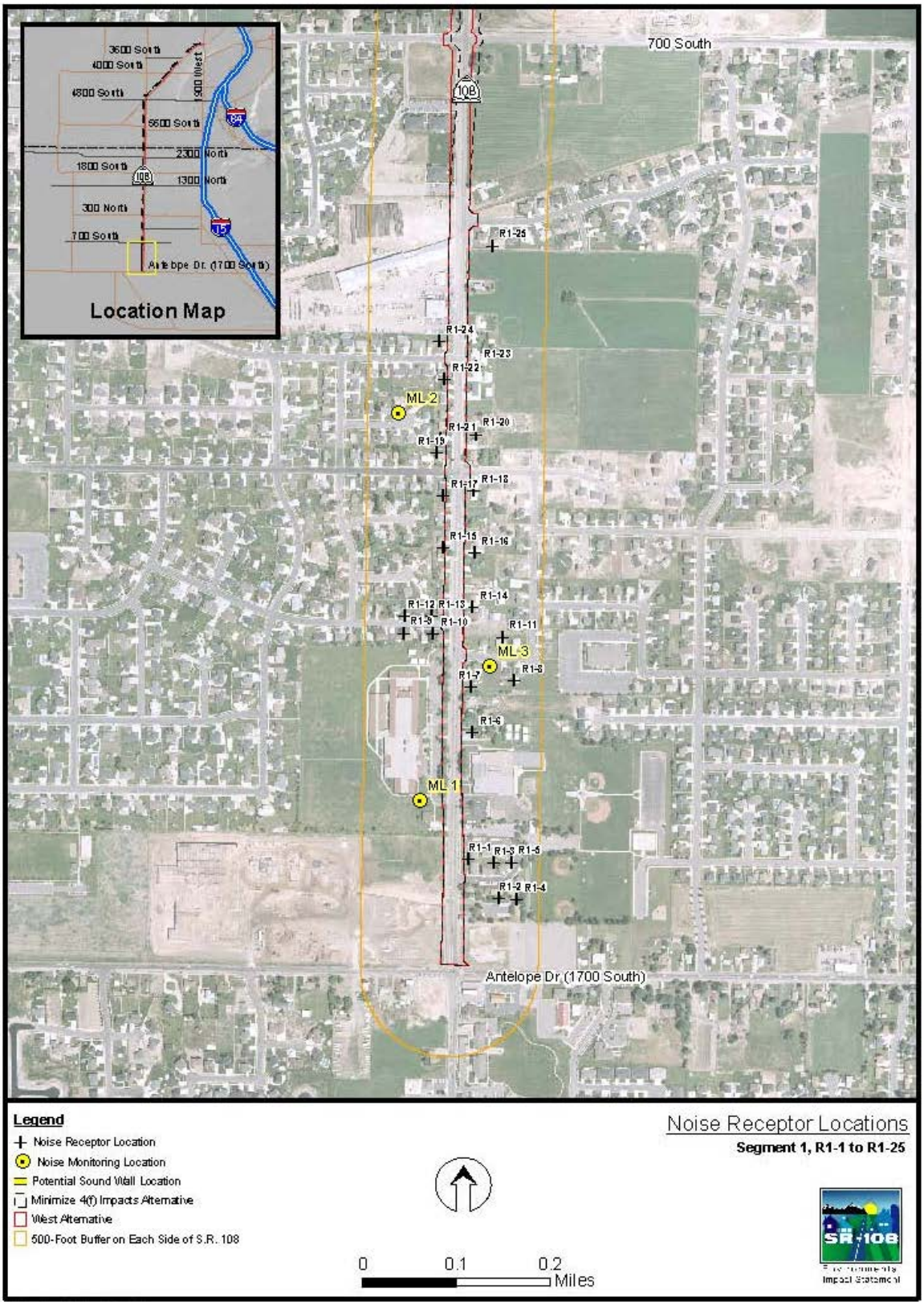


Exhibit 4.10-11: Noise Receptor Locations – Segment 2, R2-1 to R2-29

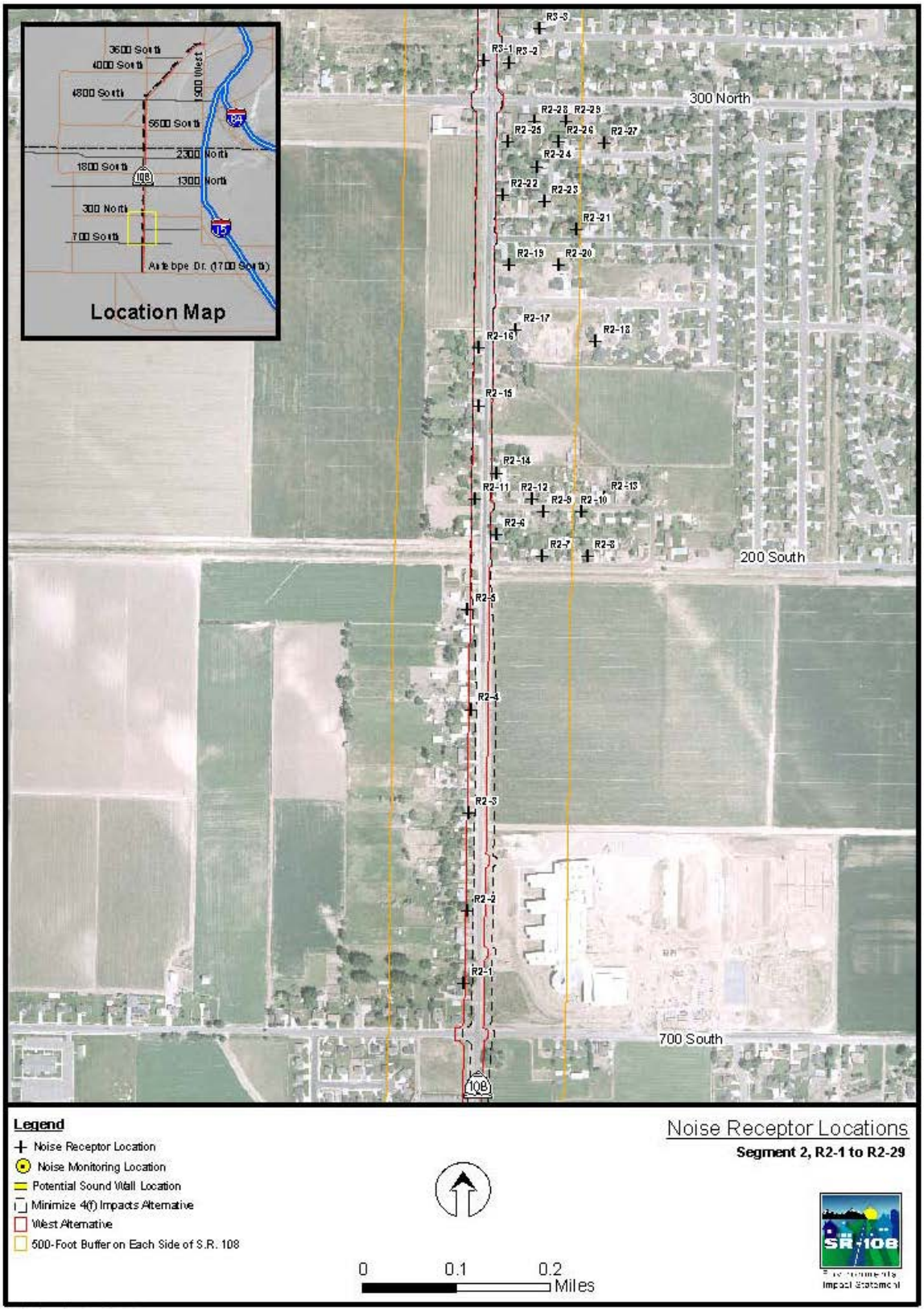


Exhibit 4.10-12: Noise Receptor Locations – Segment 3, R3-1 to R3-25

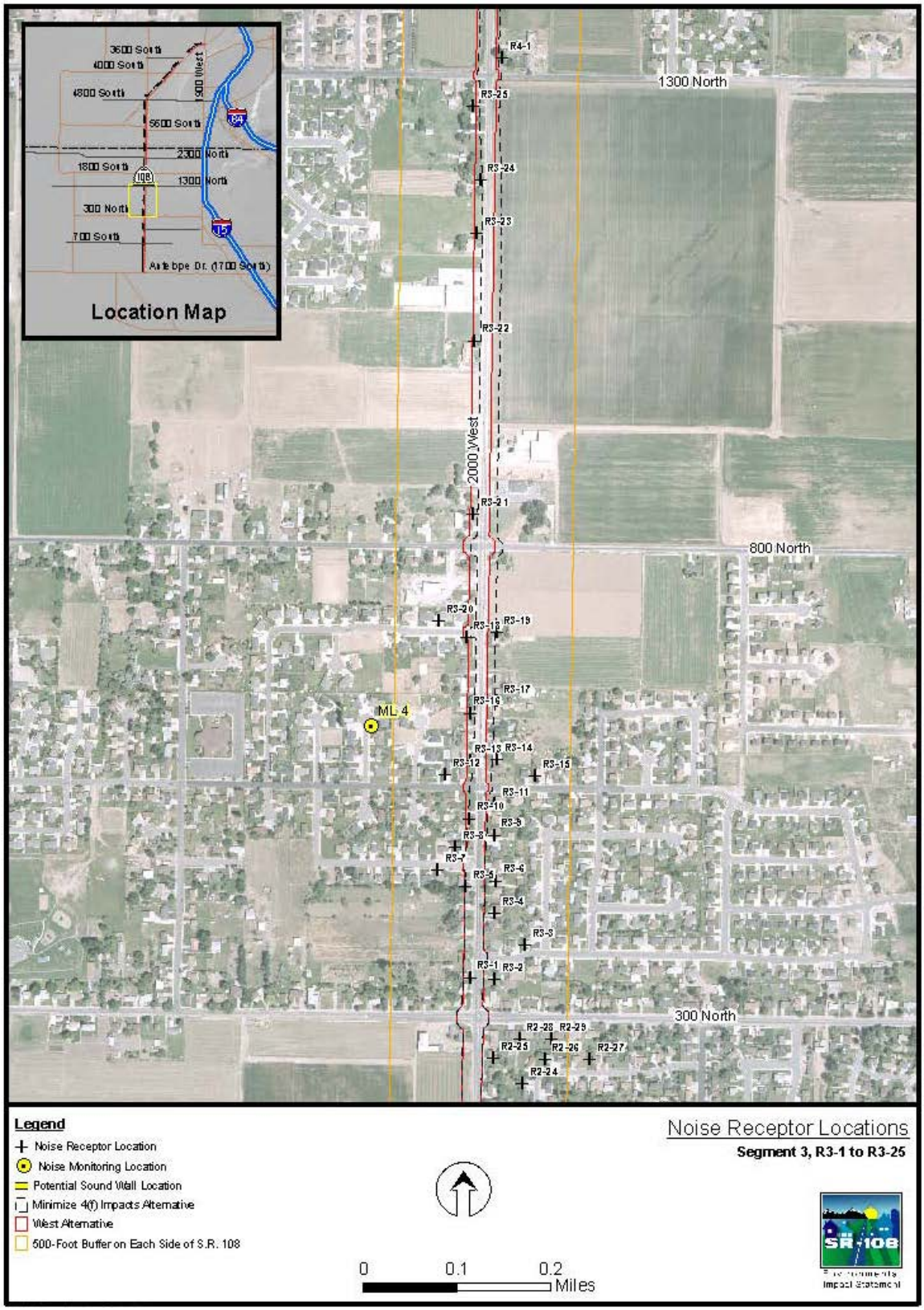


Exhibit 4.10-13: Noise Receptor Locations – Segment 4, R4-1 to R4-18

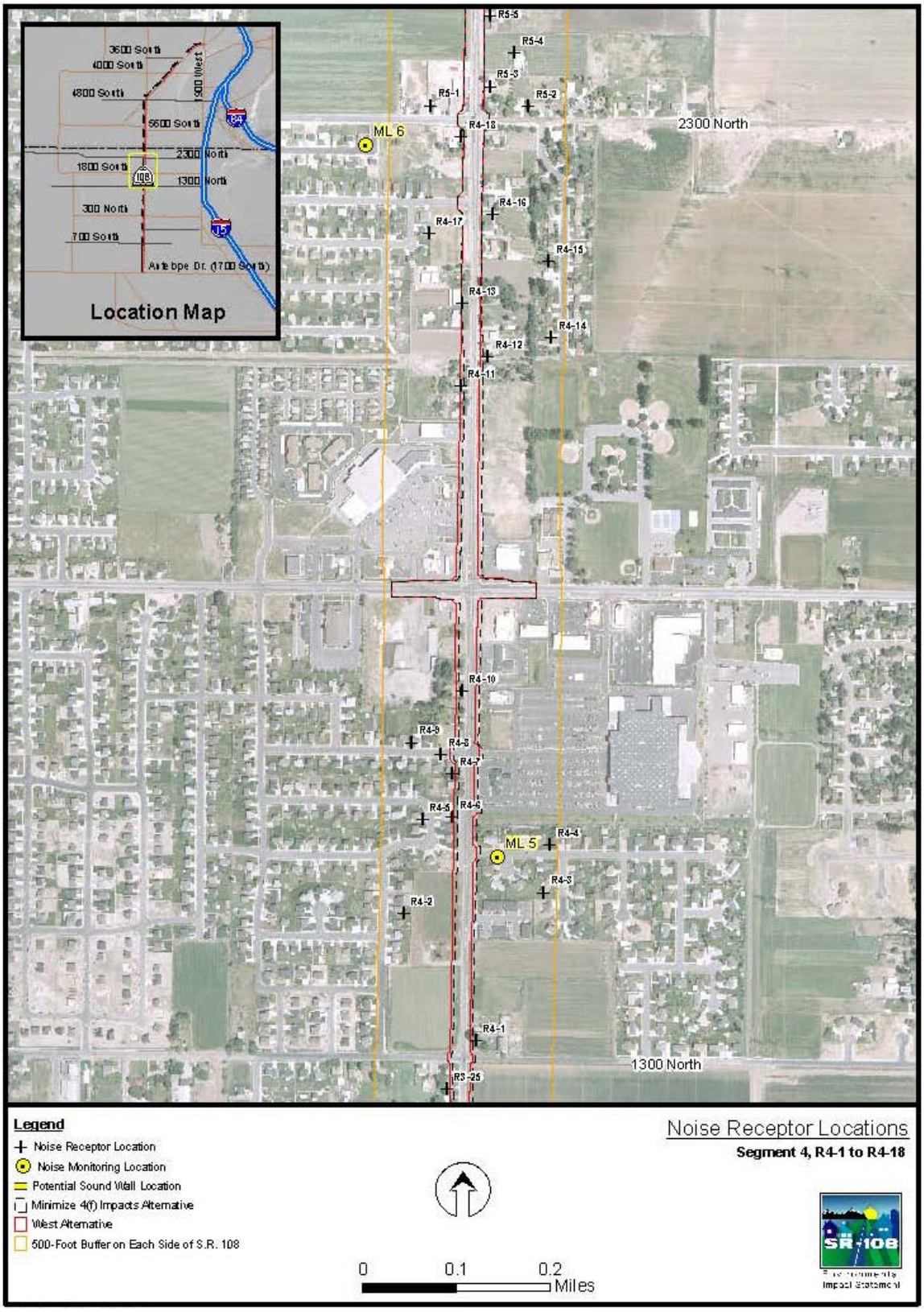


Exhibit 4.10-14: Noise Receptor Locations – Segment 5, R5-1 to R5-22

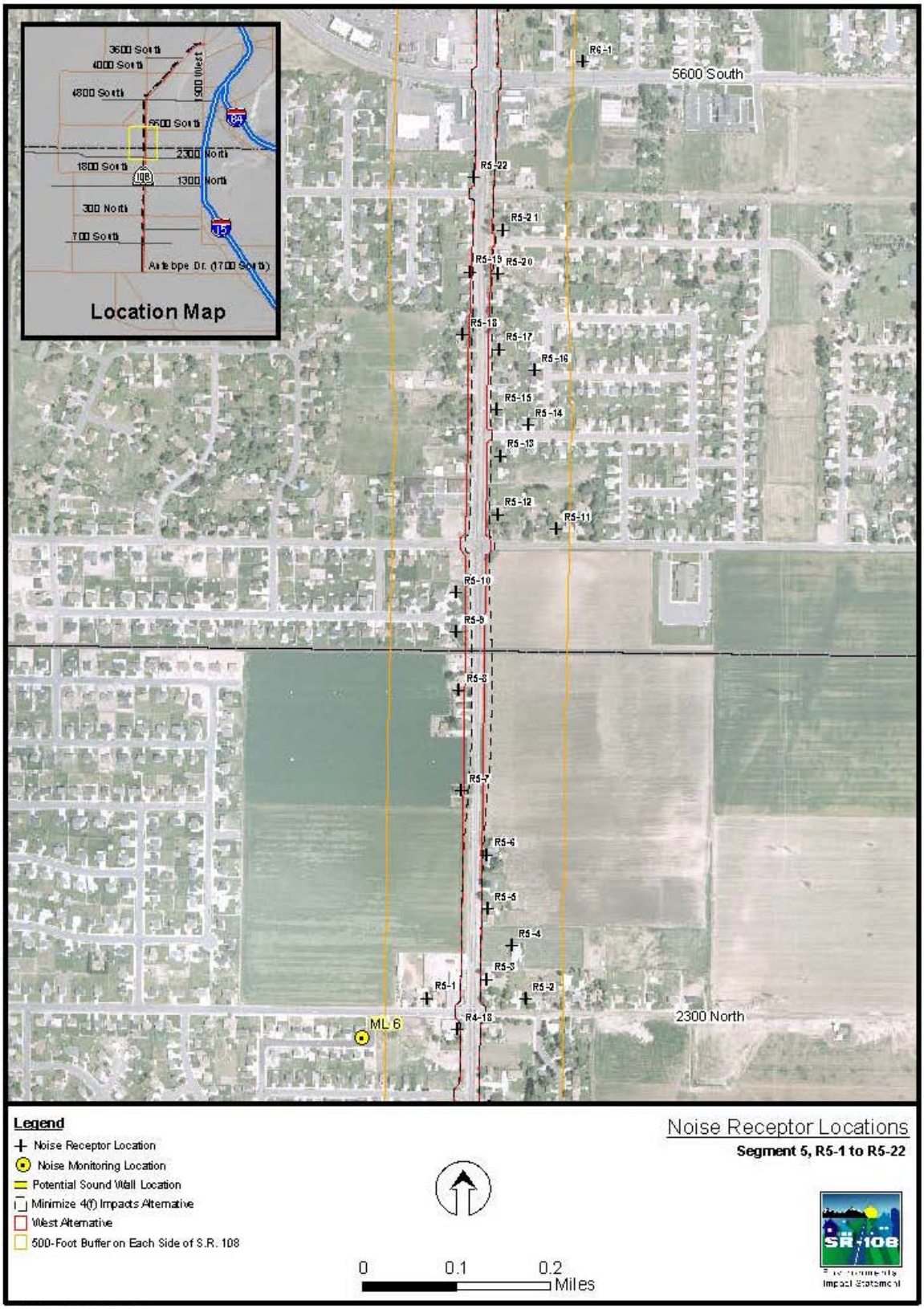


Exhibit 4.10-15: Noise Receptor Locations – Segment 6, R6-1 to R6-24

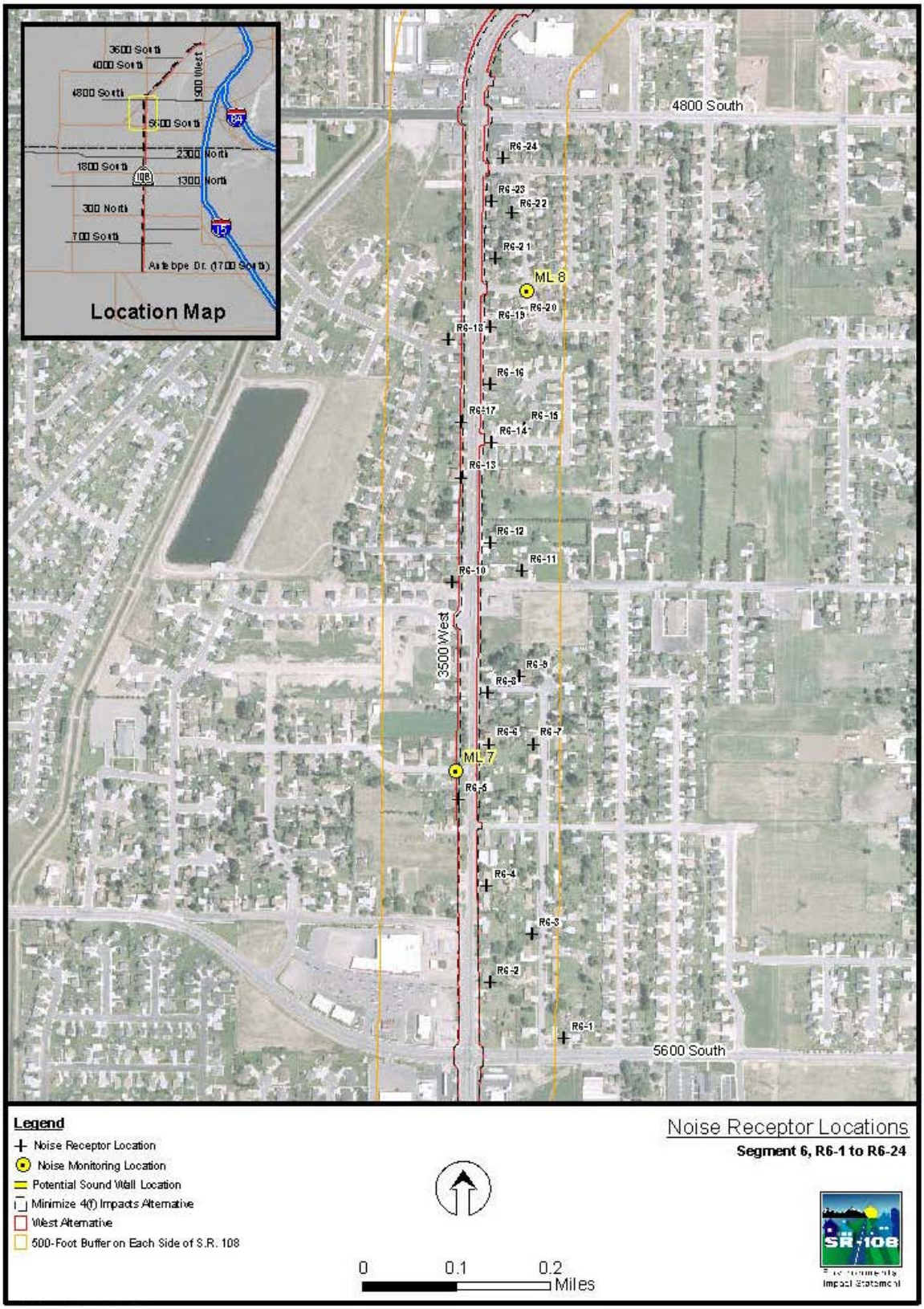


Exhibit 4.10-16: Noise Receptor Locations – Segment 7, R7-1 to R7-21

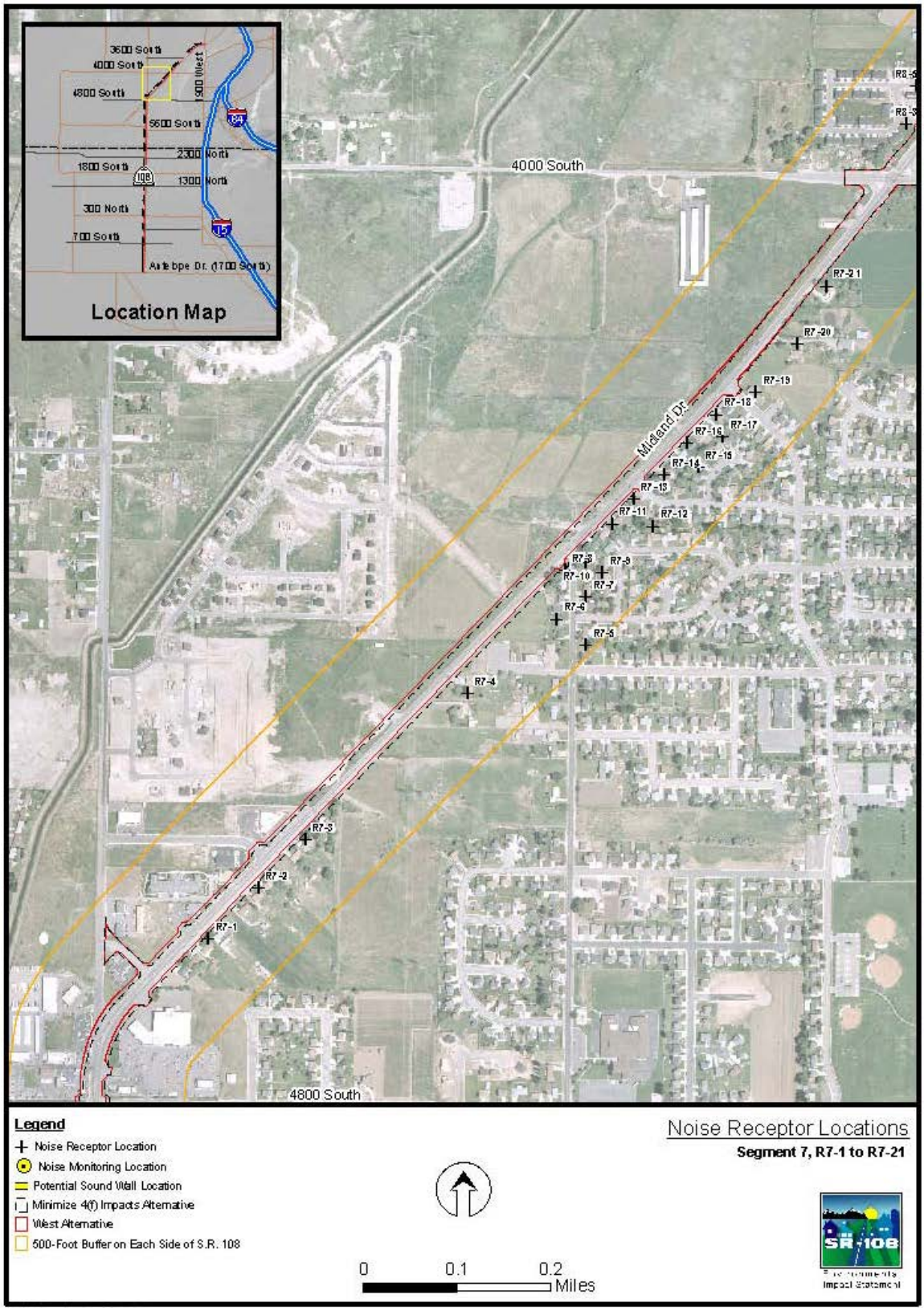


Exhibit 4.10-17: Noise Receptor Locations – Segment 8, R8-1 to R8-41

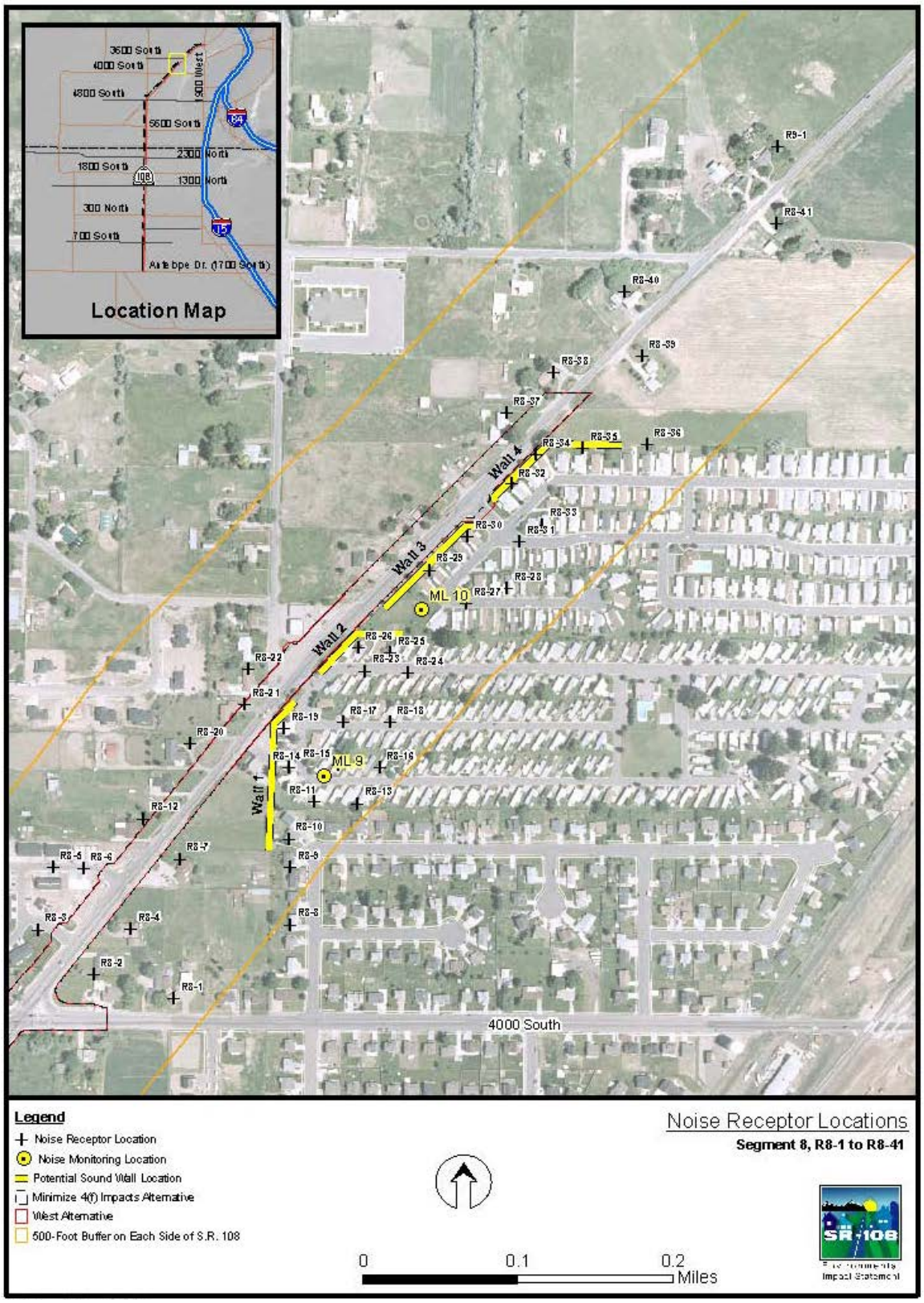


Exhibit 4.10-18: Noise Receptor Locations – Segment 9, R9-1 to R9-13

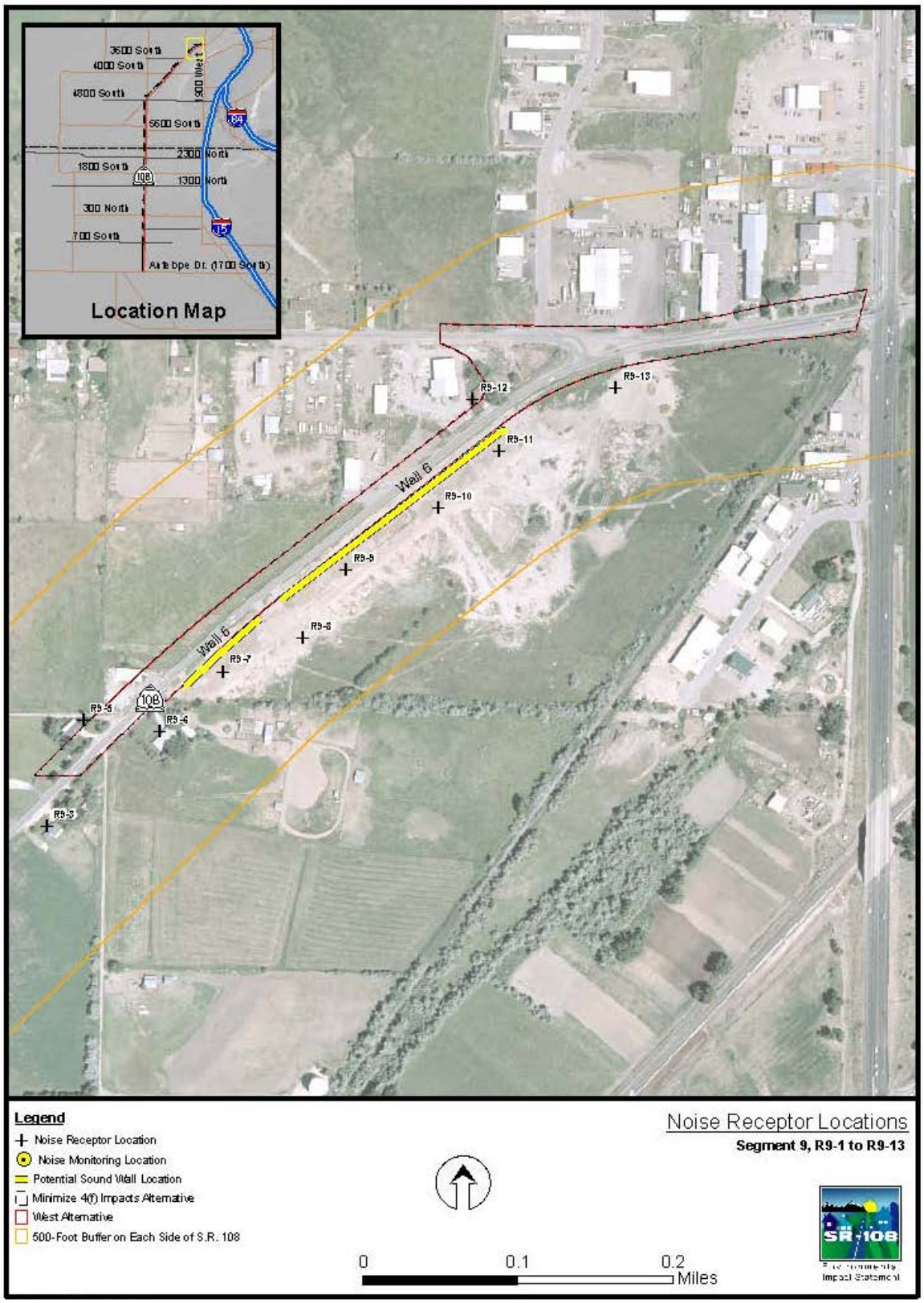


Exhibit 4.10-19: Noise Mitigation Analysis – Wall 1

Noise Reduction (in dBA) Location	Dwelling Units	No Wall	12 foot Level	12 foot Decrease	14 foot Level	14 foot Decrease	16 foot Level	16 foot Decrease	18 foot Level	18 foot Decrease
1st-row residences	8	61–71	57–61	4–10	57–60	4–11	57–60	4–12	56–59	3–12
2nd row and beyond	8	58–63	58–63	2–10	56–61	2–3	56–61	2–4	56–61	2–4

Benefiting Residences	12 foot	14 foot	16 foot	18 foot
Number of benefiting residences (at least 5 dBA)	4	4	6	6
Maximum reduction, dBA	10	11	12	12

UDOT Feasibility Requirements	12 foot	14 foot	16 foot	18 foot
1 residence >10 dBA reduction from a wall?	Yes	Yes	Yes	Yes
50% or more 1st row >5 dBA reduction?	Yes	Yes	Yes	Yes
Is wall feasible?	**Yes**	**Yes**	**Yes**	**Yes**

UDOT Cost Effectiveness Requirements	12 foot	14 foot	16 foot	18 foot
Length of modeled wall, feet	547	547	547	547
Wall area (547 feet × wall height), square feet	6,564	7,658	8,752	9,846
Wall cost ($15 × area)	$131,280	$153,160	$175,040	$196,920
Cost per benefiting residence	$32,820	$38,290	$29,173	$32,820
Is wall cost-effective?	**No**	**No**	**Yes**	**No**
Is wall feasible and cost-effective?	**No**	**No**	**Yes**	**No**

Exhibit 4.10-20: Noise Mitigation Analysis – Wall 2

Noise Reduction (in dBA) Location	Dwelling Units	No Wall	12 foot Level	12 foot Decrease	14 foot Level	14 foot Decrease	16 foot Level	16 foot Decrease	18 foot Level	18 foot Decrease
1st-row residences	3	69	63	6	63	6	63	6	62	7
2nd row and beyond	9	62–65	60–62	2–4	59–61	2–5	59–61	3–5	59–61	3–5

Benefiting Residences	12 foot	14 foot	16 foot	18 foot
Number of benefiting residences (at least 5 dBA)	3	6	6	6
Maximum reduction, dBA	6	6	6	7

UDOT Feasibility Requirements	12 foot	14 foot	16 foot	18 foot
1 residence >10 dBA reduction from a wall?	No	No	No	No
50% or more 1st row >5 dBA reduction?	Yes	Yes	Yes	Yes
Is wall feasible?	**Yes**	**Yes**	**Yes**	**Yes**

UDOT Cost Effectiveness Requirements	12 foot	14 foot	16 foot	18 foot
Length of modeled wall, feet	308	308	308	308
Wall area (308 feet × wall height), square feet	3,696	4,312	4,928	5,544
Wall cost ($15 × area)	$73,920	$86,240	$98,560	$110,880
Cost per benefiting residence	$24,620	$14,273	$16,427	$18,480
Is wall cost-effective?	**Yes**	**Yes**	**Yes**	**Yes**

Is wall feasible and cost-effective?	**Yes**	**Yes**	**Yes**	**Yes**

Exhibit 4.10-21: Noise Mitigation Analysis – Wall 3

Noise Reduction (in dBA) Location	Dwelling Units	No Wall	12 foot Level	12 foot Decrease	14 foot Level	14 foot Decrease	16 foot Level	16 foot Decrease	18 foot Level	18 foot Decrease
1st-row residences	5	69–70	60–61	9–10	59–60	9–11	59	10–12	58–59	10–12
2nd row and beyond	12	61–63	59–61	1–3	59–61	1–3	58–61	1–3	58–61	1–3

Benefiting Residences	12 foot	14 foot	16 foot	18 foot
Number of benefiting residences (at least 5 dBA)	5	5	5	5
Maximum reduction, dBA	10	11	12	12

UDOT Feasibility Requirements	12 foot	14 foot	16 foot	18 foot
1 residence >10 dBA reduction from a wall?	Yes	Yes	Yes	Yes
50% or more 1st row >5 dBA reduction?	Yes	Yes	Yes	Yes
Is wall feasible?	**Yes**	**Yes**	**Yes**	**Yes**

UDOT Cost Effectiveness Requirements	12 foot	14 foot	16 foot	18 foot
Length of modeled wall, feet	410	410	410	410
Wall area (410 feet × wall height), square feet	4,920	5,740	6,560	7,380
Wall cost ($15 × area)	$98,400	$114,800	$131,200	$147,600
Cost per benefiting residence	$19,680	$22,960	$26,240	$29,520
Is wall cost-effective?	**Yes**	**Yes**	**Yes**	**Yes**
Is wall feasible and cost-effective?	**Yes**	**Yes**	**Yes**	**Yes**

Exhibit 4.10-22: Noise Mitigation Analysis – Wall 4

Noise Reduction (in dBA) Location	Dwelling Units	No Wall	12 foot Level	12 foot Decrease	14 foot Level	14 foot Decrease	16 foot Level	16 foot Decrease	18 foot Level	18 foot Decrease
1st-row residences	7	66–71	59–61	7–10	58–60	8–12	57–59	8–13	57–58	9–14
2nd row and beyond	6	61–62	60	1–2	60	1–2	60	1–3	59–60	1–3

Benefiting Residences	12 foot	14 foot	16 foot	18 foot
Number of benefiting residences (at least 5 dBA)	7	7	7	7
Maximum reduction, dBA	10	12	13	14

UDOT Feasibility Requirements	12 foot	14 foot	16 foot	18 foot
1 residence >10 dBA reduction from a barrier?	Yes	Yes	Yes	Yes
50% or more 1st row >5 dBA reduction?	Yes	Yes	Yes	Yes
Is wall feasible?	**Yes**	**Yes**	**Yes**	**Yes**

UDOT Cost Effectiveness Requirements	12 foot	14 foot	16 foot	18 foot
Length of modeled wall, feet	426	426	426	426
Wall area (426 feet × wall height), square feet	5,112	5,964	6,816	7,668
Wall cost ($15 × area)	$102,240	$119,280	$136,320	$153,360
Cost per benefiting residence	$14,606	$17,040	$19,474	$21,909
Is wall cost-effective?	**Yes**	**Yes**	**Yes**	**Yes**
Is wall feasible and cost-effective?	**Yes**	**Yes**	**Yes**	**Yes**

Exhibit 4.10-23: Noise Mitigation Analysis – Wall 5

Noise Reduction (in dBA) Location	Dwelling Units	No Wall	8 foot Level	8 foot Decrease	10 foot Level	10 foot Decrease	12 foot Level	12 foot Decrease	14 foot Level	14 foot Decrease
1st-row residences	10	72–73	64–68	5–9	62–68	5–11	62–68	5–11	61–68	5–12

	8 foot	10 foot	12 foot	14 foot
Number of benefiting residences (at least 5 dBA)	10	10	10	10
Maximum reduction, dBA	9	11	11	12

UDOT Feasibility Requirements	8 foot	10 foot	12 foot	14 foot
1 residence >10 dBA reduction from a barrier?	No	Yes	Yes	Yes
75% or more 1st row >5 dBA reduction?	Yes	Yes	Yes	Yes
Is wall feasible?	**Yes**	**Yes**	**Yes**	**Yes**

UDOT Cost Effectiveness Requirements	8 foot	10 foot	12 foot	14 foot
Length of modeled wall, feet	360	360	360	360
Wall area (360 feet × wall height), square feet	2,880	3,600	4,320	5,040
Wall cost ($20 × area)	$57,600	$72,000	$86,400	$100,800
Cost per benefiting residence	$5,760	$7,200	$8,640	$10,080
Is wall cost-effective?	**Yes**	**Yes**	**Yes**	**Yes**

Is wall feasible and cost-effective?	**Yes**	**Yes**	**Yes**	**Yes**

Exhibit 4.10-24: Noise Mitigation Analysis – Wall 6

Noise Reduction (in dBA) Location	Dwelling Units	No Wall	8 foot Level	8 foot Decrease	10 foot Level	10 foot Decrease	12 foot Level	12 foot Decrease	14 foot Level	14 foot Decrease
1st-row residences	12	68–74	62–64	6–10	62	7–11	61–62	7–12	60–61	8–13

	8 foot	10 foot	12 foot	14 foot
Number of benefiting residences (at least 5 dBA)	12	12	12	12
Maximum reduction, dBA	10	11	12	12

UDOT Feasibility Requirements	8 foot	10 foot	12 foot	14 foot
1 residence >10 dBA reduction from a barrier?	Yes	Yes	Yes	Yes
75% or more 1st row >5 dBA reduction?	Yes	Yes	Yes	Yes
Is wall feasible?	**Yes**	**Yes**	**Yes**	**Yes**

UDOT Cost Effectiveness Requirements	8 foot	10 foot	12 foot	14 foot
Length of modeled wall, feet	950	950	950	950
Wall area (950 feet × wall height), square feet	7,600	9,500	11,400	13,300
Wall cost ($20 × area)	$152,000	$190,000	$228,000	$266,000
Cost per benefiting residence	$12,667	$15,833	$19,000	$22,167
Is wall cost-effective?	**Yes**	**Yes**	**Yes**	**Yes**

Is wall feasible and cost-effective?	**Yes**	**Yes**	**Yes**	**Yes**

4.11 Water Quality Impacts

This section discusses the expected water quality impacts to surface water and groundwater from the No-Action and action alternatives. The impact analysis consisted of identifying typical contaminants found in highway runoff and determining whether these contaminants would affect the beneficial-use classifications of the surface waters and groundwater in the water quality impact analysis area. The groundwater impact analysis also identified the number of wells that would be affected by each alternative.

What is the water quality impact analysis area?

The water quality impact analysis area includes the water bodies that could be affected by construction and operation of S.R. 108.

4.11.1 No-Action Alternative

Under the No-Action Alternative, no improvements would be made to S.R. 108 except for routine maintenance. Stormwater runoff would continue to run from the roadway directly into the nearby sloughs and canals without passing through any stormwater detention features. Under this alternative, the stormwater runoff from S.R. 108, which could contain total suspended solids (TSS) from roadside erosion and from de-icing activities, would go through the same water quality treatment process as runoff under the current conditions.

What are beneficial uses?

Lakes, rivers, and other water bodies have uses to humans and other life. These uses are called *beneficial uses*. The State of Utah defines 13 different beneficial uses for rivers, streams, lakes, and reservoirs in Utah (see Exhibit 3.11-1: Designated Beneficial Uses for Rivers, Streams, Lakes, and Reservoirs in Utah).

4.11.2 Minimize 4(f) Impacts Alternative

To evaluate impacts from the Minimize 4(f) Impacts Alternative, typical contaminants from highway runoff were identified. Some of the contaminants listed in Exhibit 4.11-1 below were evaluated to determine if the action alternatives would degrade water quality along S.R. 108 and in the waters downstream of the roadway.

Exhibit 4.11-1: Typical Highway Runoff Contaminants

Contaminant	Source
Bromide	Vehicle exhaust
Cadmium	Tire wear, insecticide application
Chloride	De-icing salts
Chromium	Metal plating, engine parts, brake lining wear
Copper	Metal plating, bearing wear, engine parts, brake lining wear, fungicide and insecticide use
Cyanide	Anticake compound used to keep de-icing salts granular
Iron	Auto body rust, steel structures, engine parts
Lead	Leaded gasoline, tire wear, lubricating oil and grease, bearing wear, atmospheric deposition
Manganese	Engine parts
Nickel	Diesel fuel and gasoline, lubricating oil, metal plating, brake lining wear, asphalt paving
Nitrogen, phosphorous	Atmosphere, roadside fertilizer use, sediments
Particulates (sediments or TSS)	Pavement wear, vehicles, atmosphere, maintenance, snow/ice abrasives, sediment disturbance
Pathogenic bacteria	Soil, litter, bird droppings, trucks hauling livestock/ stockyard waste
Polychlorinated biphenyls (PCBs), pesticides	Spraying of highway rights-of-way, atmospheric deposition, PCB catalyst in synthetic tires
Petroleum	Spills, leaks, blow-by motor lubricants, antifreeze, hydraulic fluids, asphalt surface leachate
Rubber	Tire wear
Sodium, calcium	De-icing salts, grease
Sulfate	Roadway beds, fuel, de-icing salts
Total dissolved solids (TDS)	De-icing salts, vehicle deposits, pavement wear
Zinc	Tire wear, motor oil, grease

Source: FHWA 1996, 34

4.11.2.1 Methodology for Determining Impacts to Surface Waters

Neither of the S.R. 108 action alternatives would cross any natural rivers or creeks. However, a few unnamed drainage canals cross under S.R. 108. For the purpose of the surface water quality analysis, the impact analysis area includes Howard Slough, Hooper Canal, and the Great Salt Lake.

- Howard Slough has beneficial-use classifications of 2B, 3C, and 4 (protected for secondary contact recreation, non-game fish and other aquatic life, and agricultural uses).
- UDEQ (Utah Administrative Code R317) does not specifically list beneficial uses for the Hooper Canal.
- The Great Salt Lake is classified as a Class 5 water. Class 5 waters are protected for primary and secondary contact recreation, aquatic wildlife, and mineral extraction. UDEQ has established a narrative standard for the beneficial uses of the Great Salt Lake, but no numeric standards are currently in effect.

Therefore, water quality impacts were evaluated with respect to the beneficial uses for Howard Slough because it has the most stringent water quality standards associated with its beneficial use classifications compared to the Hooper Canal and the Great Salt Lake. If an alternative would not affect the beneficial uses of Howard Slough, then it would not affect the beneficial uses of any other surface waters in the water quality impact analysis area.

Exhibit 4.11-2 presents the primary contaminants in highway runoff that also have numeric criteria associated with the designated beneficial uses of Howard Slough (2B, 3C, and 4).

What is the narrative standard for Utah waters?

The narrative standard is applied to all waters in Utah. This standard states:

"It shall be unlawful, and a violation of these regulations, for any person to discharge or place any waste or other substance in such a way as will be or may become offensive such as unnatural deposits, floating debris, oil, scum or other nuisances such as color, odor or taste; or cause conditions which produce undesirable aquatic life or which produce objectionable tastes in edible aquatic organisms; or result in concentrations or combinations of substances which produce undesirable physiological responses in desirable resident fish, or other desirable aquatic life, or undesirable human health effects, as determined by bioassay or other tests performed in accordance with standard procedures."

Exhibit 4.11-2: Numeric Criteria Associated with Beneficial Uses of Howard Slough

Beneficial Uses of Howard Slough	Phosphorus (total, mg/L)	Turbidity (increase, NTU)	pH	Dissolved Copper (mg/L)	Dissolved Lead (mg/L)	Dissolved Zinc (mg/L)	TDS (Irrigation/ Stock Watering) (mg/L)
2B (secondary contact)	0.05	10	6.5–9.0	—	—	—	—
3C (non-game fish)	—	15	6.5–9.0	0.013	0.065	0.120	—
4 (agriculture)	—	—	6.5–9.0	0.2	0.1	—	1,200/2,000

Source: Utah Administrative Code R317

NTU = nephelometric turbidity units

Class 2B Numeric Criteria

The Class 2B beneficial uses include numeric criteria for phosphorus, turbidity, and pH. Turbidity is a physical measure of water clarity, and the standard applies to turbidity increases. TSS concentrations could also be used as a surrogate to evaluate turbidity. There is no numeric standard for TSS.

Phosphorus. Phosphorous levels in roadway stormwater runoff can result from erosion of roadside sediments or from direct application of phosphorus, usually in the form of fertilizer. The project would include a storm drain system, so increases in phosphorus levels would be limited.

Turbidity and TSS. TSS is present in highway runoff from pavement wear, vehicles, the atmosphere, maintenance, snow/ice abrasives, and disturbed sediment. The storm drainage system proposed for the project includes detention basins to control flow rates. These detention basins allow sediment and other large suspended particles associated with roadway runoff to settle out of the stormwater. TSS can also result from erosion of roadside soils when stormwater erodes steep roadside embankments or when high-velocity water erodes soil at the outlet of crossing culverts. The Minimize 4(f) Impacts Alternative would include a storm drainage system, so erosion of roadside soils would be minor.

The greatest potential for the project to increase TSS and turbidity is during construction. A construction UDPES permit, which prescribes best management practices to control pollution leaving the construction site, would be required for the project. The permit conditions would require the use of erosion-control measures such as silt fences to reduce impacts to adjacent waters.

pH. The other numeric water quality criterion for Class 2B waters is pH, which is not a common constituent in highway stormwater runoff but is a measure of water quality. The Minimize 4(f) Impacts Alternative would have no effect on pH levels in receiving waters.

Class 3C and Class 4 Numeric Criteria

Four additional constituents were analyzed to determine the expected impacts to the Class 3C and Class 4 beneficial uses: copper, lead, zinc, and total dissolved solids (TDS). Copper, lead, and zinc are the dominant heavy-metal pollutants in roadway stormwater runoff and have numeric water quality criteria associated with Class 3C beneficial uses. The impacts from the three toxic heavy metals were modeled using the FHWA numerical water quality model (see the following paragraph). TDS was assessed by modeling the application of de-icing chemicals to S.R. 108 and estimating the resulting TDS concentrations in stormwater runoff and by comparing typical event mean concentrations, which are measured values, to the applicable numeric water quality criteria. The Class 4 beneficial use has numeric water quality criteria for TDS. The beneficial uses are for two agricultural uses of water: crop irrigation and stock watering.

Methodology for Analysis of Heavy Metals (Copper, Lead, and Zinc). FHWA's numerical water quality model was used to quantify the impacts of metals in the runoff from S.R. 108. The model is explained in two FHWA research documents: FHWA-RD-88-006, *Pollutant Loadings and Impacts from Highway Stormwater Runoff* (FHWA 1990), and FHWA-RD-96-095, *Retention, Detention, and Overland Flow for Pollutant Removal from Highway Stormwater Runoff* (FHWA 1996). The model used for this analysis is a probabilistic dilution model developed and applied in EPA's Nationwide Urban Runoff Program and reviewed and approved by EPA's Science Advisory Board. This model provides an estimate of the one-time-every-3-years, in-stream concentration of a pollutant after mixing (FHWA 1990, 1–2). This frequency is used because UDEQ allows these water quality criteria to be exceeded only one time in a 3-year period.

Model Inputs. The average flow rate for Howard Slough was determined by reviewing data from a U.S. Geological Survey gage on Howard Slough between 1972 and 1984, which are the most recent data available. Because UDEQ does not maintain water quality data for Howard Slough, the existing background concentrations of copper, lead, and zinc are assumed to be similar to the concentrations in the lower reaches of the Weber River watershed. Water quality data for the Weber River indicate that the

concentrations of these pollutants were below the laboratory detection limit for the majority of samples collected (EPA 2007c). The background concentration was assumed to be half the detection limit. Concentrations of copper, lead, and zinc in the stormwater runoff are assumed to be similar to the event mean concentrations as analyzed from samples collected during storm events for various locations in Salt Lake County from 1992 to June 2000. These event mean concentrations were used since they are more site-specific than the average values suggested by the numerical analysis documentation (FHWA 1996). The values used in the analysis are shown in Exhibit 4.11-3. Exhibit 4.11-3 also includes typical concentrations of TSS and TDS.

Exhibit 4.11-3: Event Mean Concentrations during Sampled Storm Events

Pollutant	Event Mean Concentration (mg/L)
Total copper	0.039
Total lead	0.031
Total zinc	0.181
TSS	116
TDS (April, May, June, Sept., Oct.)	581 (storm composite)

Source: Stantec 2000

Water Quality Treatment Considerations. Runoff from S.R. 108 would be controlled through the use of detention features. These features would include detention ponds, grassed swales, or other means to control runoff and limit stormwater discharges to current levels. To determine the impacts from the project, the quality of water in the receiving stream was examined after mixing with roadway stormwater runoff after the stormwater left a "conceptual" (proposed) detention basin, which was sized to detain water from the longest stretch of roadway (about 2 miles). The pollutant removal rates stated in the FHWA documents were used in the calculations. Because some amount of the pollutant is dissolved in water, removal rates for specific pollutants are expressed as a fraction of the estimated TSS removal rate for a specific detention basin (for lead removal, FHWA documentation suggests 90% of the TSS removal; for copper, 60%; and for zinc, 45%).

The conceptual detention basins are small and are sized to detain only the excess stormwater generated from the increase in impervious (paved) area due to the proposed project. These small detention basins are anticipated to provide a minimum TSS removal rate of 40%. This figure is based on the size of the basin relative to the size of the area that would drain into the basin (FHWA 1996). So, for example, a conceptual detention basin would remove 24% of the copper in storm runoff, because the detention basin has a TSS removal rate of 40% and the suggested percentage for copper is 60% of this rate (60% of 40% is 24%).

Note that the project might use some of the larger regional detention basins that are planned for the area. If used, these larger basins would remove more pollutants than the conceptual basins that were analyzed for this project. The project could also control stormwater by using grassed swales or a combination of swales and detention basins.

4.11.2.2 Impacts to Surface Water

Class 3C Beneficial Use (Heavy Metals Analysis)

Exhibit 4.11-4 below presents the estimated pollutant removal rates and the modeled in-stream concentration of each pollutant. As shown in Exhibit 4.11-4, the modeled one-time-every-3-years concentrations would not exceed the numeric water quality standards in Exhibit 4.11-2: Numeric Criteria Associated with Beneficial Uses of Howard Slough above, so the Minimize 4(f) Impacts Alternative would not affect the Class 3C beneficial use of Howard Slough. Because Howard Slough has the most stringent water quality standards of the water bodies examined, the Minimize 4(f) Impacts Alternative would not degrade the water quality of the other water bodies with less-stringent standards.

Exhibit 4.11-4: Effects of Detention Basins on Water Quality and Water Quality Results

Pollutant	Percent of Pollutant Removed by Detention Basin	Resulting Concentration (mg/L)	Numeric Criteria for Beneficial Use Class 3C (mg/L)[a]
Copper	24%[b]	0.0126	0.013
Lead	36%[b]	0.002	0.065
Zinc	18%[b]	0.064	0.120

[a] Utah Administrative Code R317

[b] FHWA 1996, 72

Class 4 Beneficial Use (TDS Analysis)

Increases in TDS Due to Construction. The Minimize 4(f) Impacts Alternative could increase the amount of TDS in receiving waters during project construction. However, the required UPDES permit would include erosion-control measures such as silt fences that would reduce TDS impacts.

Increases in TDS Due to Salt Application. The greatest potential effect to the Class 4 beneficial use is from the application of salt to S.R. 108 during winter storms. Dissolved salts are typically measured as total dissolved solids, or TDS. UDOT applies salt (but not sand) to reduce ice and improve traction on roads during heavy snowfall. Along the Wasatch Front, UDOT uses the following two methods to apply salt during and before a predicted winter storm (Bernhard 2006):

- Beginning 24 hours before the predicted start of the storm, 30 gallons of 23% salt brine per lane-mile are applied.
- After the storm begins, a mixture of 4 gallons of 23% brine and 250 pounds of common salt per lane-mile is applied.

Stormwater runoff from the Interstate 215 (I-215) drainage system at the outlet to the Jordan River in Salt Lake County was sampled by Salt Lake County. This highway is much wider than S.R. 108, so runoff from I-215 should have more road-related contaminants. The typical concentrations of TDS from I-215 were 581 mg/L as shown above in Exhibit 4.11-3: Event Mean Concentrations during Sampled Storm Events (Stantec 2000). The modeled TDS concentration from the Minimize 4(f) Impacts Alternative was estimated at 927 mg/L

What is a typical concentration?

The *typical concentration* is the average, or mean, concentrations as measured from laboratory analysis samples of stormwater runoff.

based on the de-icing procedures described above. The observed concentrations are less because not all of the applied salt runs off with melting snow.

Both the modeled concentrations from the Minimize 4(f) Impacts Alternative and the observed concentrations from I-215 are less than the TDS criteria for beneficial use Class 4 for crop irrigation (1,200 mg/L) and stock watering (2,000 mg/L). However, TDS levels could be higher than the estimated concentrations in winter and early spring. The TDS standard applies to agricultural uses only. The majority of agricultural use occurs from middle to late spring through summer to the early fall. De-icing salts are not typically applied during these times of the year. Consequently, the largest TDS increases would occur during periods when most water is not being used for agriculture.

4.11.2.3 Impacts to Groundwater

This section discusses the expected impacts of the Minimize 4(f) Impacts Alternative on the East Shore aquifer system. The section discusses the potential for roadway improvements to affect groundwater quality and to affect groundwater rights and wells. The Utah Division of Water Quality does not generally require groundwater permits from UDOT for its transportation projects. Impacts to groundwater wells would not necessarily affect the overall groundwater quality, but they would inconvenience users of groundwater if a well was relocated or abandoned.

What is an aquifer?

An *aquifer* is an underground geologic formation that easily stores and transmits water. Aquifers can be composed of either porous rock or unconsolidated deposits of sand and gravel. An aquifer is said to be *confined* if it is covered by an impermeable layer of rock or clay. Due to this confining layer, the groundwater in confined aquifers is usually under pressure. Drilling a well into a confined aquifer can produce an *artesian well*—one where the pressurized water rises to the surface without the aid of a pump.

Groundwater Quality

The Minimize 4(f) Impacts Alternative could cause minor impacts to shallow groundwater as pollutants in runoff infiltrate the ground surface near the roadway. However, these impacts are not likely to decrease groundwater quality because the proposed drainage system would remove some pollutants and because the water quality of the shallow aquifer does not substantially affect the deeper aquifer, which is the typical water source for groundwater wells. In addition, the water quality impact analysis area is a substantial distance away from the primary deep aquifer recharge areas along the foothills of the Wasatch Mountains and along the Weber River delta.

Groundwater Rights and Wells

The Minimize 4(f) Impacts Alternative would directly affect 34 water rights points of diversion. Two surface water rights, which are storm drain systems, and 32 groundwater rights would be affected. Exhibit 4.11-5 and Exhibit 4.11-6 below show impacts to two points of diversion for municipal water rights, but these water rights are not approved. Usually, a well is drilled only after the water right is approved. No other existing municipal drinking water sources would be directly affected by the Minimize 4(f) Impacts Alternative.

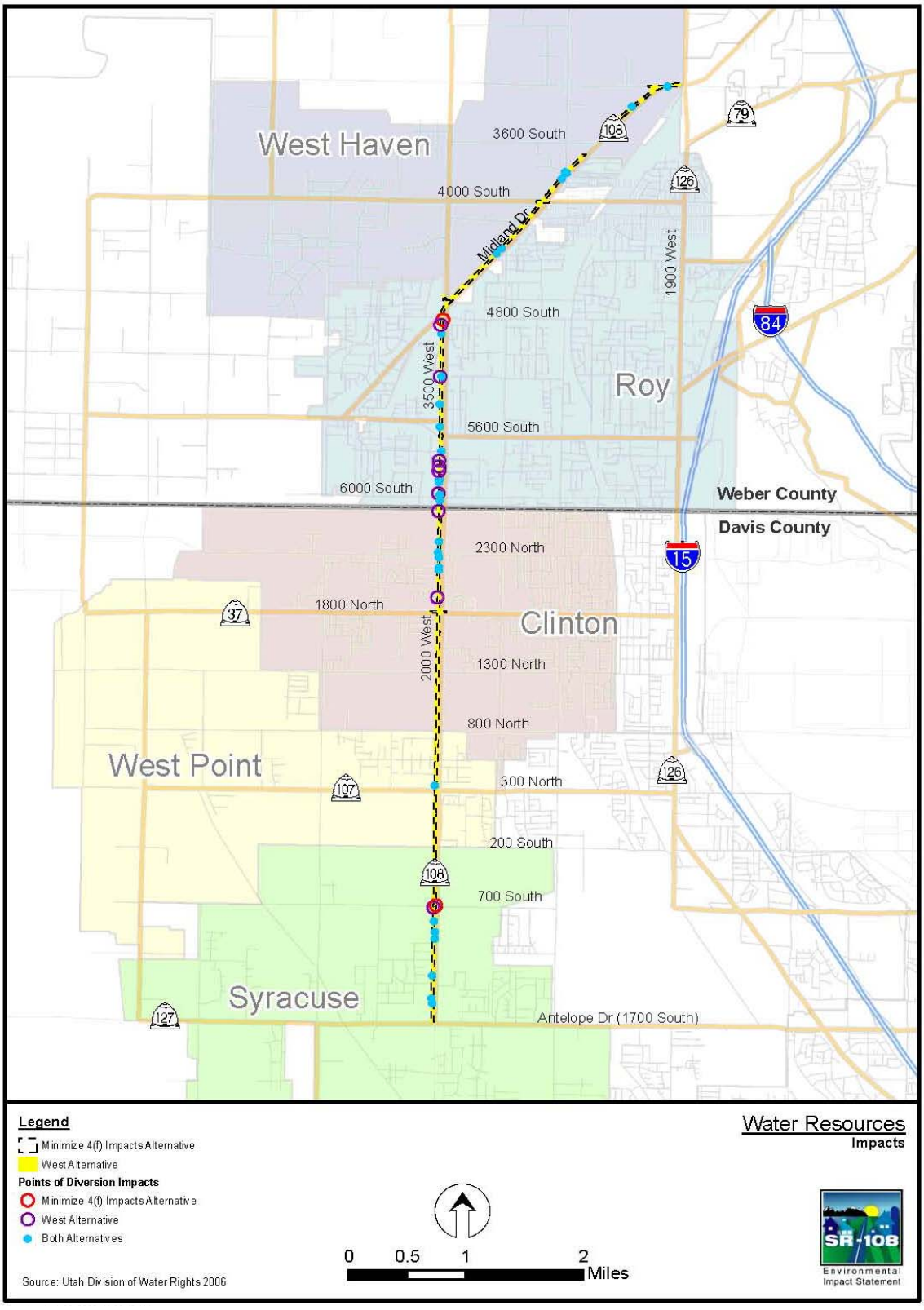
The Minimize 4(f) Impacts Alternative is located about 478 feet east of and up-gradient of the Hooper Water Improvement District's Well #1 and outside of drinking water protection Zone 1 for this well (a 150-foot radius around the well head). No other drinking water wells are both located within about 0.25 mile of the Minimize 4(f) Impacts Alternative and are down-gradient of the alternative. In addition, the source of drinking water in these wells is likely the deep aquifer, which would not be affected by runoff from the Minimize 4(f) Impacts Alternative.

Exhibit 4.11-5: Direct Impacts to Points of Diversion from the Minimize 4(f) Impacts Alternative

Water Right	Use	Source
35-4612	Irrigation and stock watering	Drain water
35-4401	*Unknown*	City of Roy storm drain
35-5813	Irrigation	Land drain system (groundwater)
35-5813	Irrigation	Land drain system (groundwater)
35-5813	Irrigation	Land drain system (groundwater)
31-5227 (unapproved)	Domestic, irrigation, and municipal	Shallow underground water wells
31-5227 (unapproved)	Domestic, irrigation, and municipal	Shallow underground water wells
31-3624	Irrigation	Underground water drain
35-1913	Irrigation	Underground water drain
35-2668	Irrigation	Underground water drain
35-3212	Irrigation and stock watering	Underground water drain
31-2488	Domestic, irrigation, stock watering	Underground water well
31-2763	Domestic and stock watering	Underground water well
31-3225	Domestic and stock watering	Underground water well
31-3228	Domestic and stock watering	Underground water well
31-3231	Domestic	Underground water well
31-3232	Domestic and stock watering	Underground water well
31-3562	Domestic, irrigation, and other	Underground water well
31-3623	Domestic and irrigation	Underground water well
31-3678	Domestic, irrigation, stock watering	Underground water well
31-4702	Irrigation	Underground water well
35-2002	Irrigation	Underground water well
35-2773	Domestic	Underground water well
35-2800	Domestic	Underground water well
35-3308	Irrigation and stock watering	Underground water well
35-3582	Domestic and stock watering	Underground water well
35-3586	Domestic	Underground water well
35-809	Domestic	Underground water well
35-857	Domestic	Underground water well
35-867	Domestic	Underground water well
31-3227	Irrigation	Underground water well
35-2179	Domestic, irrigation, stock watering	Underground water well
35-1306	Irrigation	Underground water drain
35-5661	Domestic and stock watering	Underground water well

The locations of points of diversion were provided by the Utah Division of Water Rights. Because the locations are approximate, the number of wells affected is also an approximation.

Exhibit 4.11-6: Water Resources – Impacts



The exact location of each affected well head or surface water point of diversion would be determined during the final design of the project. The Minimize 4(f) Impacts Alternative could indirectly affect other wells and surface water points of diversion if UDOT needed to acquire a residence or business with an agricultural (irrigation or stock watering) or domestic water source.

4.11.3 West Alternative

The methodology for determining impacts to surface waters from the West Alternative is the same as that used for the Minimize 4(f) Impacts Alternative (see Section 4.11.2.1, Methodology for Determining Impacts to Surface Waters).

4.11.3.1 Impacts to Surface Water

The proposed right-of-way width and the increase in impervious area for the West Alternative would be the same as for the Minimize 4(f) Impacts Alternative, so the impacts to surface water quality and beneficial uses would be the same.

4.11.3.2 Impacts to Groundwater

Groundwater Quality

The proposed right-of-way width and the increase in impervious area for the West Alternative would be the same as for the Minimize 4(f) Impacts Alternative, so the impacts to groundwater quality would be the same.

Groundwater Rights and Wells

The West Alternative would directly affect 40 water rights points of diversion. Three surface water rights, which are storm drain systems, and 37 groundwater rights would be affected. Exhibit 4.11-7 below shows impacts to two municipal water rights, but these wells are not in use. No municipal wells would be directly affected by the West Alternative.

The West Alternative is located 478 feet east of and up-gradient of the Hooper Water Improvement District's Well #1. Because the West Alternative is outside Zone 1 for this well, it would not affect this municipal drinking water source.

Exhibit 4.11-7: Direct Impacts to Points of Diversion from the West Alternative

Water Right	Use	Source
35-105	Irrigation	Drain ditch
35-4612	Irrigation and stock watering	Drain water
35-4401	*Unknown*	City of Roy storm drain
35-5813	Irrigation	Land drain system (groundwater)
35-5813	Irrigation	Land drain system (groundwater)
35-5813	Irrigation	Land drain system (groundwater)
31-5227 (unapproved)	Domestic, irrigation, and municipal	Shallow underground water wells
31-5227 (unapproved)	Domestic, irrigation, and municipal	Shallow underground water wells
31-3624	Irrigation	Underground water drain
35-1913	Irrigation	Underground water drain
35-2668	Irrigation	Underground water drain
35-3212	Irrigation and stock watering	Underground water drain
35-3264	Irrigation and stock watering	Underground water drain
31-2488	Domestic, irrigation, stock watering	Underground water well
31-2679	Stock watering	Underground water well
31-2763	Domestic and stock watering	Underground water well
31-3155	Domestic, irrigation, stock watering	Underground water well
31-3225	Domestic and stock watering	Underground water well
31-3226	Domestic and stock watering	Underground water well
31-3228	Domestic and stock watering	Underground water well
31-3231	Domestic	Underground water well
31-3232	Domestic and stock watering	Underground water well
31-3562	Domestic, irrigation, and other	Underground water well
31-3623	Domestic and irrigation	Underground water well
31-3678	Domestic, irrigation, stock watering	Underground water well
31-4702	Irrigation	Underground water well
35-2001	Domestic, irrigation, stock watering	Underground water well
35-2002	Irrigation	Underground water well
35-2773	Domestic	Underground water well
35-2800	Domestic	Underground water well
35-3308	Irrigation and stock watering	Underground water well
35-3582	Domestic and stock watering	Underground water well
35-3586	Domestic	Underground water well
35-732	Domestic	Underground water well
35-733	Domestic	Underground water well
35-809	Domestic	Underground water well
35-857	Domestic	Underground water well
35-867	Domestic	Underground water well
35-1306	Irrigation	Underground water drain
35-5661	Domestic and stock watering	Underground water well

The locations of points of diversion were provided by the Utah Division of Water Rights. Because the locations are approximate, the number of wells affected is also an approximation.

4.11.4 Mitigation Measures for Water Quality Impacts

4.11.4.1 Mitigation Measures for Water Quality Impacts due to Construction

A UPDES permit will be required if construction disturbs more than 1 acre. This permit will require the use of best management practices (BMPs) to prevent sediments and other contaminants from leaving the construction site.

4.11.4.2 Mitigation Measures for Surface Water Impacts

Detention features will be provided where the capacity of the existing stormwater system is inadequate to convey the additional runoff flows or where the expected impact to the water quality of receiving waters requires flows to be detained and water treated. In addition to reducing peak levels and velocities in streams, detention ponds have the added benefit of reducing contaminant levels of TSS, TDS, and the metals present in highway runoff.

4.11.4.3 Mitigation Measures for Impacts to Wells or Points of Diversion

During the final design of the project, UDOT will work with the property owner to determine the appropriate mitigation measure if a well head or other water right point of diversion is affected. Mitigation could include (1) relocating a well head or surface water diversion to continue to provide irrigation water to any land that is not acquired or (2) abandoning the well and compensating the owner for the value of the associated water right.

4.12 Ecosystem Impacts

This section addresses impacts to bird and wildlife habitat, wildlife, special-status species, and jurisdictional wetlands. Ecosystem impacts were evaluated based on information from several sources, including field surveys along S.R. 108, consultation with USFWS and the Utah Division of Wildlife Resources, and reviews of project aerial maps.

What is the ecosystem impact analysis area?

The ecosystem impact analysis area includes the S.R. 108 project corridor and adjacent areas that could support wildlife that might use the project corridor.

Consultation with USFWS was undertaken to comply with the Endangered Species Act. This Act requires that federally funded projects be evaluated to determine any impacts to federally listed threatened or endangered plant and wildlife species. In addition to meeting this requirement, the potential for impacts to State of Utah sensitive species was also evaluated (see Section 3.12.3.2, State of Utah Sensitive Species).

Field surveys of the S.R. 108 area were conducted in the summer and fall of 2006. These surveys identified and evaluated existing land types, including jurisdictional wetlands, for their potential to provide habitat for wildlife.

Much of the area adjacent to S.R. 108 is urbanized and has typical urban noise levels and activities associated with heavy vehicle traffic and commercial and residential uses. As a result, the action alternatives would affect lands that are for the most part highly developed and urbanized. The existing land types that could be considered as marginal wildlife habitat include the few pastureland and cropland areas and drainages or ditches.

4.12.1 No-Action Alternative

Under the No-Action Alternative, no improvements to S.R. 108 would be made except for routine maintenance, so there would be no direct or indirect impacts to wildlife or wildlife habitat as a result of the project. There would also be no direct or indirect impacts to any threatened, endangered, or State of Utah sensitive species. However, urban development in the impact analysis area will continue to convert the existing and very marginal wildlife habitat into residential and commercial uses. As urbanization continues throughout the impact analysis area, noise levels along S.R. 108 would likely increase. This increased urbanization would likely

result in further degradation of the currently marginal wildlife habitat.

4.12.2 Minimize 4(f) Impacts Alternative

4.12.2.1 Habitat for Fish, Wildlife, and Migratory Birds

The Minimize 4(f) Impacts Alternative would affect only marginal wildlife habitat. These impacts would include the loss of about 26.1 acres of agricultural lands (pasture and crops) and about 88.5 acres of urbanized/disturbed lands (roadways, residential, commercial, and landscaping). The impacts to the various land types are shown in Exhibit 4.12-1.

Exhibit 4.12-1: Impacts to Habitat by Land Type

Shown in acres

Land Type	Minimize 4(f) Impacts Alternative[a]	West Alternative[a]
Pasture	15.4	16.0
Crops	10.7	11.9
Urbanized	88.5	89.3
Disturbed	0.01	0.03
Drainages/ditches[b]	1.0	1.0
Wetlands	0.025	0.025

[a] Because the jurisdictions did not all use the same type of mapping methodology, the acreages presented in this table are an estimate only and do not match the impact acreages presented in Exhibit 3.2-2: Existing Cropland. For example, some jurisdictions apply land use designations to large expanses—including roadways—while others apply designations on a parcel-by-parcel basis and do not include roadways. Acreage estimates for urbanized land include land within and outside the existing right-of-way including the roadway.

[b] Acreages are estimates only. These numbers will be formalized when USACE releases new guidance on the jurisdiction of ditches as waters of the U.S. The acres listed include only those in open ditches and not those within closed structures (such as pipes and culverts).

4.12.2.2 Wildlife

Under the Minimize 4(f) Impacts Alternative, the direct and indirect impacts to wildlife habitat would be minor in the agricultural (pasture and crops) and disturbed land types. Of the two agricultural land types, only pasture has any noteworthy use to wildlife, provided that it has enough structural complexity and diversity of vegetation. Most of the pastures along S.R. 108 do not have the shrubs and trees needed to provide high-value habitat for wildlife. In addition, neither the disturbed land type nor the urbanized land type provides much useful wildlife habitat because these areas are dominated by either weedy and invasive plants or ornamental plants.

What is structural complexity?

With regard to habitat, *structural complexity* refers to the variety of different species of plants in different growth forms (such as grasses, flowering plants, shrubs, and trees) that provides a diversity of habitat types and functions (such as habitat for nesting, hiding, feeding, mating, and resting).

The urban noise levels under this alternative would be similar to those under the No-Action Alternative (see Section 4.10, Noise Impacts), and so the direct and indirect effects to wildlife from noise would be similar for both alternatives.

Irrigation ditches and canals are associated with agricultural lands, and the habitat along some of these ditches and canals could be affected by this alternative. Most of the irrigation ditches and canals in the area are no longer in use and contain a mixture of weedy, upland, and riparian (riverbank) vegetation. However, this vegetation has a low level of structural complexity, which limits the ditches' use by and value for wildlife.

4.12.2.3 Special-Status Species

No threatened or endangered species occur along S.R. 108. The only species that occurs near S.R. 108 is the threatened bald eagle (*Haliaeetus leucocephalus*). There would be no direct or indirect impacts to the bald eagle from the Minimize 4(f) Impacts Alternative. There are no known migratory roosts for bald eagles along S.R. 108. Although cottonwood snags (upright dead trees) along S.R. 108 could be used by the eagles as temporary perches, such snags are common throughout the area. The removal of snags by construction crews would not affect eagles' ability to find a temporary perch.

In addition, there would be no direct or indirect impacts to State of Utah sensitive species (species of special concern or conservation species). There is no habitat for sensitive species in the impact

analysis area, nor are there occurrences of any sensitive species in this area.

4.12.2.4 Waters of the U.S.

Wetlands. Under the Minimize 4(f) Impacts Alternative, there would be 0.025 acre affected from the 0.36-acre wetland on the southwest corner of the S.R. 108/1900 West intersection. There would be no impact to the 0.05-acre wetland northeast of the Midland Drive/4800 South intersection along S.R. 108. Given that both wetlands are small and isolated, their value to wildlife is likely minor. Both wetlands are along the right-of-way where increased runoff during construction could degrade the water quality. However, temporary construction measures such as environmental fencing and silt fencing, along with permanent structures for controlling roadway runoff, would avoid any negative water quality impacts.

Drainages and Canals. The jurisdictional wetland determination for the S.R. 108 project is being reviewed by USACE. The following paragraphs discuss impacts to drainages and canals in the event that they are determined to be waters of the U.S. UDOT will continue to coordinate with the USACE regarding the jurisdictional determination and any necessary mitigation.

The impacts to any jurisdictional drainages or canals would be minor. The primary use of the area has historically been agriculture, so the area has many ditches and irrigation canals. Although a few of these ditches and canals are still used by landowners for crop irrigation and are relatively free of vegetation, most are no longer used. Some of these ditches run parallel to S.R. 108, and others cross under S.R. 108. Most are now in closed systems with no outlet to any waters of the U.S.

Some of these small ditches might drain to the Layton Canal and eventually to the Great Salt Lake, which is a water of the U.S., and therefore might be considered waters of the U.S. under USACE's new guidance. About 1 acre of these potentially jurisdictional ditches would be removed to accommodate the alternative.

For the ditches and canals that cross under S.R. 108, the impacts from the alternative on these crossings would involve extending the culverts on one or both ends to accommodate the wider roadway. For

What are waters of the U.S.?

Under the Clean Water Act, *waters of the U.S.* are defined as waters that are navigable waters, those that are interstate waters, and/or those used for interstate commerce, their tributaries, and their associated wetlands. Waters of the U.S. are under the jurisdiction of USACE, so they are sometimes referred to as *jurisdictional waters*.

USACE has jurisdiction over most wetlands, but some wetlands are not considered jurisdictional. A wetland that is not navigable and is not used for interstate commerce or otherwise does not fit the definition of a water of the U.S. would not qualify as a jurisdictional wetland. This type of wetland is called an *isolated wetland*.

the small ditches that run parallel to S.R. 108 and would be affected by roadway widening, about 1 acre of these ditches would be removed to accommodate the alternative.

Prior to construction, USACE would determine whether these drainages and canals are waters of the U.S. based on its future guidance. If USACE determines that the canals are waters of the U.S., the appropriate Section 404 permit under the Clean Water Act would be obtained. Given the small amount of expected impacts to the existing canal system, it is likely that the alternative could be permitted under a nationwide permit.

4.12.3 West Alternative

4.12.3.1 Habitat for Fish, Wildlife, and Migratory Birds

The West Alternative would affect only poor wildlife habitat in the amount of about 27.9 acres of agricultural lands (pasture and crops), about 89.3 acres of disturbed lands (urbanized and disturbed areas), and no wetlands. The impacts to habitat by land type are shown in Exhibit 4.12-1: Impacts to Habitat by Land Type above.

4.12.3.2 Wildlife

The direct and indirect impacts to wildlife and wildlife habitat under the West Alternative would be the same as those from the Minimize 4(f) Impacts Alternative.

4.12.3.3 Special-Status Species

The impacts to threatened and endangered species under the West Alternative would be the same as those from the Minimize 4(f) Impacts Alternative.

4.12.3.4 Waters of the U.S.

The direct and indirect impacts to waters of the U.S. under the West Alternative would be the same as those from the Minimize 4(f) Impacts Alternative.

4.12.4 Mitigation Measures for Ecosystems Impacts

To mitigate any construction impacts to the small, isolated jurisdictional wetland, appropriate BMPs will be incorporated into the construction plan. Environmental fencing will be installed to prevent construction equipment impacts, along with installing silt fencing to control sedimentation of the wetland. Any mitigation to the 0.025 acre of wetlands and the ditches parallel to the alignment will depend on the jurisdictional status and the type of permit requested as determined by USACE. However, no mitigation is anticipated for impacts to the ditches. No mitigation will be required for impacts to disturbed or urbanized lands.

4.13 Floodplain Impacts

There are no designated floodplains in the S.R. 108 study area, so there would be no impacts to floodplains.

4.14 Impacts to Historic, Archaeological, and Paleontological Resources

This section provides an overview of the expected impacts to historic, archaeological, and paleontological resources from the No-Action and action alternatives. Based on the cultural resources inventory, the S.R. 108 project would affect architectural properties only.

What is the impact analysis area for cultural resources?

The impact analysis area for the cultural resources analysis is the area likely to be directly or indirectly affected by the proposed alternatives.

4.14.1 Definition of Section 106 Impacts

Impacts to architectural properties from the action alternatives were documented using the Section 106 guidelines in 36 CFR 800.5. These impacts are described as No Effect, No Adverse Effect, or Adverse Effect. These degrees of effects can be considered under Section 4(f) when determining the appropriateness of avoidance alternatives. The types of impacts from the action alternatives were documented by FHWA and UDOT in the Determination of Eligibility and Finding of Effect (see Appendix B, Determination of Eligibility and Finding of Effect and Native American Consultation). The definitions of these impacts are as follows:

- **No Effect.** A No Effect determination is made when the alternative has no impact (direct or indirect) on the character, use, or historic qualities of an architectural property or archaeological site.
- **No Adverse Effect.** A No Adverse Effect determination is made when the alternative affects the minor aspects of the character, use, or historic qualities of an architectural property or archaeological site, but the property or site retains its essential historic characteristics.
- **Adverse Effect.** An Adverse Effect occurs when the alternative affects the essential character, use, or qualities of an architectural property or archaeological site.

4.14.2 Methodology for Architectural Property Impacts

For the purpose of determining impacts to historic properties, appropriate historic boundaries must be established for each eligible property within the project's area of potential effect. National Register Bulletin 21, *Defining Boundaries for National Register Properties* (Siefert 1995), offers guidance on how to establish such boundaries. The bulletin cautions researchers to "remember that many buildings have associated contributing landscape and archaeological features" and to "consider these resources as well as the architectural resources when selecting boundaries and evaluating significance of buildings." The bulletin offers the following recommendations for defining property boundaries for architectural properties:

- Select boundaries that encompass the entire resource, including both historic and modern additions. Include surrounding land historically associated with the resource that retains integrity and contributes to the property's historic significance.
- Use the legally recorded parcel number or lot lines for urban and suburban properties that retain their historic boundaries and integrity.
- For small rural properties, select boundaries that encompass significant resources, including outbuildings and the associated setting.
- For larger rural properties, select boundaries that include fields, forests, and open range land that is historically associated with the property and conveys the property's historic setting. The areas included must have integrity and contribute to the property's historic significance.

Historic properties along S.R. 108 are almost entirely suburban or rural in nature. For most historic buildings, the majority of which were constructed during the early to middle 20th century, the current legal property boundaries represent the original historic property boundaries. For this reason, the current legal property boundaries were used to define the boundaries of most of the eligible historic architectural properties along S.R. 108. In rare instances, the current legal property boundaries either do not reflect the historic boundaries

What are historic resources, archaeological resources, and paleontological resources?

*Historic resource*s are architectural properties such as buildings. *Archaeological resources* are sites, features, and structures composed primarily of non-architectural elements. *Paleontological resources* are fossil resources.

What is the National Register of Historic Places?

The *National Register of Historic Places*, or NRHP, is a listing of archaeological sites, buildings, and structures throughout the United States that have undergone thorough documentation and rigorous evaluation and have been determined to be important in local, national, or international prehistory or history.

or no longer contribute to the primary building's overall integrity. With these factors in mind, appropriate boundaries were identified for each eligible primary structure documented during the reconnaissance-level survey.

4.14.3 No-Action Alternative

Under the No-Action Alternative, no physical changes would be made to S.R. 108. No impacts to historic, archaeological, or paleontological resources would occur as a result of the S.R. 108 project. The transportation projects identified in other agency long-range plans and by the local communities would be constructed, and these projects could cause impacts to historic, archaeological, or paleontological resources.

Additionally, private development will continue to result in the demolition of historic buildings to accommodate modern structures, and private landowners will continue to modify their historic residences with such actions as applying modern exterior treatments (such as aluminum or vinyl siding or stucco), replacing historic windows, and constructing modern additions. Finally, as non-transportation development continues in the area, historic features such as open irrigation ditches will be enclosed or piped.

4.14.4 Minimize 4(f) Impacts Alternative

4.14.4.1 Historic Architectural Properties

The Minimize 4(f) Impacts Alternative would have a long-term adverse effect on 14 of the 61 NRHP-eligible architectural properties along S.R. 108. This alternative would have no adverse effect on 40 of the 61 architectural resources and would entirely avoid five properties. (Two additional properties would not be affected as part of this project.) Exhibit 4.14-1 below summarizes the impacts to NRHP-eligible architectural properties from this alternative. Shaded rows indicate properties that would be adversely affected.

Exhibit 4.14-1: Impacts to NRHP-Eligible Historic and Archaeological Resources from the Minimize 4(f) Impacts Alternative

Address or Site[a]	Description	NRHP Eligibility Criterion	Nature of Impact
1663 South 2000 West, Syracuse	1-part commercial block exhibiting a combination of early and late 20th-century style	A	Direct impact to historic building; Adverse Effect
1609 South 2000 West, Syracuse	Foursquare residence of general Bungalow style	C	Substantive impact from cut/fill; possible removal of primary historic building; Adverse Effect
?1451 South 2000 West, Syracuse	1-part block vernacular service station	C	Minor impact from cut/fill; No Adverse Effect
1419 South 2000 West, Syracuse	Vernacular Minimal Traditional residence of undefined type	C	Minor impact from cut/fill; No Adverse Effect[b]
1401 South 2000 West, Syracuse	Residence of undefined type and vernacular style with some Minimal Traditional elements; historical tree line about 7 feet from existing curb and historical fence about 20 feet from curb	C	Minor impact from cut/fill; No Adverse Effect
1373 South 2000 West, Syracuse	Ranch/Rambler residence of vernacular Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
1317 South 2000 West, Syracuse	Bungalow residence of general Bungalow style	C	Minor impact from cut/fill; No Adverse Effect
1217 South 2000 West, Syracuse	Foursquare residence of mixed Bungalow and general Victorian style; historical tree line about 12 feet from existing curb	C	Minor impact from cut/fill; No Adverse Effect
1189 South 2000 West, Syracuse	Vernacular Ranch/Rambler residence of general Ranch/Rambler and Contemporary style	C	Minor impact from cut/fill; No Adverse Effect
1147 South 2000 West, Syracuse	Vernacular Ranch/Rambler residence of general Ranch/Rambler style; historical trees about 12 feet from existing edge of pavement	C	Minor impact from cut/fill; No Adverse Effect
1133 South 2000 West, Syracuse	Period Cottage of Greek Revival and general Period Revival style; small, historical ditch along north edge of property	C	Minor impact from cut/fill; No Adverse Effect
963 South 2000 West, Syracuse	Bungalow residence of general Bungalow style	C	Minor impact from cut/fill; No Adverse Effect
850 South 2000 West, Syracuse	Utah Onions warehouse of early 20th-century style	C	Direct impact to historic building; Adverse Effect
723 South 2000 West, Syracuse	Cross-wing (T-cottage) of general Victorian style	C	Direct impact to historic building; Adverse Effect
150 South 2000 West, West Point	World War II (WWII)-Era Cottage with general Ranch/Rambler style	C	Substantive impact from cut/fill; possible removal of primary historic building; Adverse Effect
145 South 2000 West, West Point	Ranch/Rambler residence of general Ranch/Rambler and Post-WWII style	C	No impact; No Effect
58 South 2000 West, West Point	Period Cottage of general Period Revival style; clad in striated brick	C	Direct impact to historic building; Adverse Effect

Address or Site[a]	Description	NRHP Eligibility Criterion	Nature of Impact
39 South 2000 West, West Point	Ranch/Rambler residence of general Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
?20 North 2000 West, West Point (agricultural outbuilding complex only)	Agricultural outbuilding complex consisting of a block-and-wing Monitor-style barn and two lean-to sheds	C	Minor impact from cut/fill; No Adverse Effect
310 North 2000 West, West Point	Ranch/Rambler residence of Ranch/ Rambler and Contemporary style	C	Minor impact from cut/fill; No Adverse Effect
647 North 2000 West, West Point	WWII-Era Cottage of general Post-WWII style	C	Minor impact from cut/fill; No Adverse Effect
667 North 2000 West, West Point	Ranch/Rambler residence of general Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
796 North 2000 West, West Point	WWII-Era Cottage of vernacular style	C	Direct impact to historic building; Adverse Effect
817 North 2000 West, Clinton	Ranch/Rambler residence of general Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
868 North 2000 West, Clinton	WWII-Era Cottage of general Post-WWII and Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
881 North 2000 West, Clinton	Early Ranch/Rambler of Early Ranch/ Rambler style	C	Minor impact from cut/fill; No Adverse Effect
1071 North 2000 West, Clinton	Hall-Parlor or Single Cell residence of early 20th-century style	C	Minor impact from cut/fill; No Adverse Effect
1141 North 2000 West, Clinton	Early Ranch/Rambler residence of Early Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
1197 North 2000 West, Clinton	Duplex of general Ranch/Rambler style; historical ditch running along the property frontage about 10 feet from the existing edge of pavement for S.R. 108	C	Direct impact to historic ditch (contributing feature); Adverse Effect
1253 North 2000 West, Clinton	WWII-Era Cottage of general Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
1318 North 2000 West, Clinton	Period Cottage of the English Cottage style; probable historical tree in front yard near house and probable historical ditch along the west edge of the associated agricultural field to the north of the residence	C	Substantive impact from cut/fill; possible removal of primary historic building; Adverse Effect
1693 North 2000 West, Clinton	Early Ranch/Rambler of Early Ranch style	C	Substantive impact from cut/fill; possible removal of primary historic building; Adverse Effect
1969 North 2000 West, Clinton	Ranch/Rambler residence of general Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
1993 North 2000 West, Clinton	WWII-Era Cottage of general Post-WWII style	C	Substantive impact from cut/fill; possible removal of primary historic building; Adverse Effect
2133 North 2000 West, Clinton	Bungalow residence of general Bungalow and Arts & Crafts styles	C	Direct impact to historic building; Adverse Effect
2162 North 2000 West, Clinton	Ranch/Rambler residence of general Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
2184 North 2000 West, Clinton	WWII-Era Cottage of general Post-WWII style	C	Minor impact from cut/fill; No Adverse Effect

Address or Site[a]	Description	NRHP Eligibility Criterion	Nature of Impact
2212 North 2000 West, Clinton	Ranch/Rambler residence of general Ranch Rambler and Contemporary style	C	No impact; No Effect
2282 North 2000 West, Clinton	Residence of undefined type and general Post-WWII/Contemporary style	C	Minor impact from cut/fill; No Adverse Effect
1988 West 2300 North, Clinton	Period Cottage of Greek Revival style; clad in stucco	C	Minor impact from cut/fill; No Adverse Effect
2342 North 2000 West, Clinton	Modified (simplified) Cape Cod vernacular residence	C	Minor impact from cut/fill; No Adverse Effect
2404 North 2000 West, Clinton	Early Ranch/Rambler of Early Ranch style	C.	Minor impact from cut/fill; No Adverse Effect
2422 North 2000 West, Clinton	Ranch/Rambler residence of general Post-WWII style	C	Minor impact from cut/fill; No Adverse Effect
2541 North 2000 West, Clinton	WWII-Era Cottage of general Post-WWII style	C	Minor impact from cut/fill; No Adverse Effect
5986 South 2000 West, Roy	WWII-Era Cottage of general Minimal Traditional style	C	Minor impact from cut/fill; No Adverse Effect
5939 South 3500 West, Roy	Ranch/Rambler residence of general Ranch/Rambler Style	C	Minor impact from cut/fill; No Adverse Effect
5867 South 3500 West, Roy	Ranch/Rambler of general Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
5844 South 3500 West, Roy	WWII-Era Cottage of general Minimal Traditional and Period Revival style; probable historical trees within 15 feet of the existing curb	C	Minor impact from cut/fill; No Adverse Effect
5839 South 3500 West, Roy	Residence of undefined type and Contemporary style; possible historical retaining wall about 15 feet from the existing edge of pavement of S.R. 108	C	Minor impact from cut/fill; No Adverse Effect
5823 South 3500 West, Roy	Ranch/Rambler residence of Ranch/ Rambler and Contemporary style	C	Minor impact from cut/fill; No Adverse Effect
5720 South 3500 West, Roy	Contemporary type and style residence	C	Direct impact to historic building; Adverse Effect
4180 Midland Drive, West Haven	Bungalow residence of general Bungalow style	C	Minor impact from cut/fill; No Effect
4148 Midland Drive, West Haven	Bungalow residence of general Bungalow style; antique Jackson-Perkins test roses along property frontage	A and C	No impact; No Effect
3982 Midland Drive, West Haven	Ranch/Rambler residence (with attached garage) of general Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
3964 Midland Drive, West Haven	Ranch/Rambler residence of general Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
3801 Midland Drive, West Haven	Ranch/Rambler residence of general Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
3713 Midland Drive, West Haven (outbuildings only)	Agricultural outbuildings only; primary outbuilding is a shed or possible milking barn	C	Direct impact to primary historic outbuilding; Adverse Effect
3594 Midland Drive, West Haven	WWII-Era Cottage of general Post-WWII style; probable historical landscaping 40 to 50 feet from existing pavement of S.R. 108	C	NA[c]

Address or Site[a]	Description	NRHP Eligibility Criterion	Nature of Impact
3575 Midland Drive, West Haven (outbuilding only)	Outbuilding only; historical tree line about 20 feet from existing edge of pavement	C	NA[c]
3478 Midland Drive, West Haven	Ranch/Rambler residence of general Post-WWII style	C	No impact; No Effect
2008 West 3300 South, West Haven	Bungalow residence of general Bungalow style	C	Minor impact from cut/fill; No Adverse Effect
Site 42Wb352	Denver & Rio Grande Western Railroad	A	No impact; No Effect

Shaded rows indicate properties that would be adversely affected.

[a] A "?" in front of an address means the address is estimated.

[b] A strip take is assessed as No Adverse Effect if no NRHP-eligible historic buildings or contributing features would be affected.

[c] The impact to this property was evaluated under the UDOT Hinckley Drive Extension project.

The adverse effects to historic architectural properties from the Minimize 4(f) Impacts Alternative would be greater than those from the No-Action Alternative but less than those from the West Alternative.

4.14.4.2 Archaeological Sites

One archaeological site identified along S.R. 108 was determined to be eligible for the NRHP. This is Site 42Wb352, the Denver & Rio Grande Western Railroad, located at the intersection of S.R. 108 and S.R. 126. The Minimize 4(f) Impacts Alternative would avoid this site.

4.14.4.3 Traditional Cultural Properties

No known traditional cultural properties would be affected by this alternative.

4.14.4.4 Paleontological Resources

No known paleontological resources would be affected by this alternative.

4.14.5 West Alternative

4.14.5.1 Historic Architectural Properties

The West Alternative would have a long-term adverse effect on 22 of the 61 NRHP-eligible historic architectural properties along S.R. 108. This alternative would have no adverse effect on 33 of the 61 resources and would entirely avoid four properties. (Two additional properties would not be affected as part of this project.) Exhibit 4.14-2 summarizes the impacts to NRHP-eligible architectural resources from this alternative. Shaded rows indicate properties that would be adversely affected.

Exhibit 4.14-2: Impacts to NRHP-Eligible Historic and Archaeological Resources from the West Alternative

Address or Site[a]	Description	NRHP Eligibility Criterion	Nature of Impact
1663 South 2000 West, Syracuse	1-part commercial block exhibiting a combination of early and late 20th-century style	A	Direct impact to historic building; Adverse Effect
1609 South 2000 West, Syracuse	Foursquare residence of general Bungalow style	C	Substantive impact from cut/fill; possible removal of primary historic building; Adverse Effect
?1451 South 2000 West, Syracuse	1-part block vernacular service station	C	Minor impact from cut/fill; No Adverse Effect[b]
1419 South 2000 West, Syracuse	Vernacular Minimal Traditional residence of undefined type	C	Minor impact from cut/fill; No Adverse Effect
1401 South 2000 West, Syracuse	Residence of undefined type and vernacular style with some Minimal Traditional elements; historical tree line about 7 feet from existing curb and historical fence about 20 feet from curb	C	Minor impact from cut/fill; No Adverse Effect
1373 South 2000 West, Syracuse	Ranch/Rambler residence of vernacular Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
1317 South 2000 West, Syracuse	Bungalow residence of general Bungalow style	C	Minor impact from cut/fill; No Adverse Effect
1217 South 2000 West, Syracuse	Foursquare residence of mixed Bungalow and general Victorian style; historical tree line about 12 feet from existing curb	C	Minor impact from cut/fill; No Adverse Effect
1189 South 2000 West, Syracuse	Vernacular Ranch/Rambler residence of general Ranch/Rambler and Contemporary style	C	Minor impact from cut/fill; No Adverse Effect
1147 South 2000 West, Syracuse	Vernacular Ranch/Rambler residence of general Ranch/Rambler style; historical trees about 12 feet from existing edge of pavement	C	Minor impact from cut/fill; No Adverse Effect

Address or Site[a]	Description	NRHP Eligibility Criterion	Nature of Impact
1133 South 2000 West, Syracuse	Period Cottage of Greek Revival and general Period Revival style; small, historical ditch along north edge of property	C	Minor impact from cut/fill; No Adverse Effect
963 South 2000 West, Syracuse	Bungalow residence of general Bungalow style	C	Minor impact from cut/fill; No Adverse Effect
850 South 2000 West, Syracuse	Utah Onions warehouse of early 20th-century style	C	Direct impact to historic building; Adverse Effect
723 South 2000 West, Syracuse	Cross-wing (T-cottage) of general Victorian style	C	Minor impact from cut/fill; No Adverse Effect
150 South 2000 West, West Point	WWII-Era Cottage with general Ranch/ Rambler style	C	Substantive impact from cut/fill; possible removal of primary historic building; Adverse Effect
145 South 2000 West, West Point	Ranch/Rambler residence of general Ranch/Rambler and Post-WWII style	C.	No impact; No Adverse Effect
58 South 2000 West, West Point	Period Cottage of general Period Revival style; clad in striated brick	C	Direct impact to historic building; Adverse Effect
39 South 2000 West, West Point	Ranch/Rambler residence of general Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
?20 North 2000 West, West Point (agricultural outbuilding complex only)	Agricultural outbuilding complex consisting of a block-and-wing Monitor-style barn and two lean-to sheds	C	Minor impact from cut/fill; No Adverse Effect
310 North 2000 West, West Point	Ranch/Rambler residence of Ranch/ Rambler and Contemporary style	C	Minor impact from cut/fill for intersection; No Adverse Effect
647 North 2000 West, West Point	WWII-Era Cottage of general Post-WWII style	C	Direct impact to historic building; Adverse Effect
667 North 2000 West, West Point	Ranch/Rambler residence of general Ranch/Rambler style	C	Substantive impact from cut/fill; possible removal of primary historic building; Adverse Effect
796 North 2000 West, West Point	WWII-Era Cottage of vernacular style	C	Direct impact to historic building; Adverse Effect
817 North 2000 West, Clinton	Ranch/Rambler residence of general Ranch/Rambler style	C	Direct impact to historic building; Adverse Effect
868 North 2000 West, Clinton	WWII-Era Cottage of general Post-WWII and Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
881 North 2000 West, Clinton	Early Ranch/Rambler of Early Ranch/Rambler style	C	Direct impact to historic building; Adverse Effect
1071 North 2000 West, Clinton	Hall-Parlor or Single Cell residence of early 20th-century style	C	Direct impact to historic building; Adverse Effect
1141 North 2000 West, Clinton	Early Ranch/Rambler residence of Early Ranch/Rambler style	C	Substantive impact from cut/fill; possible removal of primary historic building; Adverse Effect
1197 North 2000 West, Clinton	Duplex of general Ranch/Rambler style; historical ditch running along the property frontage about 10 feet from the existing edge of pavement for S.R. 108	C	Direct impact to historic building; Adverse Effect
1253 North 2000 West, Clinton	WWII-Era Cottage of general Ranch/ Rambler style	C	Direct impact to historic building; Adverse Effect

Address or Site[a]	Description	NRHP Eligibility Criterion	Nature of Impact
1318 North 2000 West, Clinton	Period Cottage of the English Cottage style; probable historical tree in front yard near house and probable historical ditch along the west edge of the associated agricultural field to the north of the residence	C	No impact; No Effect
1693 North 2000 West, Clinton	Early Ranch/Rambler of Early Ranch style	C	Direct impact to historic building; Adverse Effect
1969 North 2000 West, Clinton	Ranch/Rambler residence of general Ranch/Rambler style	C	Direct impact to historic building; Adverse Effect
1993 North 2000 West, Clinton	WWII-Era Cottage of general Post-WWII style	C	Direct impact to historic building; Adverse Effect
2133 North 2000 West, Clinton	Bungalow residence of general Bungalow and Arts & Crafts styles	C	Direct impact to historic building; Adverse Effect
2162 North 2000 West, Clinton	Ranch/Rambler residence of general Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
2184 North 2000 West, Clinton	WWII-Era Cottage of general Post-WWII style	C	Minor impact from cut/fill; No Adverse Effect
2212 North 2000 West, Clinton	Ranch/Rambler residence of general Ranch Rambler and Contemporary style	C	No impact; No Effect
2282 North 2000 West, Clinton	Residence of undefined type and general Post-WWII/Contemporary style	C	Minor impact from cut/fill; No Adverse Effect
1988 West 2300 North, Clinton	Period Cottage of Greek Revival style; clad in stucco	C	Minor impact from cut/fill; No Adverse Effect
2342 North 2000 West, Clinton	Modified (simplified) Cape Cod vernacular residence	C	Minor impact from cut/fill; No Adverse Effect
2404 North 2000 West, Clinton	Early Ranch/Rambler of Early Ranch style	C	Minor impact from cut/fill; No Adverse Effect
2422 North 2000 West, Clinton	Ranch/Rambler residence of general Post-WWII style	C	Minor impact from cut/fill; No Adverse Effect
2541 North 2000 West, Clinton	WWII-Era Cottage of general Post-WWII style	C	Direct impact to historic building; Adverse Effect
5986 South 2000 West, Roy	WWII-Era Cottage of general Minimal Traditional style	C	Minor impact from cut/fill; No Adverse Effect
5939 South 3500 West, Roy	Ranch/Rambler residence of general Ranch/Rambler Style	C	Minor impact from cut/fill; No Adverse Effect
5867 South 3500 West, Roy	Ranch/Rambler of general Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
5844 South 3500 West, Roy	WWII-Era Cottage of general Minimal Traditional and Period Revival style; probable historical trees within 15 feet of the existing curb	C	Minor impact from cut/fill; No Adverse Effect
5839 South 3500 West, Roy	Residence of undefined type and Contemporary style; possible historical retaining wall about 15 feet from the existing edge of pavement of S.R. 108	C	Probable historic retaining wall (contributing feature) removed; Adverse Effect
5823 South 3500 West, Roy	Ranch/Rambler residence of Ranch/ Rambler and Contemporary style	C	Minor impact from cut/fill; No Adverse Effect

Address or Site[a]	Description	NRHP Eligibility Criterion	Nature of Impact
5720 South 3500 West, Ro y	Contemporary type and style residence	C	Minor impact from cut/fill; No Adverse Effect
4180 Midland Drive, West Haven	Bungalow residence of general Bungalow style	C	Minor impact from cut/fill; No Adverse Effect
4148 Midland Drive, West Haven	Bungalow residence of general Bungalow style; antique Jackson-Perkins test roses along property frontage	A and C	Minor impact from cut/fill; No Adverse Effect
3982 Midland Drive, West Haven	Ranch/Rambler residence (with attached garage) of general Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
3964 Midland Drive, West Haven	Ranch/Rambler residence of general Ranch/Rambler style	C	Minor impact from cut/fill; No Adverse Effect
3801 Midland Drive, West Haven	Ranch/Rambler residence of general Ranch/Rambler style	C	Substantive impact from cut/fill; possible removal of primary historic building; Adverse Effect
3713 Midland Drive, West Haven (outbuildings only)	Agricultural outbuildings only; primary outbuilding is a shed or possible milking barn	C	Direct impact to historic building; Adverse Effect
3594 Midland Drive, West Haven	WWII-Era Cottage of general Post-WWII style; probable historical landscaping 40 to 50 feet from existing pavement of S.R. 108	C	NA[c]
3575 Midland Drive, West Haven (outbuilding only)	Outbuilding only; historical tree line about 20 feet from existing edge of pavement	C	NA[c]
3478 Midland Drive, West Haven	Ranch/Rambler residence of general Post-WWII style	C	No impact; No Effect
2008 West 3300 South, West Haven	Bungalow residence of general Bungalow style	C	Minor impact from cut/fill; No Adverse Effect
Site 42Wb352	Denver & Rio Grande Western Railroad	A	No impact; No Effect

Shaded rows indicate properties that would be adversely affected.

[a] A "?" in front of an address means the address is estimated.

[b] A strip take is assessed as No Adverse Effect if no NRHP-eligible historic buildings or contributing features would be affected.

[c] This property is within the area of potential effect where S.R. 108 intersects Hinckley Drive. Impacts to this property were evaluated under the UDOT Hinckley Drive Extension project, which will be constructed first. The S.R. 108 project would have no additional impacts to this property.

The adverse impacts to historic architectural properties from the West Alternative would be greater than those from either the No-Action Alternative or the Minimize 4(f) Impacts Alternative.

4.14.5.2 Archaeological Sites

One archaeological site identified along S.R. 108 was determined to be eligible for the NRHP. This is Site 42Wb352, the Denver & Rio Grande Western Railroad, located at the intersection of S.R. 108 and S.R. 126. The West Alternative would avoid this site.

4.14.5.3 Traditional Cultural Properties

No known traditional cultural properties would be affected by this alternative.

4.14.5.4 Paleontological Resources

No known paleontological resources would be affected by this alternative.

4.14.6 Mitigation Measures for Impacts to Historic, Archaeological, and Paleontological Resources

Mitigation measures for adverse effects to historic buildings will be necessary under either action alternative. The exact mitigation measures would be negotiated between FHWA, UDOT, the Utah SHPO, and interested parties through the Section 106 process of the National Historic Preservation Act. These measures would be determined by historic protection experts to mitigate the impacts to these resources to the greatest extent feasible. A Memorandum of Agreement has been developed between FHWA and the Utah SHPO (UDOT is an invited signatory) outlining the specific mitigation measures to be implemented if an action alternative is selected in the Record of Decision for the project. The Memorandum of Agreement (see Appendix B, Determination of Eligibility and Finding of Effect and Native American Consultation) states that adverse impacts to historic properties will include a Utah State Intensive-Level Survey (ILS) in advance of construction activities. Submittals will include ILS forms and photographs according to SHPO standards.

In accordance with 36 CFR 800.13(b), UDOT and FHWA are providing for the protection, evaluation, and treatment of any historic property discovered prior to or during construction. UDOT Standard Specifications Section 01355, Part 1.13, Discovery of Historical, Archaeological, or Paleontological Objects, Features, Sites, Human Remains, or Migratory Avian Species, will be enforced during this project. This specification stipulates procedures to be followed if any archaeological, historic, or paleontological resources and/or human remains are discovered during construction of the project. See Appendix B for a more detailed discussion of the stipulations outlined in the Memorandum of Agreement.

4.15 Impacts to Hazardous Waste Sites

Section 3.15, Hazardous Waste Sites, identifies the potentially hazardous sites in the hazardous waste impact analysis area. This section discusses the expected impacts of the No-Action and action alternatives on known and potential hazardous waste sites in the hazardous waste impact analysis area (see Exhibit 3.15-2, Potential Hazardous Waste Sites of Greatest Concern within One-Half Mile of S.R. 108).

What is the hazardous waste impact analysis area?

The hazardous waste impact analysis area is the area within one-half mile of each side of the existing S.R. 108 centerline.

The first step in evaluating hazardous waste sites of concern was to categorize the types of sites identified in the impact analysis area by the relative likelihood of finding contamination. The second step was to conduct a "windshield" (drive-through) survey to validate the site locations of hazardous waste sites. Sites were categorized as having a high, moderate, or low probability of environmental degradation. For more information about this process and the types of hazardous waste sites, see Section 3.15, Hazardous Waste Sites.

High Probability of Environmental Degradation. The following sites have a high probability of existing soil or groundwater contamination:

- Open LUST sites

Moderate Probability of Environmental Degradation. The following sites have a moderate probability of environmental degradation:

- Closed LUST sites
- Active UST sites

Low Probability of Environmental Degradation. The following sites have a low probability of environmental degradation:

- Removed and closed USTs
- AST sites
- FINDS sites

4.15.1 No-Action Alternative

Under the No-Action Alternative, no improvements to S.R. 108 would be made except for routine maintenance. Therefore, no impacts or disturbances to potentially hazardous waste sites would occur from the S.R. 108 improvements. However, continued development adjacent to S.R. 108 could disturb some sites.

4.15.2 Minimize 4(f) Impacts Alternative

4.15.2.1 Known Sites

Patterson Farms (LUST, UST; 1613 West 2300 North, Clinton)

The Minimize 4(f) Impacts Alternative would not affect the Patterson Farms property. All LUSTs and USTs at this site are currently closed (DERR 2007). Patterson Farms has been sold to a developer, and it is assumed that the tanks will be removed as the property is developed (HDR 2007).

Old Farm Market – Now Maverik #340 (UST, FINDS; 5511 South 3500 West, Roy)

The Minimize 4(f) Impacts Alternative would require a strip take of about 3,443 square feet of this property. The gas pumps and three associated USTs at this site are currently in use (DERR 2007). The close proximity of this site to S.R. 108 and the potential relocation of the pumps and underground storage tanks make this property a site of concern. UDOT is aware of possible soil contamination and would take appropriate steps to prevent construction workers from being exposed to or spreading hazardous chemicals when working near this facility.

Syracuse Junior High School (FINDS; 1450 South 2000 West, Syracuse)

The Minimize 4(f) Impacts Alternative would require a strip take of about 39,650 square feet of the parking lot of Syracuse Junior High School. The building itself would not be affected. No chemical or fuel storage areas were noted in the location of the strip take, so the potential for impacts from hazardous materials is low (HDR 2007).

Triple Stop Phillips 66 (UST, LUST; 4795 South 3500 West, Roy)

The Minimize 4(f) Impacts Alternative would require the relocation of this facility due to a take of about 5,444 square feet of this property. Gas pumps and associated USTs are in use. A LUST occurrence was reported at this facility and is currently being monitored on a quarterly basis by DERR (Beery 2007). Although the LUST is located outside the right-of-way for this alternative, construction workers could encounter petroleum-based contamination that has migrated into the right-of-way. Because this site is up-gradient of S.R. 108 (that is, groundwater is assumed to flow east to west through this site toward S.R. 108), this site is noted as a site of concern. UDOT is aware that the right-of-way could be contaminated and would take appropriate steps to prevent construction workers from being exposed to or spreading hazardous chemicals when working near this facility. UDOT will check the site status before construction and coordinate with DERR to determine what remedial procedures are required.

What is a hydraulic gradient?

A *hydraulic gradient* is the slope of the water table or aquifer. The hydraulic gradient influences the direction and rate of groundwater flow. If an alternative is down-gradient from a hazardous waste site, then groundwater likely flows from the site in the direction of the alternative.

Dee's Service (LUST, UST, FINDS; 1793 North 2000 West, Clinton)

The Minimize 4(f) Impacts Alternative would require a strip take of about 2,464 square feet of this property. The service station is closed. LUSTs and USTs were documented at the site; these LUST and UST cases have been closed and the tanks have been removed (DERR 2007). If contaminated soil or groundwater remains at the site, it could be encountered during construction. UDOT is aware of possible residual soil contamination at this site and would take appropriate steps to prevent construction workers from being exposed to or spreading hazardous chemicals when working near this property.

CH Dredge and Co. – Now SCI (LUST, UST, AST; 918 South 2000 West, Syracuse)

The Minimize 4(f) Impacts Alternative would require a strip take of about 12,496 square feet of this property. The LUST and UST cases at this site have been closed, and the tanks have been removed (DERR 2007). During a field survey, an AST was noted in the rear parking lot between SCI and Utah Onions. If contaminated soil or

groundwater remain at the site, they could be encountered during construction. UDOT is aware of possible soil contamination and would take appropriate steps to prevent construction workers from being exposed to or spreading hazardous chemicals when working near this facility.

Utah Onions, Inc. (UST, FINDS; 850 South 2000 West, Syracuse)

The Minimize 4(f) Impacts Alternative would require the relocation of the Utah Onions facility due to a take of about 5,177 square feet of this property. The front of the building and an existing overhead power line would be taken by this alternative. A UST located at this facility was removed (DERR 2007). An AST was noted in the parking lot between Utah Onions and SCI (HDR 2007). However, the potential for this AST to contaminate the site is low because a leaking AST is more easily detected than a leaking UST and remedial measures can be taken more quickly. UDOT is aware of the potential to encounter soil contamination at this site and would take appropriate steps to prevent construction workers from being exposed to or spreading hazardous chemicals when working near this facility.

Midland Market – Now Sinclair Gas (UST; 3805 S. Midland Drive, West Haven)

The Minimize 4(f) Impacts Alternative would require a strip take of about 3,617 square feet of this property. Gas pumps and associated USTs at this site are currently in use (DERR 2007). Because a pump station and USTs might need to be relocated, and because this site is up-gradient of S.R. 108 (that is, groundwater is assumed to flow through this site toward S.R. 108), this site is noted as a site of concern. If contaminated soil or groundwater remains at the site, it could be encountered during construction. UDOT is aware of possible soil contamination at this site and would take appropriate steps to prevent construction workers from being exposed to or spreading hazardous chemicals when working near this facility.

4.15.2.2 Undocumented Sites

During a field survey, three undocumented facilities (sites that were not identified in the databases searched) were noted as having a potential to contain hazardous materials. The locations of these facilities are approximate.

Clinton Nursery (1071 North 2000 West, Clinton)

At the time of the hazardous waste site analysis, this site was not documented in any hazardous material database maintained by DERR or EPA. A gasoline AST with secondary containment and a pumping structure were noted on the property (HDR 2007). The Minimize 4(f) Impacts Alternative would likely take part of the parking lot in front of the building. If contamination is present, it could be petroleum-, pesticide-, or herbicide-based. UDOT is aware of the potential to encounter soil contamination at this site and would take appropriate steps to prevent construction workers from being exposed to or spreading hazardous chemicals when working near this property.

Unnamed Storage Yard (about 868 North 2000 West, Clinton)

This site is a storage yard with farm equipment and miscellaneous small mobile chemical storage tanks (HDR 2007). Construction workers could encounter contamination at this site in the form of fertilizers, herbicides, or pesticides.

Unnamed Construction Yard (2117 West 3300 South, Ogden)

This site is a construction company yard that contains equipment and an AST pump (HDR 2007). If contamination is present, it could be encountered during construction.

4.15.3 West Alternative

4.15.3.1 Known Sites

Patterson Farms (LUST, UST; 1613 West 2300 North, Clinton)

The impacts to Patterson Farms from the West Alternative would be the same as those from the Minimize 4(f) Impacts Alternative.

Old Farm Market – Now Maverik #340 (UST, FINDS; 5511 South 3500 West, Roy)

The West Alternative would require a strip take of about 304 square feet of this property. The amount of property acquired would be less than that for the Minimize 4(f) Impacts Alternative, but all other impacts would be the same as those from the Minimize 4(f) Impacts Alternative.

Syracuse Junior High School (FINDS; 1450 South 2000 West, Syracuse)

The West Alternative would require a strip take of about 38,650 square feet of the parking lot of Syracuse Junior High School, slightly less than what would be required under the Minimize 4(f) Impacts Alternative. No other impacts are expected.

Triple Stop Phillips 66 (LUST, UST; 4795 South 3500 West, Roy)

The West Alternative would require the relocation of this business due to a take of about 2,762 square feet of this property. The amount of property acquired would be less than that for the Minimize 4(f) Impacts Alternative, but all other impacts would be the same as those from the Minimize 4(f) Impacts Alternative.

Dee's Service (UST, LUST, FINDS; 1793 North 2000 West, Clinton)

The West Alternative would require a strip take of about 1,241 square feet of this property. The amount of property acquired would be less than that for the Minimize 4(f) Impacts Alternative, but all other impacts would be the same as those from the Minimize 4(f) Impacts Alternative.

CH Dredge and Co. – Now SCI (LUST, UST, AST; 918 South 2000 West, Syracuse)

The West Alternative would require a strip take of about 12,494 square feet of this property. The impacts from this alternative would be the same as those from the Minimize 4(f) Impacts Alternative.

Utah Onions, Inc. (UST, FINDS; 850 South 2000 West, Syracuse)

The West Alternative would require the relocation of this business due to a take of about 5,120 square feet of this property. The impacts from this alternative would be the same as those from the Minimize 4(f) Impacts Alternative.

Midland Market – Now Sinclair Gas (UST; 3805 S. Midland Drive, West Haven)

The West Alternative would require a strip take of about 2,253 square feet of this property. The amount of property acquired would be less than that for the Minimize 4(f) Impacts Alternative, but all other impacts would be the same as those from the Minimize 4(f) Impacts Alternative.

4.15.3.2 Undocumented Sites

As described in Section 4.15.2.2, Undocumented Sites, three undocumented sites were found in the impact analysis area. The impacts to undocumented sites from the West Alternative would be the same as those from the Minimize 4(f) Impacts Alternative.

4.15.4 Mitigation Measures for Impacts to Hazardous Waste Sites

Measures will be implemented to prevent the spread of contamination and to limit worker exposure. Site investigations will determine the chemical hazard, if any, and the appropriate protective measures. In the case of an identified chemical hazard, the site remedy will be negotiated with the property owner prior to property acquisition and through the possible coordination with DERR.

Previously unidentified sites or contamination could be encountered during construction. In such a case, all work will stop in the area of the contamination according to UDOT Standard Specifications, and the contractor will consult with UDOT and DERR to determine the appropriate remedial measures. Hazardous wastes will be handled according to UDOT Standard Specifications and the requirements and regulations of DERR.

At the time of construction, coordination will take place between UDOT or DERR, the construction contractor, and the appropriate property owners. This coordination will involve determining the status of the sites of concern, identifying newly created sites, identifying the nature and extent of remaining contamination (if any), and minimizing the risk to all parties involved. Environmental site assessments will be conducted at the sites of concern to further evaluate the nature and extent of contamination and to better identify the potential risks of encountering hazardous waste when constructing the selected alternative.

4.16 Visual Impacts

Impacts to visual resources consist of the amount of visual change along S.R. 108 and the effects of these changes on viewers who would see those changes. Certain land uses, including residential and recreation areas and publicly used lands, are considered to be more sensitive to visual changes.

What is the visual impact analysis area?

The visual impact analysis area includes S.R. 108 and its viewshed. The viewshed is all areas from which physical changes associated with the proposed alternatives could be seen.

4.16.1 No-Action Alternative

4.16.1.1 Construction Impacts

Under the No-Action Alternative, S.R. 108 would remain at its current width. Because no major roadway improvements would be made, no large topographic changes or soil disturbances from construction-related cuts and fills would occur. However, commercial and residential construction will continue to occur along S.R. 108, which will result in typical construction views: cleared and graded parcels, construction equipment, construction fencing, and construction materials.

4.16.1.2 Long-Term Impacts

Under the No-Action Alternative, S.R. 108 would remain at its current width. The long-term visual impacts of the No-Action Alternative would come from continued commercial and residential development.

With or without the S.R. 108 project, views near Syracuse, West Point, Clinton, Roy, and West Haven would change as development occurs. Most of the agricultural areas along S.R. 108 are planned for development in the cities' land-use plans (see Section 3.1, Land Use). Representatives of the jurisdictions believe that the current types and rates of land use and development will continue with or without the project (S. Anderson 2006a; Anderson and Davis 2006; Larson 2006a; Vinzant 2006; Worthen 2006). Given these assumptions, the views along the corridor would also continue to change to those of a more urban environment with or without the project.

4.16.2 Minimize 4(f) Impacts Alternative

4.16.2.1 Construction Impacts

Under the Minimize 4(f) Impacts Alternative, short-term construction-related impacts would include construction vehicle activity and accompanying staging areas, stockpiling of excavated material, traffic congestion, and construction-related dust. Construction impacts would occur everywhere that improvements are made along S.R. 108, but because the project would be completed in three phases over a 6-year period, only specific segments of S.R. 108 would experience construction-related impacts at any given time.

During construction, the work zone would be cleared of vegetation. The exposed bare ground would likely contrast visually with the surrounding agricultural, residential, and/or commercial areas that the viewer is used to seeing. Visual quality from sensitive viewer locations (such as residences next to S.R. 108) would be temporarily reduced during construction and would include the presence of construction equipment and staging and storage areas. Until the construction is completed and the disturbed areas are revegetated or become part of the roadway section, the construction areas would stand out.

4.16.2.2 Long-Term Impacts

The Minimize 4(f) Impacts Alternative would not substantially alter the general visual conditions along S.R. 108. Most changes would be due to the increased pavement width as the existing two-lane road is widened to five lanes. This change requires a larger right-of-way footprint (110 feet), which would bring S.R. 108 closer to buildings that currently line the roadway. It would also increase the visual dominance and scale of S.R. 108 as viewed from nearby locations, particularly residences, churches, businesses, and schools.

Other changes would include cut-and-fill slopes, loss of mature trees and vegetation, replacement of existing drainage structures, the potential addition of noise walls between 3600 South and 4000 South, and removal of residential and commercial structures, fencing, and landscaping. However, these impacts would occur along

the existing roadway and would not be the result of a new transportation corridor.

There are a few remaining farm fields and open-space areas along S.R. 108 where development has not occurred. Some of this open space would be acquired by UDOT to build a larger roadway, and much of the remaining open space is either already scheduled for development or soon will be developed in accordance with the cities' land-use plans.

In general, the Minimize 4(f) Impacts Alternative would likely have positive effects on the visual aesthetics of the study area and its surroundings, especially on the foreground and middle-ground views described in Section 3.16.3, Foreground and Middle-Ground Views. The existing S.R. 108 roadway is not uniform in design and provides an undesirable mix of improved and unimproved sections due to the ongoing commercial and residential development in the area. Sections of S.R. 108 that have been developed typically have new sidewalks, landscaping, and street lighting, while sections of S.R. 108 that haven't been recently developed have dirt shoulders and no sidewalks or lighting. The addition of consistent design elements including park strips, sidewalks, medians, and permanent landscaping/aesthetic enhancements could enhance the visual conditions along S.R. 108.

UDOT would use context-sensitive design to ensure that any new design elements along S.R. 108 would complement the design of adjacent properties. For instance, the visual character of potential noise barriers in relationship to their environmental setting would be carefully considered. In general, it is desirable to locate a noise barrier at a distance from residences approximately four times its height and to provide landscaping near the barrier to prevent it from visually dominating the area. Additionally, noise barriers should reflect the character of their surroundings as much as possible.

For the most part, there would be no change to the background views described in Section 3.16.2, Background Views. While it is always desirable to preserve aesthetic views and scenic vistas to the extent possible, for residents between 3600 South and 4000 South and near the new townhomes just south of 1900 West, views could be blocked to some extent due to the potential addition of 8-foot-high to 18-foot-high noise walls.

4.16.3 West Alternative

The visual impacts from the West Alternative would be the same as those from the Minimize 4(f) Impacts Alternative.

4.16.4 Mitigation Measures for Visual Impacts

During the preliminary design of the project, several mitigation measures were considered to reduce the visual impacts of the alternatives. Additional aesthetic measures such as lighting, vegetation and plantings, and other architectural features will be considered during the final design of the project. Landscape plans for the roadway will include replacement landscaping to reduce impacts from the loss of vegetation.

4.17 Cumulative Impacts

The cumulative impact analysis was prepared according to the requirements of the NEPA regulations and guidance from CEQ, *Considering Cumulative Effects under the National Environmental Policy Act* (CEQ 1997). The CEQ regulations (40 CFR 1500–1508) that implement the procedural provisions of NEPA define cumulative impacts as:

> The impact on the environment which results from the incremental impact of the [proposed] action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal, or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

Cumulative impacts include both direct and indirect impacts.

4.17.1 Cumulative Impacts Study Area and Elements

According to CEQ's cumulative impacts guidance, the cumulative impact analysis should be narrowed to focus on important issues at the national, regional, or local level. The analysis should look at other actions that could have similar effects and should analyze whether a particular resource has been historically affected by cumulative actions.

As discussed in Chapter 1, Purpose of and Need for Action, the project area is focused on the segment of S.R. 108 between Antelope Drive on the south and 1900 West on the north (see Exhibit 1.1-1, S.R. 108 Study Area). The area of potential impacts for the cumulative impact analysis is the project area; commercial, residential, and agricultural land on either side of S.R. 108; and areas beyond the corridor that could be directly or indirectly affected by changes to S.R. 108. The timeframe for this analysis is through the year 2035.

Over time, the communities of Syracuse, West Point, Clinton, Roy, and West Haven have transitioned from open land with minimal development and farmlands to an area with commercial and residential development and limited farmlands. This development trend is continuing as existing open areas are converted to residential and commercial development in accordance with local plans and policies.

The reasonably foreseeable future actions within the timeframe of the analysis are development that follows the five cities' adopted land-use and transportation plans. As noted in Section 3.1, Land Use, all of the cities along the corridor are expected to reach full build-out by 2030 except for West Point, which is expected to reach full build-out by 2035. The precise timing of the future development is unknown.

What is build-out?

Build-out means that there is no more land available for development because any undeveloped land is already being used for its intended use of open space, agriculture, or other defined uses. However, build-out rarely means the end of development in a city, because parcels of land can be redeveloped and a city can add to its existing land base by annexing adjacent parcels.

The general plans of Syracuse, Clinton, Roy, and West Haven each address the ultimate width of S.R. 108 (City of Roy 2005; City of West Haven 2005; City of Syracuse 2006b; City of Clinton 2006a). The Syracuse plan calls for a 110-foot-wide right-of-way. The Clinton and Roy plans call for specific numbers of lanes: five total lanes for Clinton and four travel lanes for Roy. Finally, the West Haven plan calls for a 100-foot-wide to 110-foot-wide roadway. The West Point general plan does not address the ultimate configuration of S.R. 108. Other improvements identified by the cities are summarized in Exhibit 4.17-1 below.

Exhibit 4.17-1: Proposed New Transportation Facilities near S.R. 108

City/Jurisdiction	Street/Facility	Improvement
Syracuse	Legacy Parkway	Reserve right-of-way, interchange at 1700 South
	Bluff Road	Install traffic circle at 1000 West
	200 South	New major arterial (110 feet wide)
West Point	Legacy Parkway	Reserve right-of-way; possible construction
Clinton	800 North	Three lanes for entire length in city; install roundabouts at 3000 West and 1500 West
	1300 North	New signal at S.R. 108; install roundabouts at 3000 West, 1500 West, and 1000 West
	1800 North	Five lanes for entire length in city; install new signals at 3000 West, about 1700 West, and 1500 West
	2200 West (approximate location)	Build new roadway between 800 North and 1500 North and between 1800 North and about 2100 North
Roy	Various	New and reconstructed short segments of local and collector streets throughout city
	Hinckley Drive Extension[a]	New roadway from 1900 West to S.R. 108
West Haven	2100 South	New 100-foot to 110-foot arterial from 1900 West to 4700 West (which is outside the West Haven city limit)
	4700 West	New 100-foot to 110-foot arterial from about 4600 South to southern city limit and beyond (outside city limit, no end point identified)

Sources: City of West Point 2005; City of Roy 2005; City of West Haven 2005; City of Clinton 2006a; City of Syracuse 2006b

[a] Also extends into West Haven. The new extension is shown on the future transportation system maps for both Roy and West Haven.

S.R. 108 is an important connector to Antelope Drive (also known as 1700 South), which in turn is an important connector to I-15. Improvements to S.R. 108 need to be considered in conjunction with any proposed improvements to Antelope Drive and other potential connections to I-15, such as the new 200 South arterial in Syracuse and the Hinckley Drive extension in Roy and West Haven. Antelope Drive and perhaps other east-west roadways will also connect to the anticipated northern extension of the Legacy Parkway when that project is completed.

4.17.2 Cumulative Impact Analysis

The proposed project itself would not directly or indirectly affect regionally and locally important resources such as water quality, threatened or endangered species, and air quality, so the project would not contribute to cumulative impacts to these resources. The

proposed project would affect about 16 acres of pastureland that could be used by wildlife; however, most of this pastureland does not have shrubs or trees and provides low-value wildlife habitat. The project would also result in the loss of about 11 acres of farmland adjacent to S.R. 108. This would result in less than 1% loss of the farmland in Davis and Weber Counties and less than 1% loss of the farmland along S.R. 108. As described in the sections of this chapter on these resources, continued regional growth and development will have cumulative impacts on these resources. The project could affect about 0.025 acre of wetlands. As discussed below, the project area has been and continues to be converted from open/agricultural uses to urban at a rapid pace, resulting in the cumulative loss of wetlands. Although the S.R. 108 project would result in 0.025 acre of impact (less than 1% of the wetlands in the region), this minor contribution to the cumulative impact would be mitigated and therefore would not substantially contribute to regional wetland cumulative impacts.

The proposed roadway width is consistent with the cities' plans for S.R. 108 and each of the cities' transportation plans. As noted in Section 3.1, Land Use, city representatives believe that residential and commercial growth along the corridor will continue with or without the proposed project, although the project could affect the timing of the development adjacent to S.R. 108. As described in Section 4.1, Land Use Impacts, there are two reasons for assuming that the area will develop to full build-out with or without the S.R. 108 project: (1) past trends that show numerous new developments being built in the last 3 years, and (2) the expected continued rapid growth in both population and employment within the five cities that border the project.

The S.R. 108 project would result in localized community impacts (social impacts), particularly during construction. These impacts are not expected to extend beyond the S.R. 108 corridor or affect the cohesiveness or quality of life for residents of the entire region. Residents of the area know that their communities are growing, that the area is becoming more urbanized, and that such growth would occur with or without the project (45% of respondents to the Community Profile Survey believe that the characteristics of their community will change over time with or without improvements to S.R. 108). Many residents do not like the change, but they understand that it is coming. The S.R. 108 project would contribute

to residents' feelings that the area is growing and changing, but this growth and change would occur regardless of the project. The growth could also change the nature of the community by removing many of the older residential structures, some of which are older than 50 years. For the S.R. 108 project, up to 22 potentially historic homes would be affected, and many developers are buying older houses and replacing them with commercial developments or newer residential areas.

The portions of Davis and Weber Counties near I-15 are growing rapidly. One reason why people who work in Salt Lake City or Ogden choose to live in Syracuse, West Point, Clinton, Roy, or West Haven is that the cost of living is more affordable. The cities' transportation plans for the area are designed to accommodate the expected residential and non-residential growth. UDOT and its planning partners, such as WFRC and UTA, also recognize the growth trends and have plans for regional solutions to the anticipated future transportation challenges. The S.R. 108 project would not contribute substantially to environmental impacts from the type of local and regional transportation planning that is being considered by the cities, counties, and UDOT and its partners.

4.18 Indirect Impacts

CEQ regulations for implementing NEPA require that an EIS analyze the direct and indirect effects of the proposed action. Indirect effects are defined by the CEQ regulations (40 CFR 1508.8) as effects

> which are caused by the [proposed] action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to the 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.

For this project, indirect effects are defined as effects that could result from the project beyond direct impacts to property and resources within the project right-of-way and the construction footprint. In this analysis, indirect effects are those that result from induced development, which could occur in the S.R. 108 study area due to the improved accessibility and mobility from the project.

What is induced development?

Induced development is development that occurs because a roadway project makes it easier for residents to live farther from destinations such as employment and shopping. Induced development can change the pattern of land uses, population density, or growth rates in the project's study area.

Indirect effects to natural resources such as vegetation and wildlife would typically be caused by the conversion of undeveloped and partially developed land to other land uses. Indirect impacts other than impacts to growth, development, and travel demand are described under the individual resource sections in this chapter.

4.18.1 Indirect Impact Analysis

The S.R. 108 project is not expected to induce local or regional growth. The proposed roadway widening is consistent with the cities' land use or transportation plans for S.R. 108. As noted in Section 4.1.1.1, Impacts on Existing Land Use, city representatives believe that residential and nonresidential growth along the corridor will continue with or without the project and that improvements to S.R. 108 would not change the rate of growth or types of developments in their communities, although the type and timing of growth adjacent to S.R. 108 could change. In addition, no indirect impacts from roadway construction or operation on the environmental resources analyzed in this EIS have been identified.

As noted in Section 3.1, Land Use, the cities along S.R. 108 plan to develop the corridor with more commercial uses to support the growing residential areas. An improved S.R. 108 would provide more opportunities for residents to shop locally instead of traveling to the main commercial corridor, S.R. 126, about 2 miles to the east. Reduced congestion on S.R. 108 would allow improved commercial access. Local residents could shop closer to home, which would reduce travel times and distances in the region compared to the No-Action Alternative. With the reduced travel distances and times, the S.R. 108 improvements would not cause indirect impacts to the transportation system compared to the No-Action Alternative.

4.19 Energy Impacts

NEPA regulations (40 CFR 1502.16) require an examination of the energy requirements of a proposed project and the potential of the project for conserving energy. This section describes how energy demands would be affected in the short term and long term under the No-Action and action alternatives. Energy is evaluated primarily in the form of vehicle fuel consumption.

How is energy evaluated in this EIS?

In this EIS, energy is evaluated primarily in the form of vehicle fuel consumption.

Fuel consumption varies with traffic characteristics. The primary traffic characteristics are traffic flow (average vehicle speed), driver behavior, the geometric configuration of the roadway, the vehicle mix (cars versus trucks), and climate and weather. Of all the traffic-related factors, average vehicle speed accounts for most of the variability in fuel consumption and is a good predictor of fuel economy for most urban travel. Fuel efficiency under steady-flow, "cruising" driving conditions peaks at 45 mph to 60 mph and then rapidly declines as speeds increase. At lower speeds, fuel efficiency is reduced by engine friction, under-inflated tires, use of powered accessories (such as power steering and air conditioning), and repeated braking and acceleration (Davis and Diegel 2003).

4.19.1 No-Action Alternative

4.19.1.1 Construction-Related Energy Impacts

Under the No-Action Alternative, the only construction-related energy impacts would be caused by roadway maintenance and any roadway work that occurs as part of ongoing commercial and residential development along S.R. 108.

4.19.1.2 Direct Energy Impacts

Under the No-Action Alternative, increased traffic and congestion, coupled with stop-and-go traffic from the projected growth in the region, would increase overall energy requirements under the No-Action Alternative compared to existing conditions.

4.19.2 Minimize 4(f) Impacts Alternative

4.19.2.1 Construction-Related Energy Impacts

Constructing the Minimize 4(f) Impacts Alternative would involve the operation of heavy machinery with a resulting negative impact on energy use since fuel would be consumed as part of the construction activities. In addition, traffic congestion would increase during construction, so more fuel would be used.

4.19.2.2 Direct Energy Impacts

Under the Minimize 4(f) Impacts Alternative, some congestion would be relieved on S.R. 108, which would increase average

vehicle speeds and fuel efficiency. Based on the results of travel demand modeling, the Minimize 4(f) Impacts Alternative might cause a slight increase in the vehicle-miles traveled along S.R. 108 but would not change the vehicle-miles traveled in the region. However, the overall impact to energy consumption would not produce any beneficial or adverse impacts.

4.19.3 West Alternative

Impacts to energy consumption under the West Alternative would be the same as those from the Minimize 4(f) Impacts Alternative.

4.20 Construction Impacts

Construction of either of the action alternatives would cause temporary construction-related impacts due to ground disturbance and the operation of construction equipment. Construction could also cause impacts to air quality, water quality, noise and vibration levels, light levels, visual resources, cultural resources, wildlife, vehicle flow (business operations), utility service, and hazardous material sites.

The nature and timing of these impacts would be related to the project's construction methods and phasing. As proposed, the improvements would be made to S.R. 108 as funding becomes available. Most construction-related impacts to the public would be associated with travel delays on local surface streets.

4.20.1 No-Action Alternative

Under the No-Action Alternative, S.R. 108 would not be reconstructed, so there would be no construction-related impacts from the project. However, as farmland is developed for commercial and residential uses along S.R. 108, the developer would make sure that homes are set back an appropriate distance from S.R. 108 and would include curb and gutter for the new development according to UDOT and local ordinances.

4.20.2 Action Alternatives

The action alternatives would make improvements to S.R. 108 along the existing corridor. The improvements would be made in three

phases over a 6-year period as funding becomes available. Overall, most of the construction-related impacts would be temporary and would not result in long-term impacts. The following discussion of impacts applies to both of the action alternatives unless otherwise stated.

A thorough public information program would be implemented to inform the public about construction activities and to minimize impacts. Information would include work hours and alternate routes. Construction signs would be used to notify motorists about work activities and changes in traffic patterns. In addition, night and weekend work could be scheduled to shorten the duration of construction impacts as long as permit requirements are satisfied.

4.20.2.1 Construction Phasing

Because of the uncertainty of obtaining funding for the project, the exact timeline and location for construction cannot be determined. Initial construction could start as early as 2010.

4.20.2.2 Air Quality Construction Impacts

Air quality impacts during construction would be limited to short-term increases in fugitive dust, particulates, and localized pollutant emissions from construction equipment. The project would generate pollutant emissions from the following construction activities:

- Excavation related to cut-and-cover
- Mobile emissions from construction workers' vehicles as they travel to and from the project site
- Mobile emissions from delivering and hauling construction supplies and debris to and from the project site
- Stationary emissions from onsite construction equipment
- Mobile emissions from vehicles whose speeds are slowed because of increased congestion caused by construction of S.R. 108

Because S.R. 108 would be constructed in phases, it is difficult to determine emissions associated with construction. Because construction would be localized and short-term, any impacts to individual air

quality receptors would also be short-term. The most common type of air pollutant resulting from construction would be PM_{10}.

4.20.2.3 Water Quality Construction Impacts

Excavating, grading, and other construction activities could reduce water quality during construction. These impacts would continue until the proposed project is completed and permanent protective measures are installed.

4.20.2.4 Noise Construction Impacts

The operation of machinery and other construction activities would increase noise levels. Construction would cause temporary increases in noise levels in the communities along S.R. 108, but the impacts would be short-term. Construction equipment could generate noise levels near residences of 80 dBA to 90 dBA or similar to that of a heavy truck at 50 feet.

4.20.2.5 Visual Construction Impacts

During construction, the work zone would be cleared of vegetation and the exposed bare ground would contrast visually with the surrounding agricultural, recreational, and residential areas that viewers of the area are accustomed to seeing. In addition, construction equipment and materials would clutter views in the construction area. Visual quality from sensitive viewer locations such as homes and parks would be temporarily reduced during construction. Until construction is completed and the right-of-way is revegetated, the construction area would visually stand out.

4.20.2.6 Utility Service Construction Impacts

Although utility service would be maintained throughout most construction activities, utility service could be temporarily disrupted during construction. The affected utilities could include electric, gas, water, sewer, phone, cable, and storm drainage. UDOT would consult with all utility providers affected by construction to complete utility agreements before construction, and the construction contractor would coordinate with all utility providers to minimize utility service interruptions.

4.20.2.7 Traffic Construction Impacts

The primary construction impacts that would affect vehicle traffic, pedestrians, and bicyclists during construction of either of the action alternatives are the following:

- Traffic detours and some temporary road closures would change frequently throughout construction. Changes in roadway conditions could include rerouting of traffic onto other roads, temporary closure of lanes or sections, and temporary lane shifts. These conditions could occur both on S.R. 108 and on minor cross-streets and at major intersections. Detours and road closures would temporarily increase vehicle commute times, fuel usage, and air pollutant emissions.
- Access to residential and commercial properties and community facilities such as schools would be temporarily disrupted, resulting in longer commute times and a potential loss of business for some commercial businesses.

4.20.2.8 Economics Construction Impacts

Construction activities could temporarily affect access to businesses in the construction area. Although access to properties would be maintained to the extent practicable, temporary detours would limit some access or change the route to some businesses. The resulting traffic congestion and motorists' perceptions of inaccessibility could discourage some shoppers from patronizing businesses in the construction area.

A Business Profile Survey for S.R. 108 Improvements was hand-delivered to all businesses along S.R. 108 in November 2006. Many business owners expressed concern that the construction along S.R. 108 would affect access to their business and their sales. Research shows that concerns raised over the potential loss of sales during construction are legitimate. Studies suggest that sales can decline 10% to 60% depending on the nature of the business, the length of time of construction, the length of time that the business has been in operation, the location of the business, alternate access routes to the business, and other factors.

With the likely loss of sales to the businesses along S.R. 108 during construction, the sales tax revenue generated by the businesses on

S.R. 108 would also decline. However, most survey respondents who were concerned about accessibility and sales during construction also stated that, in the long term, an improved S.R. 108 would help their businesses since congestion and accessibility along S.R. 108 would be improved.

The businesses most likely to be affected are those that cater to impulse shopping or "in-route" shopping. Fast-food restaurants and gas stations belong to this first group and are considered businesses that would be highly affected by construction. Destination businesses that have extensive competition, such as grocery stores, hardware stores, and "sit-down" restaurants, would be the next-most-affected group and are therefore considered businesses that would be moderately affected by construction.

Low-impact businesses include specialty and unique stores; these businesses are likely to be only slightly affected by construction. The fourth group of businesses, which includes offices, industrial parks, schools, and churches, is not expected to be affected. Construction activities would most likely not affect this group's day-to-day operations since consumer traffic generally does not sustain their business activities.

4.20.2.9 Hazardous Materials Construction Impacts

Construction workers could encounter soil contamination from underground storage tanks, leaking underground storage tanks, and other hazardous material sites that might be near S.R. 108. Exposure to these sites could pose a health risk. Because the general public would not be allowed onto construction sites, there would be no health risks to the public from ground contamination.

4.20.2.10 Construction Staging and Material Borrow Areas

During construction, the contractor would establish staging areas for equipment and would obtain fill material for S.R. 108 improvements. Because a contractor has not yet been selected, the exact location of staging areas and sources of fill material is not known.

4.20.2.11 Invasive Species Construction Impacts

Construction operations would remove the existing hard surfaces and established vegetation, which would expose the underlying soils to the risk of being infiltrated by invasive weeds. Materials and equipment delivered to the job site could introduce invasive weeds into the area if seeds are present in imported soil or on equipment that is not properly cleaned.

4.20.3 Mitigation Measures for Construction Impacts

The following mitigation measures will be implemented during construction.

4.20.3.1 Mitigation Measures for Public Impacts Due to Construction

A thorough public information program will be implemented to inform the public about construction activities and to minimize impacts. Information will include work hours and alternate routes. Construction signs will be used along the corridor to notify motorists about work activities and changes in traffic patterns.

Impacts from lights used during nighttime construction will be minimized by aiming construction lights directly at the work area and/or shielding the lights. Utility agreements will be completed to coordinate utility relocations.

4.20.3.2 Mitigation Measures for Air Quality Impacts due to Construction

The contractor will be required to provide the following mitigation measures to preserve air quality during construction:

- **Fugitive-Dust Control.** The contractor will maintain a fugitive-dust-control program. This program will include wetting excavation areas, unpaved parking and staging areas, and onsite stockpiles of debris, dirt, or dusty material to reduce windblown dust.
- **Street Sweeping.** The contractor will use street-sweeping equipment where needed.
- **Equipment Emissions.** The contractor will shut off construction equipment when it is not in direct use to reduce emissions from idling.

Other mitigation measures that could be implemented to minimize air quality impacts include the following:

- Use newer, cleaner-emitting construction equipment and properly maintain the equipment.
- Install control equipment on diesel construction equipment (such as particulate filters or traps, oxidizing soot filters, and oxidation catalysts) to the extent that is feasible.
- Reroute truck traffic away from schools and communities when reasonably practical.
- Consider the use of alternate engines and diesel fuels such as electric engines, engines that use liquefied or compressed natural gas, diesel engines that meet EPA 2007 regulations, diesel engines fueled with low-sulfur fuel, and diesel engines outfitted with catalyzed diesel particulate filters and fueled with low-sulfur fuel (less than 15 ppm sulfur).

4.20.3.3 Mitigation Measures for Water Quality Impacts due to Construction

To minimize the temporary impacts to water quality, a UPDES General Storm Water Discharge Permit will be required. As part of the requirements of the permit, the contractor will be required to develop and implement a Storm Water Pollution Prevention Plan. The plan will contain provisions for controlling the stormwater in the project area to reduce erosion and siltation.

4.20.3.4 Mitigation Measures for Noise Impacts due to Construction

To reduce temporary noise impacts associated with construction, the contractor will comply with all state and local regulations relating to construction noise. Measures for reducing construction noise include limiting construction in residential areas during nighttime hours, locating rock-crushing activities away from residential areas, and placing temporary barriers. Each construction area will be evaluated for the appropriate measures to use.

4.20.3.5 Mitigation Measures for Visual Impacts due to Construction

The contractor will prepare and implement an appropriate seeding vegetation and/or landscaping plan to restore or enhance aesthetics at the completion of the project. The contractor will also be required to maintain and keep the storage area for equipment, materials, and other accessories in a reasonable condition of cleanliness and orderly placement to avoid an unpleasant appearance. The contractor will promptly remove unused or unnecessary traffic-control equipment.

4.20.3.6 Mitigation Measures for Utility Service Impacts due to Construction

The project specifications will require the contractor to coordinate with the utility companies to plan work activities so that utility disruptions to a business occur when the business is closed or during off-peak times. Before beginning work, the contractor is required to contact Blue Stakes to identify the location of all utilities. The contractor will be required to use care when excavating to avoid unplanned utility disruptions. If utilities are unintentionally

disrupted, UDOT will work with the contractor and the utility companies to restore service as quickly as possible.

4.20.3.7 Mitigation Measures for Traffic Impacts due to Construction

The contractor will be required to develop a maintenance of traffic plan that defines measures to minimize construction impacts on traffic. A general requirement of this plan is that, to the extent reasonably practical, safe access to businesses and residences must be maintained and existing roads must be kept open to traffic unless alternate routes are provided. However, prior to construction of each phase, the project team will coordinate with business and property owners to identify where temporary access can be shared and to define timeframes (such as night) when access is not needed. Signs will be placed to notify motorists where business access is provided. Finally, information will be made available to the public detailing construction activities and providing alternate transportation routes.

Even with the implementation of the maintenance of traffic plan, short-term increases in traffic congestion would occur in the vicinity of S.R. 108 construction. Street closures would be limited to what is specified in the maintenance of traffic plan as approved by UDOT before the start of construction.

4.20.3.8 Mitigation Measures for Economic Impacts due to Construction

Access to businesses will be maintained during the construction and post-construction phases of this project, as this is UDOT's policy with respect to access issues on all UDOT roadway improvement projects. For each phase of the project, the project team will coordinate with property owners and businesses to evaluate ways to maintain access while still allowing efficient construction operations. This could entail sharing temporary access or identifying acceptable timeframes when access is not needed. Adequate signage will be placed in construction areas to direct motorists to businesses and industrial areas. Other potential mitigation measures for construction impacts include:

- Provide a frequent newsletter to all businesses along S.R. 108 describing the progress of the construction and upcoming construction events.
- Provide business access signs along S.R. 108 that identify business access points within the construction limits.
- Hold a monthly meeting with business owners to inform them of upcoming construction activities and to provide a forum for the businesses to express their concerns with the project.
- To minimize noise and light impacts at night, conduct major construction activities in residential areas during the day.

4.20.3.9 Mitigation Measures for Hazardous Materials Impacts due to Construction

To minimize the risk of exposure to hazardous materials, the UDOT project team will coordinate with DERR, the construction contractor, and the appropriate property owners. This coordination will involve determining the status of the sites of concern, identifying newly created sites, identifying the nature and extent of remaining contamination (if any), and minimizing the risk to all parties involved.

Measures will be implemented to prevent the spread of contamination and to limit worker exposure. Site investigations will determine the chemical hazard, if any, and the appropriate protection measures. In the case of an identified chemical hazard, the site remedy will be negotiated through coordination with DERR.

Previously unidentified sites or contamination could be encountered during construction. In such a case, all work will stop in the area of the contamination according to UDOT Standard Specifications, and the contractor will consult with UDOT and DERR to determine the appropriate remedial measures. Hazardous wastes will be handled according to UDOT Standard Specifications and the requirements and regulations of UDEQ.

4.20.3.10 Mitigation Measures for Construction Staging and Material Borrow Areas

Earth-disturbing activities are generally confined to the limits of cut and fill, although staging areas and some construction activity might

be located outside the limits of cut and fill. Any staging areas or construction fill material areas will need to be coordinated with UDOT to ensure that no sensitive environmental resources are affected. The contractor will limit impacts and restore any disturbed vegetation or other improvements within the selected staging areas.

4.20.3.11 Mitigation Measures for Invasive Species Impacts due to Construction

To mitigate the possible introduction of invasive weeds due to construction activities, the invasive weed BMPs in UDOT's current Standard Specifications for Road and Bridge Construction will be implemented and monitored and included in the plans and specifications for the project.

- The contractor will be required to follow noxious weed mitigation and control measures identified in UDOT Standard Specifications for Invasive Weed Control.
- Strictly following BMPs will also reduce the potential for weed infestations.
- Reseeding with native plants, followed by monitoring seedlings and invasive species until the vegetation has re-established, will mitigate direct-disturbance impacts and reduce the potential for weed invasions. UDOT will be responsible for monitoring and determining when vegetation becomes re-established.

4.21 Short-Term Uses versus Long-Term Productivity

The short-term use of the environment versus preserving its long-term productivity is related to converting the natural productivity of the land, a renewable use, to a developed use that has a relatively short economic life. Improvements to S.R. 108 would be consistent with the local land-use and transportation plans and are consistent with regional projections of increases in population. Because most of the study area is already developed, the action alternatives would not alter the long-term productivity of the area.

4.22 Irreversible and Irretrievable Commitment of Resources

Implementing an action alternative involves a commitment of a range of natural, physical, human, and fiscal resources. Land used for constructing the S.R. 108 project would be considered an irreversible commitment of these resources during the time that the land is used for the roadway. However, if a greater need for use of the land arises, or if the roadway is no longer needed, the land could be converted to another use. At present, there is no reason to believe that such conversion would ever be necessary or desirable.

A considerable amount of fossil fuels, labor, and roadway construction materials such as cement, aggregate, and bituminous material would be expended. Additionally, large amounts of labor and natural resources would be necessary for fabricating and preparing the construction materials. These materials are generally not retrievable, but they are not in short supply and their use would not have an adverse effect on the continued availability of these resources.

Historic buildings in the study area would be affected by the action alternatives as discussed in Section 4.14, Impacts to Historic, Archaeological, and Paleontological Resources. The demolition of historic buildings as part of construction is considered an irreversible commitment of resources.

Constructing the proposed project would also require a substantial expenditure of irretrievable funds. The commitment of these resources is based on the premise that residents in the area, the state, and the region would benefit from the improved quality of the transportation system. These benefits would consist of improved accessibility, increased safety, and savings in travel time, all of which are anticipated to outweigh the commitment of these financial resources.

4.22.1 Mitigation Measures for Impacts to Irretrievable Resources

Mitigation for the demolition of historic buildings consists of performing an intensive-level site survey, which preserves information about historic structures through documentation. See Section 4.14, Impacts to Historic, Archaeological, and Paleontological Resources, for more information.

4.23 Permits and Clearances

Exhibit 4.23-1 shows the permits and clearances that would be required for the proposed S.R. 108 project. These permits and clearances would apply to both the Minimize 4(f) Impacts and West Alternatives.

Exhibit 4.23-1. Required Permits and Clearances

Permit	Granting Agency(ies)	Applicant	Application Time	Granting Time	Applicable Portion of Project
Section 401 Certification (Clean Water Act)	Utah Division of Water Quality	UDOT	Concurrent with Final EIS	Concurrent with Record of Decision	Required if the project could result in any discharge into navigable waters
Stream Alteration Permit (potentially)	Utah Division of Water Rights	UDOT (prepared by contractor)	Construction phase	Before construction	Required if contractor proposes changes to stream crossing designs
Section 402 Permit (UPDES)	Utah Division of Water Quality	Contractor	Construction phase	Before construction	Stormwater quality during construction phrase
Section 404 Permit (Clean Water Act) and Stream Alteration Permit	USACE, Utah Division of Water Rights	UDOT	Prior to construction	Before construction	Portions of roadway in wetlands
Air Quality Approval Order	Utah Division of Air Quality	Contractor	Construction phase	Before construction	Air quality during construction phase (emissions from equipment)
Water Rights (change deed record or apply for change in point of diversion)	Utah Division of Water Rights	UDOT	Right-of-way acquisition phase	Right-of-way acquisition phase	Changes in point of diversion or change of use associated with wells in the right-of-way or water required for wetland mitigation
Section 106 of the National Historic Preservation Act	Utah SHPO, Advisory Council on Historic Preservation	UDOT	Concurrent with EIS	Final EIS	Mitigation of historic and archaeological resources
Memorandum of Agreement	Utah SHPO, Advisory Council on Historic Preservation	UDOT	EIS phase	Final EIS	Impacts on NRHP-eligible properties
Approval of Remediation Work Plan (potentially)	UDEQ or EPA	UDOT	EIS phase	Before construction	Hazardous waste, CERCLIS, and National Priorities List (NPL) sites
Construction-related permits for all of the above (potentially)	Various agencies	Contractor	Contractor	Before construction	Impacts associated with offsite activities such as construction staging, borrow areas, batch plant sites, and so on

All of the listed permits would be required or potentially required under both action alternatives.

4.23.1 Section 401 Certification, Clean Water Act (UDEQ)

EPA is the agency with regulatory authority for Clean Water Act issues at the federal level, but in July 1987, EPA delegated portions of this authority to the State of Utah. UDEQ is the governing agency for issues related to water quality, including the Section 401 certification and the Section 402 NPDES permits.

If the construction or operation of facilities could result in any discharge into a water body, the applicant must request certification from UDEQ that the proposed activity would not violate state or federal water quality standards.

4.23.2 Stream Alteration Permit (Utah Division of Water Rights)

Constructing any new drainage structures at a stream crossing would constitute a major stream alteration or modification. A Stream Alteration Permit from the Utah Division of Water Rights would be required for each stream crossing.

4.23.3 Section 402 Permit, Utah Pollution Discharge Elimination System (Utah Division of Water Quality)

Constructing either action alternative would disturb more than 1 acre and so would require a UPDES construction phase permit. These permits are issued in response to the 1987 reauthorization of the Clean Water Act, which requires EPA to institute an NPDES permitting program for storm drainage systems or to approve state programs. EPA approved Utah's version of this program (UPDES) in 1987.

Obtaining the UPDES permit requires development of a Storm Water Pollution Prevention Plan that includes a Temporary Erosion and Sediment Control Plan. The Temporary Erosion and Sediment Control Plan identifies BMPs as well as site-specific measures to minimize erosion and prevent eroded sediment from leaving the work zone.

4.23.4 Section 404, Clean Water Act, Individual Permit (USACE)

Project applicants are required to obtain a Clean Water Act Section 404 permit if a proposed action would result in the discharge of dredged or fill materials in waters of the U.S., including wetlands. The S.R. 108 project could affect 0.025 acre of wetlands and 1 acre of drainage canals. Consultation with USACE is ongoing to determine if these features are waters of the U.S. If they are considered waters of the U.S., either an individual or nationwide permit could be required.

4.23.5 Air Quality Approval Order (Utah Division of Air Quality)

A permit for air quality impacts during the construction phase is required for both action alternatives. The intent of the permit is to control fugitive dust and emissions. This permit would be obtained by the contractor before construction. It would include requirements for a dust-control plan to address emission sources and possibly other construction approvals depending on the source and location of aggregate, asphalt, equipment emissions, and/or fuel storage facilities.

4.23.6 Water Rights (Utah Division of Water Rights)

Existing groundwater wells within the right-of-way inventoried by the Utah Division of Water Rights are referred to as points of diversion. If the point of diversion is changed (that is, if the well is relocated outside the right-of-way), the owner of the well must file an application with the Division of Water Rights to change the well. If UDOT purchases the water right associated with a well in the right-of-way, the deed record with the Division of Water Rights would have to be changed.

4.23.7 Section 106, National Historic Preservation Act (Utah SHPO and Advisory Council on Historic Preservation)

Section 106 of the National Historic Preservation Act of 1966 requires federal agencies to take into account the effects of their undertakings on historic properties and give the Advisory Council on Historic Preservation a reasonable opportunity to comment. Any property listed in or eligible for the NRHP is considered historic. For the S.R. 108 project, FHWA has consulted with the Utah SHPO and potentially affected Native American tribes and has developed a Memorandum of Agreement for evaluating cultural resources that would be affected by the proposed action and for implementing required mitigation (see Appendix B, Determination of Eligibility and Finding of Effect and Native American Consultation). A permit would be granted to UDOT by the Utah SHPO to perform recovery mitigation on eligible archaeological sites affected by the project. For the S.R. 108 project, UDOT does not anticipate that any archaeological sites would be affected.

4.23.8 Approval of Remediation Work Plan (UDEQ or EPA)

The action alternatives could affect an area with contaminated soils. Construction activities on any contaminated site would require a remediation work plan approved by the appropriate regulatory agency for each site (UDEQ or EPA). The plan would define cleanup levels and protective measures for construction workers.

4.23.9 Construction-Related Permits and Clearances (Various Agencies)

The contractor would be responsible for obtaining all construction-related permits and other environmental clearances for activities occurring outside the right-of-way, such as construction staging areas, borrow areas, and batch plant sites.

4.24 Mitigation Summary

4.24.1 Mitigation Measures for Impacts to Farmland

UDOT will work with each farm owner on a case-by-case basis to determine the farm's eligibility for benefits under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and other state and federal guidelines. Generally, UDOT will provide compensation for the expense of re-establishing farm enterprises and for fair market value of the buildings and land.

4.24.2 Mitigation Measures for Community Impacts

4.24.2.1 Public Health and Safety

If raised medians are incorporated into the final design, the sponsoring agencies will ensure that the locations of the medians will not interfere with emergency service providers' ability to respond to emergencies. Raised medians will also be placed near schools and busy commercial centers so that pedestrians have a relatively safe place to stop when crossing the road.

During the final design of the project, UDOT will coordinate modifications to the existing school crossing zones for Syracuse Junior High School, Syracuse Elementary School, and Syracuse High School with those schools to ensure that roadway improvements maintain student safety at those crossing locations.

During construction, equipment and excavations could pose a safety hazard for students who walk to school on S.R. 108. Before construction begins, the contractor will coordinate with the schools so that appropriate safety measures can be implemented. These measures could include avoiding construction during the morning and afternoon while students are walking to school and providing a safety monitor to watch students as they walk to school near the construction areas.

4.24.2.2 Relocations

The loss of residences or businesses due to either of the action alternatives will be mitigated according to federal, state, and local

relocation policies. Assistance and re-establishment expenses will be provided to the displaced property owners and lease holders according to eligibility requirements and other requirements of the Uniform Relocation Assistance Act of 1970, as amended. Relocation resources will be available to each relocated resident and business without discrimination. UDOT will evaluate the need to provide early right-of-way acquisition for those property owners that demonstrate a hardship because of this project.

If housing of comparable size and value to that being acquired is not available (or is not available within the Uniform Relocation Assistance Act's payment limits), UDOT will invoke a process called "housing of last resort." This process allows necessary replacement housing for relocated homeowners through any of several methods, including:

- Purchasing a comparable residential property and making it available to the relocated person in exchange for the acquired property
- Relocating and rehabilitating (if necessary) a dwelling purchased by UDOT and making it available to the relocated person in exchange for the acquired property
- Purchasing, rehabilitating, and/or constructing additions to an existing dwelling to make it comparable to a particular acquired property
- Purchasing land and constructing a new replacement dwelling comparable to a particular acquired property when comparable dwellings are not otherwise available
- Other measures that fairly compensate for the acquired property

The Uniform Relocation Assistance Act also contains allowances for renters. A one-time rental assistance payment is available that is intended to cover 42 months of rent in a decent, sanitary, safe dwelling. This period could be increased if necessary to fully mitigate affected households. Extensions are considered on a case-by-case basis depending on individual circumstances.

4.24.2.3 Public Services and Utilities

The UDOT document Accommodation of Utilities and the Control and Protection of State Highway Rights-of-Way, Utah Administrative Code Rule 930-6, will be followed. The construction contractor will contact local businesses and residences if any loss of service is required during construction.

4.24.3 Mitigation Measures for Economic Impacts

Although the acquisition of commercial properties could cause an adverse impact on a given business, this impact would not necessarily cause an adverse impact to the area economy. Acquired businesses would be relocated by UDOT according to the Uniform Relocation Assistance Act, as amended; Title VI of the Civil Rights Act of 1964; and 49 CFR 24, Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs. If shoppers continue to want the services provided by a relocated business, the business should be successful at its new location, especially if it is reasonably close to the current location.

4.24.4 Mitigation Measures for Impacts to Air Quality

Because there were no CO impacts associated with either alternative, no mitigation for impacts to CO is required.

For PM_{10}, several mitigation measures will be implemented as part of the proposed project. These measures will include minimizing construction emissions through best management practices and maintaining construction equipment engines.

4.24.5 Mitigation Measures for Noise Impacts

4.24.5.1 UDOT's Noise-Abatement Criteria

This section discusses methods for abating, or reducing, the traffic noise impacts from S.R. 108 that were identified in the previous sections.

According to UDOT's Noise-Abatement Policy (UDOT 08A2-1), noise abatement will be considered for roadway construction projects

where noise impacts are identified. Both of the S.R. 108 action alternatives would add additional lanes of travel, so noise-abatement measures can be considered. The goal of noise abatement is to substantially reduce noise levels, although this noise reduction might or might not result in noise levels that are below the applicable noise-abatement criterion (66 dBA for residential locations).

The two relevant criteria to consider when identifying and evaluating noise-abatement measures are feasibility and reasonableness. Noise abatement will be provided by UDOT only if the noise-abatement measures are *both* feasible and reasonable.

Feasibility

Noise-abatement feasibility deals primarily with construction and engineering considerations. (For example, can noise be substantially reduced at a specific location? Is noise abatement limited by factors such as topography, access requirements, the presence of local cross streets, or other noise sources in the area?)

Under the UDOT noise policy, a noise wall (or other abatement measure) that will not reduce noise by at least 5 dBA for at least 75% of the first-row residences (those closest to the roadway) is not considered feasible.

Reasonableness

Reasonableness is a more subjective criterion than feasibility. Reasonableness suggests that common sense and good judgment have been applied in arriving at a decision to recommend a noise-abatement measure. (For example, does the noise-abatement measure satisfy the cost criterion established by the noise policy?) As a result, a noise wall could be feasible (that is, provide the minimum required 5 dBA of noise reduction at a majority of the first-row residences), but not be reasonable (for example, by not meeting UDOT's cost criterion).

4.24.5.2 Feasibility and Reasonableness Factors

UDOT considers the following factors, among others, when determining the feasibility and reasonableness of noise-abatement measures:

- **Noise-Abatement Benefits.** Reasonable efforts will be made to substantially reduce noise. UDOT defines a substantial noise reduction as a 10-dBA noise reduction at one first-row receiver adjacent to the proposed alignment. Under the UDOT noise policy, noise walls are considered feasible if they reduce noise by at least 5 dBA at the majority of first-row receivers.
- **Land Use and Zoning.** The existing zoning and land uses adjacent to the transportation facility will be reviewed. In general, noise walls are not consistent with commercial or industrial zoning because businesses usually attract customers by being visible to drivers on the road.
- **Engineering, Safety, and Maintenance.** Engineering, safety, and maintenance issues must be considered to determine the constructability of a noise-abatement measure. If any of these issues are substantial enough to preclude good safety and maintenance practices, then the noise wall might not be feasible.
- **Cost of Abatement.** In residential areas, all residences affected by the proposed project must be considered in determining a noise wall's cost effectiveness. Under UDOT policy, a benefiting residence is one at which noise is reduced by at least 5 dBA as a result of the noise wall. The maximum cost used to determine the reasonableness of a noise-abatement measure is $30,000 per benefiting receiver based on a noise wall cost of $20 per square foot.
- **Public Involvement and Balloting.** The UDOT Project Manager, Public Involvement Coordinator, and Environmental Engineer/Manager will decide on the appropriate level of public involvement. The purpose of the public involvement process is to ensure that the concerns of the affected communities are known and that every effort is made to provide noise abatement to an affected community.
- **Abatement Design.** A noise-abatement measure must be designed with the following considerations in mind: (1) good design practice, (2) optimal performance, and (3) current highway safety technology. UDOT will consider aesthetics treatment, graffiti deterrence, and landscaping where appropriate

in relation to design standard specifications, cost efficiency, maintenance, and the regulations of local municipalities.

Once a noise wall has been determined to be feasible, UDOT will determine whether its construction is reasonable by thoroughly considering the range of factors described above, including the cost-effectiveness of the measure. UDOT will construct noise walls only if they have been determined to be both feasible and reasonable. The decision to recommend or not recommend a noise wall is the responsibility of the UDOT Environmental Engineer/Manager with concurrence from the Project Manager and the Preconstruction Engineer. For projects with federal involvement, FHWA will have final approval for noise-abatement measures.

4.24.5.3 Noise-Abatement Methodology

The effectiveness of noise walls is generally limited to areas within about 500 feet of the proposed right-of-way. Beyond this distance, noise walls do not effectively reduce noise levels at individual residences. In addition, noise walls are most effective where they are continuous and block a number of individual residences. The short spacing between individual residences and driveways, as well as the need to maintain access along S.R. 108, make noise walls infeasible in Segments 1 through 7 of S.R. 108.

Noise walls were considered for two mobile-home parks in Segment 8 and for townhomes adjacent to the alignment in Segment 9. Four noise walls were considered adjacent to Karol's Mobile Estates and the Country Meadows Estates, and two noise walls were constructed adjacent to the townhomes in Segment 9. The results of the evaluation are summarized below. Beginning on page 4-106, Exhibit 4.10-19 through Exhibit 4.10-24, Noise Mitigation Analysis, show the abatement evaluation for each noise wall that was considered. The locations of potential noise walls are shown in Exhibit 4.10-17: Noise Receptor Locations – Segment 8, R8-1 to R8-41 and Exhibit 4.10-18: Noise Receptor Locations – Segment 9, R9-1 to R9-13 on pages 4-104 and 4-105.

For each noise wall considered, the feasibility and reasonableness of wall heights between 6 feet and 18 feet were evaluated to determine the following:

- The number of noise-impacted residences that would benefit from the noise wall (those at which noise would be reduced by at least 5 dBA)
- The maximum noise level reduction from the noise wall (the degree to which a noise wall could reduce noise by at least 10 dBA as required by UDOT's Noise Policy)
- Whether at least 75% of first-row residences would benefit from the noise wall
- The cost-effectiveness of the noise wall (cost per benefiting residence)

An overall determination of whether the noise wall is both feasible and reasonable (cost-effective)

4.24.5.4 Noise-Abatement Measures

Segment 8 (4000 South to 3600 South)

Four noise walls were considered in Segment 8, and all four were considered feasible and reasonable. Residents who are adjacent to the proposed noise walls will be able to vote on whether they want the noise walls to be built. If residents are in favor of noise walls, they will be constructed.

- **Wall 1** (about 550 feet long) was located on the southeast side of Karol's Mobile Estates. A noise wall 16 feet high at this location would reduce noise by 4 dBA to 12 dBA at the majority of first-row residences and would be feasible and reasonable according to UDOT's noise-abatement criteria. For more information, see Exhibit 4.10-19: Noise Mitigation Analysis – Wall 1 on page 4-106.
- **Wall 2** (about 300 feet long) was located on the northeast side of Karol's Mobile Estates. A noise wall between 12 feet and 18 feet high would reduce noise by up to 6 dBA at the majority of first-row residences. A noise wall in this location would be feasible and reasonable according to UDOT's noise-abatement criteria.

For more information, see Exhibit 4.10-20: Noise Mitigation Analysis – Wall 2 on page 4-107.

- **Wall 3** (about 400 feet long) was located on the south end of the Country Meadows Estates. A noise wall between 12 feet and 18 feet high would reduce noise by 9 dBA to 12 dBA at first-row residences and would be feasible and reasonable according to UDOT's noise-abatement criteria. For more information, see Exhibit 4.10-21: Noise Mitigation Analysis – Wall 3 on page 4-108.
- **Wall 4** (about 425 feet long) was located on the north end of the Country Meadows Estates. A noise wall between 12 feet and 18 feet high would reduce noise by 7 dBA to 13 dBA at first-row residences and would be feasible and reasonable according to UDOT's noise-abatement criteria. For more information, see Exhibit 4.10-22: Noise Mitigation Analysis – Wall 4 on page 4-109.

Segment 9 (3600 South to 1900 West)

Two noise walls were considered in Segment 9, and both were considered feasible and reasonable. Residents who are adjacent to the proposed noise walls will be able to vote on whether they want the noise walls to be built. If residents are in favor of noise walls, they will be constructed.

- **Wall 5** (about 360 feet long) was located adjacent to the relatively new townhome development on the south side of the alignment. A noise wall 8 feet high at this location would reduce noise by about 5 dBA to 9 dBA at the majority of first-row residences and would be feasible and reasonable according to UDOT's noise-abatement criteria. For more information, see Exhibit 4.10-23: Noise Mitigation Analysis – Wall 5 on page 4-110.
- **Wall 6** (about 950 feet long) was located on the south side of the alignment adjacent to the townhome development. Similar to Wall 5 described above, a noise wall 8 feet high would reduce noise by 6 dBA to 10 dBA at the majority of first-row residences. A noise wall in this location would be feasible and reasonable according to UDOT's noise-abatement criteria. For

more information, see Exhibit 4.10-24: Noise Mitigation Analysis – Wall 6 on page 4-111.

4.24.6 Mitigation Measures for Water Quality Impacts

4.24.6.1 Mitigation Measures for Water Quality Impacts due to Construction

A UPDES permit will be required if construction disturbs more than 1 acre. This permit will require the use of best management practices (BMPs) to prevent sediments and other contaminants from leaving the construction site.

4.24.6.2 Mitigation Measures for Surface Water Impacts

Detention features will be provided where the capacity of the existing stormwater system is inadequate to convey the additional runoff flows or where the expected impact to the water quality of receiving waters requires flows to be detained and water treated. In addition to reducing peak levels and velocities in streams, detention ponds have the added benefit of reducing contaminant levels of TSS, TDS, and the metals present in highway runoff.

4.24.7 Mitigation Measures for Impacts to Wells or Points of Diversion

During the final design of the project, UDOT will work with the property owner to determine the appropriate mitigation measure if a well head or other water right point of diversion is affected. Mitigation could include (1) relocating a well head or surface water diversion to continue to provide irrigation water to any land that is not acquired or (2) abandoning the well and compensating the owner for the value of the associated water right.

4.24.8 Mitigation Measures for Ecosystem Impacts

To mitigate any construction impacts to the small, isolated jurisdictional wetland, appropriate BMPs will be incorporated into the construction plan. Environmental fencing will be installed to prevent construction equipment impacts, along with installing silt

fencing to control sedimentation of the wetland. Any mitigation to the 0.025 acre of wetlands and the ditches parallel to the alignment will depend on the jurisdictional status and the type of permit requested as determined by USACE. However, no mitigation is anticipated for impacts to the ditches. No mitigation will be required for impacts to disturbed or urbanized lands.

4.24.9 Mitigation Measures for Impacts to Historic, Archaeological, and Paleontological Resources

Mitigation measures for adverse effects to historic buildings will be necessary under either action alternative. The exact mitigation measures would be negotiated between FHWA, UDOT, the Utah SHPO, and interested parties through the Section 106 process of the National Historic Preservation Act. These measures would be determined by historic protection experts to mitigate the impacts to these resources to the greatest extent feasible. A Memorandum of Agreement has been developed between FHWA and the Utah SHPO (UDOT is an invited signatory) outlining the specific mitigation measures to be implemented if an action alternative is selected in the Record of Decision for the project.

4.24.10 Mitigation Measures for Impacts to Hazardous Waste Sites

Measures will be implemented to prevent the spread of contamination and to limit worker exposure. Site investigations will determine the chemical hazard, if any, and the appropriate protective measures. In the case of an identified chemical hazard, the site remedy will be negotiated with the property owner prior to property acquisition and through the possible coordination with DERR.

Previously unidentified sites or contamination could be encountered during construction. In such a case, all work will stop in the area of the contamination according to UDOT Standard Specifications, and the contractor will consult with UDOT and DERR to determine the appropriate remedial measures. Hazardous wastes will be handled according to UDOT Standard Specifications and the requirements and regulations of DERR.

At the time of construction, coordination will take place between UDOT or DERR, the construction contractor, and the appropriate property owners. This coordination will involve determining the status of the sites of concern, identifying newly created sites, identifying the nature and extent of remaining contamination (if any), and minimizing the risk to all parties involved. Environmental site assessments will be conducted at the sites of concern to further evaluate the nature and extent of contamination and to better identify the potential risks of encountering hazardous waste when constructing the selected alternative.

4.24.11 Mitigation Measures for Visual Impacts

During the preliminary design of the project, several mitigation measures were considered to reduce the visual impacts of the alternatives. Additional aesthetic measures such as lighting, vegetation and plantings, and other architectural features will be considered during the final design of the project. Landscape plans for the roadway will include replacement landscaping to reduce impacts from the loss of vegetation.

4.24.12 Mitigation Measures for Construction Impacts

The following mitigation measures will be implemented during construction.

4.24.12.1 Mitigation Measures for Public Impacts Due to Construction

A thorough public information program will be implemented to inform the public about construction activities and to minimize impacts. Information will include work hours and alternate routes. Construction signs will be used along the corridor to notify motorists about work activities and changes in traffic patterns.

Impacts from lights used during nighttime construction will be minimized by aiming construction lights directly at the work area and/or shielding the lights. Utility agreements will be completed to coordinate utility relocations.

4.24.12.2 Mitigation Measures for Air Quality Impacts due to Construction

The contractor will be required to provide the following mitigation measures to preserve air quality during construction:

- **Fugitive-Dust Control.** The contractor will maintain a fugitive-dust-control program. This program will include wetting excavation areas, unpaved parking and staging areas, and onsite stockpiles of debris, dirt, or dusty material to reduce windblown dust.
- **Street Sweeping.** The contractor will use street-sweeping equipment where needed.
- **Equipment Emissions.** The contractor will shut off construction equipment when it is not in direct use to reduce emissions from idling.

Other mitigation measures that could be implemented to minimize air quality impacts include the following:

- Use newer, cleaner-emitting construction equipment and properly maintain the equipment.
- Install control equipment on diesel construction equipment (such as particulate filters or traps, oxidizing soot filters, and oxidation catalysts) to the extent that is feasible.
- Reroute truck traffic away from schools and communities when reasonably practical.
- Consider the use of alternate engines and diesel fuels such as electric engines, engines that use liquefied or compressed natural gas, diesel engines that meet EPA 2007 regulations, diesel engines fueled with low-sulfur fuel, and diesel engines outfitted with catalyzed diesel particulate filters and fueled with low-sulfur fuel (less than 15 ppm sulfur).

4.24.12.3 Mitigation Measures for Water Quality Impacts due to Construction

To minimize the temporary impacts to water quality, a UPDES General Storm Water Discharge Permit will be required. As part of the requirements of the permit, the contractor will be required to develop and implement a Storm Water Pollution Prevention Plan.

The plan will contain provisions for controlling the stormwater in the project area to reduce erosion and siltation.

4.24.12.4 Mitigation Measures for Noise Impacts due to Construction

To reduce temporary noise impacts associated with construction, the contractor will comply with all state and local regulations relating to construction noise. Measures for reducing construction noise include limiting construction in residential areas during nighttime hours, locating rock-crushing activities away from residential areas, and placing temporary barriers. Each construction area will be evaluated for the appropriate measures to use.

4.24.12.5 Mitigation Measures for Visual Impacts due to Construction

The contractor will prepare and implement an appropriate seeding vegetation and/or landscaping plan to restore or enhance aesthetics at the completion of the project. The contractor will also be required to maintain and keep the storage area for equipment, materials, and other accessories in a reasonable condition of cleanliness and orderly placement to avoid an unpleasant appearance. The contractor will promptly remove unused or unnecessary traffic-control equipment.

4.24.12.6 Mitigation Measures for Utility Service Impacts due to Construction

The project specifications will require the contractor to coordinate with the utility companies to plan work activities so that utility disruptions to a business occur when the business is closed or during off-peak times. Before beginning work, the contractor is required to contact Blue Stakes to identify the location of all utilities. The contractor will be required to use care when excavating to avoid unplanned utility disruptions. If utilities are unintentionally disrupted, UDOT will work with the contractor and the utility companies to restore service as quickly as possible.

4.24.12.7 Mitigation Measures for Traffic Impacts due to Construction

The contractor will be required to develop a maintenance of traffic plan that defines measures to minimize construction impacts on

traffic. A general requirement of this plan is that, to the extent reasonably practical, safe access to businesses and residences must be maintained and existing roads must be kept open to traffic unless alternate routes are provided. However, prior to construction of each phase, the project team will coordinate with business and property owners to identify where temporary access can be shared and to define timeframes (such as night) when access is not needed. Signs will be placed to notify motorists where business access is provided. Finally, information will be made available to the public detailing construction activities and providing alternate transportation routes.

Even with the implementation of the maintenance of traffic plan, short-term increases in traffic congestion would occur in the vicinity of S.R. 108 construction. Street closures would be limited to what is specified in the maintenance of traffic plan as approved by UDOT before the start of construction.

4.24.12.8 Mitigation Measures for Economic Impacts due to Construction

Access to businesses will be maintained during the construction and post-construction phases of this project, as this is UDOT's policy with respect to access issues on all UDOT roadway improvement projects. For each phase of the project, the project team will coordinate with property owners and businesses to evaluate ways to maintain access while still allowing efficient construction operations. This could entail sharing temporary access or identifying acceptable timeframes when access is not needed. Adequate signage will be placed in construction areas to direct motorists to businesses and industrial areas. Other potential mitigation measures for construction impacts include:

- Provide a frequent newsletter to all businesses along S.R. 108 describing the progress of the construction and upcoming construction events.
- Provide business access signs along S.R. 108 that identify business access points within the construction limits.
- Hold a monthly meeting with business owners to inform them of upcoming construction activities and to provide a forum for the businesses to express their concerns with the project.

- To minimize noise and light impacts at night, conduct major construction activities in residential areas during the day.

4.24.12.9 Mitigation Measures for Hazardous Materials Impacts due to Construction

To minimize the risk of exposure to hazardous materials, the UDOT project team will coordinate with DERR, the construction contractor, and the appropriate property owners. This coordination will involve determining the status of the sites of concern, identifying newly created sites, identifying the nature and extent of remaining contamination (if any), and minimizing the risk to all parties involved.

Measures will be implemented to prevent the spread of contamination and to limit worker exposure. Site investigations will determine the chemical hazard, if any, and the appropriate protection measures. In the case of an identified chemical hazard, the site remedy will be negotiated through coordination with DERR.

Previously unidentified sites or contamination could be encountered during construction. In such a case, all work will stop in the area of the contamination according to UDOT Standard Specifications, and the contractor will consult with UDOT and DERR to determine the appropriate remedial measures. Hazardous wastes will be handled according to UDOT Standard Specifications and the requirements and regulations of UDEQ

4.24.12.10 Mitigation Measures for Construction Staging and Material Borrow Areas

Earth-disturbing activities are generally confined to the limits of cut and fill, although staging areas and some construction activity might be located outside the limits of cut and fill. Any staging areas or construction fill material areas will need to be coordinated with UDOT to ensure that no sensitive environmental resources are affected. The contractor will limit impacts and restore any disturbed vegetation or other improvements within the selected staging areas.

4.24.12.11 Mitigation Measures for Invasive Species Impacts due to Construction

To mitigate the possible introduction of invasive weeds due to construction activities, the invasive weed BMPs in UDOT's current Standard Specifications for Road and Bridge Construction will be implemented and monitored and included in the plans and specifications for the project.

- The contractor will be required to follow noxious weed mitigation and control measures identified in UDOT Standard Specifications for Invasive Weed Control.
- Strictly following BMPs will also reduce the potential for weed infestations.
- Reseeding with native plants, followed by monitoring seedlings and invasive species until the vegetation has re-established, will mitigate direct-disturbance impacts and reduce the potential for weed invasions. UDOT will be responsible for monitoring and determining when vegetation becomes re-established.

4.24.13 Mitigation Measures for Impacts to Irretrievable Resources

Mitigation for the demolition of historic buildings consists of performing an intensive-level site survey, which preserves information about historic structures through documentation. See Section 4.14, Impacts to Historic, Archaeological, and Paleontological Resources, for more information.