3.6 Transportation Services

The transportation system in the study area has five major components:

- Freeways and local streets
- The Reno-Tahoe International Airport
- Pedestrian and bike routes
- Bus transit
- Rail

For each of these transportation system components, this section describes the transportation system as it exists today, lists the potential impacts of the No Build Alternative and Alternatives 1, 2, and 3, and identifies mitigation measures to address adverse impacts.

TRANSPORTATION PLANNING COMPATIBILITY

It is important that transportation projects are consistent with the goals of statewide and regional transportation plans. Table 3.6-1 summarizes relevant transportation planning documents from NDOT and the Regional Transportation Commission of Washoe County (RTC). Common themes in these plans are providing adequate capacity for future growth and improving safety while also incorporating and encouraging alternative modes of travel such as pedestrian, bike, and transit. Each plan refers to relevant components of the Spaghetti Bowl Project.

Southbound US 395 approaching the Spaghetti Bowl.

Table 3.6-1. Summary of Relevant Transportation Plans

Plan	Summary
	NDOT
2019-2022 Statewide Transportation Improvement Program (https://www.nevadadot.com/projects-programs/proposed-transportation-projects)	The Statewide Transportation Improvement Program is the state's transportation capital improvement program for federal fiscal years 2019-2022. It includes federally funded and regionally significant projects across the state. The first phase of the Spaghetti Bowl Project is funded and is included in this plan.
2017 NDOT Nevada State Freight Plan (https://www.nevadadot.com/mobility/freight-planning/nevada-freight-plan)	The statewide intermodal freight plan for Nevada provides a strategic framework enhancing freight mobility in the state. Reno-Sparks-Carson City is identified as one of two primary freight hubs in the state, and I-80 is the primary freight corridor connecting to hubs outside of Nevada. The plan also recognizes potential for freight connections between Union Pacific's Sparks rail yard, the freeway, and between the airport and the freeway. The plan's list of priority freight projects for the Reno-Sparks region identifies several freeway improvements as "critical" to improving freight shipping in northern Nevada: • Spaghetti Bowl improvements • US 395 widening and interchange improvements, I-80 to Parr Boulevard • I-80 widening from McCarran Boulevard to Vista Parkway The list also includes widening I-580 to 8 or 10 lanes, with interchange improvements, as "very important."
One Nevada Transportation Plan (http://onenvplan.com/) This plan is under development.	The One Nevada Transportation Plan is the statewide long range transportation plan and is still under development. NDOT is studying the existing roadway inventory and travel demand modeling as a basis for the plan. The Spaghetti Bowl improvements are being incorporated into this plan.
	Regional Transportation Commission
2040 Regional Transportation Plan (https://www.rtcwashoe.com/mpo-projects/rtp/)	This plan identifies the RTC's long-term transportation investments that will be made in Reno-Sparks through the year 2040. It includes reconstructing the Spaghetti Bowl and widening I-80 and I-580/US 395.
2018-2022 Regional Transportation Improvement Program (https://www.rtcwashoe.com/mpo-projects/rtip-stip/)	The Regional Transportation Improvement Program is the list of prioritized highway, transit, bike, and pedestrian projects that will be implemented in Washoe County over the next 5 years. Fully funded projects listed in the 2040 Regional Transportation Plan are advanced to the Regional Transportation Improvement Program. The first phase of the Spaghetti Bowl Project is included in the Regional Transportation Improvement Program.

EXISTING CONDITIONS

Freeways and Local Streets

Chapter 1, Why is the Project Needed?, describes the Spaghetti Bowl, I-80, and I-580/US 395 in the study area, the local street network, and the causes for congestion and safety problems on the freeways. Appendix A, Existing Freeway Conditions Report, provides a detailed description of the freeways.

Reno-Tahoe International Airport

The Reno-Tahoe International Airport is east of I-580 at Plumb Lane. Two routes provide access to the airport from I-580:

- Plumb Lane to the main airport entrance a few hundred feet east of I-580.
- A southbound off-ramp and a northbound on-ramp that connect directly to/from the airport circulation roads and I-580.

The Reno-Tahoe Airport Authority recently updated the *Reno-Tahoe International Airport Master Plan*, which will guide development at the airport for the next 20 years based on forecasts of future passenger and air cargo demand (Reno-Tahoe Airport Authority, 2018). The master plan assumes that access between I-580 and the airport will remain essentially the same.

There are three paths for pedestrians and bikes in the study area, including the Truckee River Trail, as well as shared-use paths on the north side of I-80 and along the south bank of the Truckee River.

Ninth Street near the underpass at US 395, facing east.

Pedestrians and Bikes

Sidewalks, bike lanes, and shared-use paths are important parts of the local transportation system, providing alternative modes of travel, helping to encourage healthy lifestyles, and reducing the number of vehicles on the road and air pollution.

Sidewalks are on at least one side of all local streets in the study area. Along Oddie Boulevard, the sidewalks are gravel, but all other sidewalks are concrete paved.

Fourteen streets in the study area have designated bike lanes. Eight of these streets connect to freeway interchanges. There is a cycle track (exclusive bike lanes separated from sidewalks and motor vehicle traffic) on the north side of Victorian Avenue between Seventh Street (one block east of Pyramid Way) and Nichols Boulevard, continuing north on Nichols Boulevard to McCarran Boulevard.

There are also three paths for pedestrians and bikes in the study area. The most prominent is the Truckee River Trail that passes beneath I-580 along the north bank of the Truckee River (part of the Tahoe-Pyramid Bikeway, discussed in Chapter 6, Final Section 4(f) Evaluation and Section 6(f) Assessment). There are also shared-use paths on the north side of I-80 between Wells Avenue and Valley Road, and along the south bank of the Truckee River east of I-580.

The Regional Transportation Plan includes several proposed pedestrian and bike improvements along local streets in the study area (RTC 2017). In addition, the RTC is studying options for extending the path along the south bank of the Truckee River west beneath I-580.

Bus Transit

This section describes existing intracity and intercity bus transit.

The RTC RIDE is the public transit bus system serving the greater Reno-Sparks area (a map of the RIDE bus system is available at the RTC website https://www.rtcwashoe.com/). Eighteen bus routes cross through the study area on streets with freeway interchanges, and several others use streets that cross over or under the freeways. No RTC RIDE bus routes travel along the freeways within the project limits.

Three transit hubs serve the RTC RIDE bus system. Centennial Plaza is adjacent to I-80 on Victorian Avenue in downtown Sparks. The Centennial Plaza opened in 2008 after a 10-year planning effort, and it cost approximately $30 million to build. Six RTC RIDE routes connect at Centennial Plaza. The other two stations—the Fourth Street Station in downtown Reno and the Meadowood Mall Station—are outside the study area but provide connections for routes in it. The Prater Way/Fourth Street Bus Rapid Transit Project, which is under construction, crosses under I-580 and provides a direct, express connection between the Fourth Street Station and Centennial Plaza.

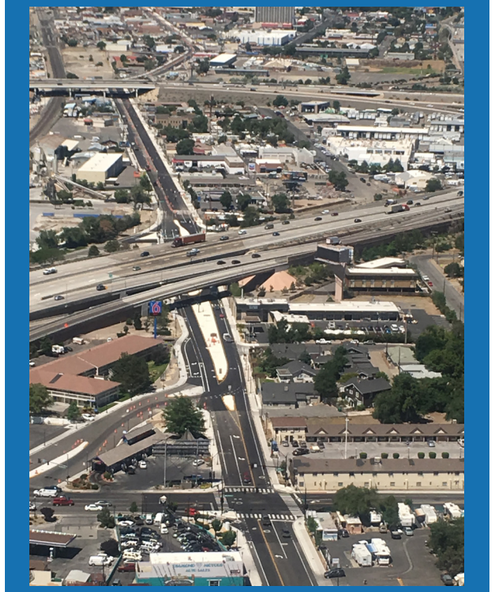
The RTC Villanova Maintenance garage is mostly beneath I-580, between Villanova Drive and Plumb Lane. Access to the maintenance garage is from Villanova Drive. The RTC has leased the site from NDOT since 1983 for its bus terminal, maintenance garage, and administrative offices. The lease allows either RTC or NDOT to terminate the lease with prior notice for good cause, including NDOT expansion or improvement to I-580. RTC recently expanded the bus storage and maintenance capacity of the building.

The Reno-Sparks Indian Colony operates a daily intracity transit service for its residents to the Reno-Sparks area.

The bus travels Second Street, Kietzke Lane, and Victorian Avenue, where it stops at the RTC Centennial Plaza, and then travels Pyramid Highway to the Hungry Valley Community Center north of Sparks.

RTC INTERCITY provides bus service between the RTC Fourth Street Station and Carson City via I-80 and I-580. This service carries over 36,000 passengers per year. Several private intercity bus companies stop at the Centennial Plaza station. They include the Silverado Mainline bus service that runs daily between Centennial Plaza and Las Vegas along I-80 and I-580. Incoming buses from eastbound I-80 exit to Nugget Avenue, and then turn north on Victorian Plaza Circle to Centennial Plaza. Outgoing buses follow Victorian Avenue to Rock Boulevard to westbound I-80.

Greyhound and Megabus also provide intercity service. Greyhound lines use I-80, stopping only at the Greyhound station in downtown Reno. Megabus also uses I-80 but has no stops in Reno or Sparks.



The Prater Way/Fourth Street corridor was reconstructed for bus rapid transit and improved bicycle and pedestrian travel. I-80 crossing is in the foreground, with I-580 in the distance.

Rail

Union Pacific Railroad operates two freight lines in the study area. A double-track line is parallel to and south of I-80 and crosses beneath I-580 in the study area. The Sparks rail yard is along this line, adjacent to Nugget Avenue from Pyramid Way to Rock Boulevard. The second Union Pacific rail line crosses over I-80 at Record Street.

Amtrak provides intercity passenger rail to Reno-Sparks along the Union Pacific track that parallels I-80.

Centennial Plaza is between I-80 and Victorian Avenue.

Union Pacific Railroad under I-580.

TRANSPORTATION SERVICES IMPACTS

Alternatives 1, 2, and 3 would improve traffic flow and safety along the freeways and local streets at the interchanges. They would change some freeway access points and would affect some local streets adjacent to the freeway where the freeway would be widened, and freeway ramps would move. The freeway widening and new ramp locations would impact other transportation features, such as bus transit buildings and routes, depending on the alternative.

Chapter 2, Range of Alternatives Considered and Identification of Preferred Alternative, describes how Alternatives 1, 2, and 3 would improve freeway operations, improve traffic flow on local streets at freeway ramp intersections, and improve safety. Table 3.6-2 compares the impacts of the No Build Alternative and Alternatives 1, 2, and 3 on the various components of the transportation system.

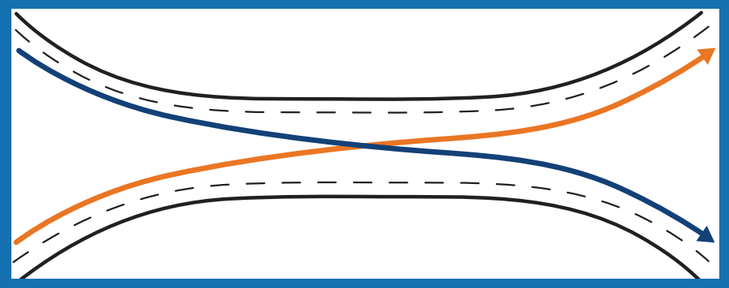
The construction costs listed in Table 3.6-2 include construction, design, real estate acquisition, utility relocation, and construction management. The No Build Alternative would not have construction costs; however, it would have higher maintenance costs because I-80/I-580/US 395 would need more maintenance. Maintenance costs of Alternatives 1, 2, and 3 would be less than the No Build Alternative because the pavement and bridges would be new.

The cost in 2018 dollars listed in Table 3.6-2 for Alternatives 1, 2, and 3 represents the estimated total project cost as if it would all be constructed this year. However, since the project would be constructed over 20 years, inflation causes the cost to increase. Year-of-expenditure cost is the total project cost including inflation.

Alternatives 1, 2, and 3 would all greatly reduce freeway travel delays during rush hours and improve safety compared to the No Build Alternative.

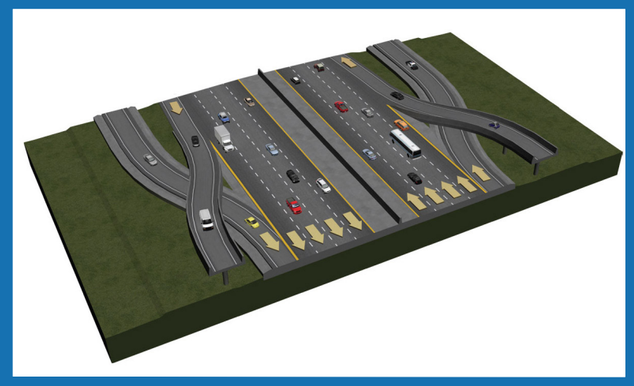
Alternative 2 would reduce delay and improve travel speeds better than Alternatives 1 and 3.

Weaving



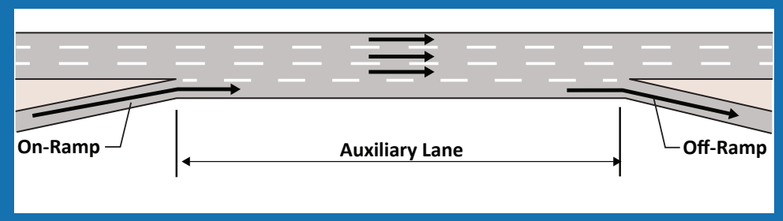
Weaving is the crossing of two or more traffic streams traveling in the same direction. For example, weaving occurs when an interchange entrance ramp is followed by an exit ramp. The most critical aspect of operation within a weaving segment is lane changing. The configuration of the weaving segment (i.e., the relative placement of entry and exit lanes) has a major effect on the number of lane changes required of weaving vehicles to successfully complete their maneuver.

Ramp Braiding



Ramp braids are freeway on- and off-ramps that are close to one another and built so one ramp crosses over the other. Ramp braids eliminate the need for weaving.

Auxiliary Lanes



Auxiliary lanes are lanes between on- and off-ramps for speed changes, weaving, and maneuvering of entering and leaving traffic.

Table 3.6-2. Transportation Changes

	No Build	Alternative 1	Alternative 2 (Preferred Alternative)	Alternative 3
		Freeway Access Changes		
Depending on the alternative, drivers would need to travel farther to get on the freeway in a few places. None of the access changes for Alternative 1, 2, or 3 would make trips more than 1 mile longer. The additional travel time would be outweighed by shorter travel times on the freeways and less delay on local streets at the ramp intersections during rush hours.				
I-80	No change	• Prater Way/Fourth Street and Kietzke Lane combined as a split diamond interchange. • Rock Boulevard interchange remains.	• Kietzke Lane interchange to replace the Prater Way/Fourth Street interchange, with no measurable impact on travel time to/from the freeway. • Rock Boulevard interchange closed. Frontage roads would connect to Kietzke Lane, and Nugget Avenue would be converted to a two way street to Pyramid Way (Figure 3.6-1).	• No freeway access at Prater Way/Fourth Street or Kietzke Lane. Travel to/from the freeway could increase by approximately 0.5 mile or about 2 to 3 minutes. • Rock Boulevard interchange remains.
I-580/US 395	No change	• Prater Way/Fourth Street exit on I-80 would not be directly accessible from northbound I-580. Ramp from Glendale Avenue/Second Street added to connect to Fourth Street. • Reconstructed Plumb Lane interchange on I-580 would remove the ramps at Villanova Drive. The Plumb Lane interchange would remain a single-point diamond. Travel to/from the freeway could increase by up to 0.6 mile, or about 2 to 3 minutes.	• North and west of the Spaghetti Bowl, access to I-580/US 395 and I-80 would be split between the Oddie Boulevard interchange (connecting to I-580/US 395 only) and the Wells Avenue interchange (connecting to I-80 and I-580/US 395, but there would be no access to Wells Avenue from I-580/US 395). Travel to/from the freeways could increase by 2 to 3 minutes. • Reconstructed Plumb Lane interchange on I-580 would remove the ramps at Villanova Drive. The Plumb Lane interchange would be converted to a diverging diamond interchange. Travel to/from the freeway in the area could increase by up to 0.6 mile, or about 2 to 3 minutes.	• Glendale Avenue/Second Street and Mill Street interchanges would be replaced with a shared buttonhook interchange. Southbound traffic to Glendale/Second Street would travel about 0.5 mile (1 to 2 minutes) farther, and northbound traffic to Mill Street would travel about 1 mile (2 to 3 minutes) farther. • Center Street bridge would be removed, the westbound off-ramp and eastbound on-ramp would connect to Virginia Street. There would be minimal impact on travel distances or times to/from the freeway.
Construction impacts	None	During construction, traffic would be diverted from parts of I-80/I-580/US 395, especially when Spaghetti Bowl or service interchange ramps are closed. There would be temporary closures to streets around the Spaghetti Bowl that would require detours. NDOT would evaluate detour routes to determine if improvements to those routes are necessary because of increased traffic volumes. Construction is tentatively anticipated to occur in five phases from 2020 to 2039: • Phase 1: Construct two ramps within the Spaghetti Bowl, the Second Street/Glendale Avenue interchange, and the Mill Street interchange (southbound only), and open a third southbound lane along I-580/US 395 through Spaghetti Bowl (2020-2022). NDOT calls Phase 1 the Spaghetti Bowl Xpress. • Phase 2: Construct east leg (2023-2025) • Phase 3: Construct north leg (2027-2029) • Phase 4: Construct remaining south leg not completed in Phase 1 (2035-2037) • Phase 5: Construct remaining Spaghetti Bowl ramps and west leg (2037-2039) Each Spaghetti Bowl ramp (for example, eastbound to northbound ramp, southbound to eastbound ramp) would be closed at some point during construction. However, there would be no long-term closures of the Spaghetti Bowl. I-80 would remain open all through construction, although some lanes would be closed. I-580/US 395 would also remain open, with lane closures. Short-term closures for removing or installing bridge girders or moving traffic to newly built roadways between stages may reduce the number of lanes. Each service interchange is expected to be under construction for 1 to 2 years, meaning each on- and off-ramp would be closed for some duration within that time.		

FHWA has the responsibility to approve new or revised access points to the interstate system under U.S.C. Title 23, Section 111. A separate technical report was submitted to FHWA for determination of safety, operations, and engineering acceptability of the changes to the interstate proposed by this project (Appendix H). Consideration of all the social, economic, and environmental impacts and planning considerations are addressed in the NEPA documentation of this project.

Table 3.6-2. Transportation Changes (continued)

	No Build	Alternative 1	Alternative 2 (Preferred Alternative)	Alternative 3
Reno-Tahoe International Airport Access				
Changes in airport access from I-580	No change	• Removes direct access ramps; all access would be from Plumb Lane (Figure 3.6-2). The Plumb Lane interchange would be reconstructed, removing the Villanova Drive ramps and frontage roads and improving traffic movement at the ramp intersections. This change would add approximately 1 to 2 minutes of travel time to the airport from southbound I-580 but no additional travel time from the airport to northbound I-580. • Access to southbound I-580 and from northbound I-580, which is currently from the Plumb Lane interchange, would be unchanged. • The Reno-Tahoe Airport Authority opposes removing these two direct ramps.	• Provides southbound I-580 direct-connect ramp to the airport. Removes direct-connect ramp to northbound I-580. • Access to southbound I-580 and from northbound I-580, which is currently from the Plumb Lane interchange, would be unchanged. • This is a design change since the Draft EIS. The Reno-Tahoe Airport Authority supports this revised alternative. See the Airport Access Options section in Chapter 2.	No change
Construction impacts	None	None of the alternatives would affect air traffic during construction. Reconstructing the Plumb Lane interchange ramps may cause interruptions in access to and from Reno-Tahoe International Airport. While the Plumb Lane interchange is closed, drivers may use the direct-connect ramps or adjacent interchanges to get to the airport. Under Alternatives 2 and 3, minimal interruptions would occur during the reconstruction of direct-connect ramps. NDOT would work with Reno-Tahoe Airport Authority to develop a construction access plan for the airport.		

Figure 3.6-1. New Connections between I-80 and Rock Boulevard with Alternative 2 (Preferred Alternative)

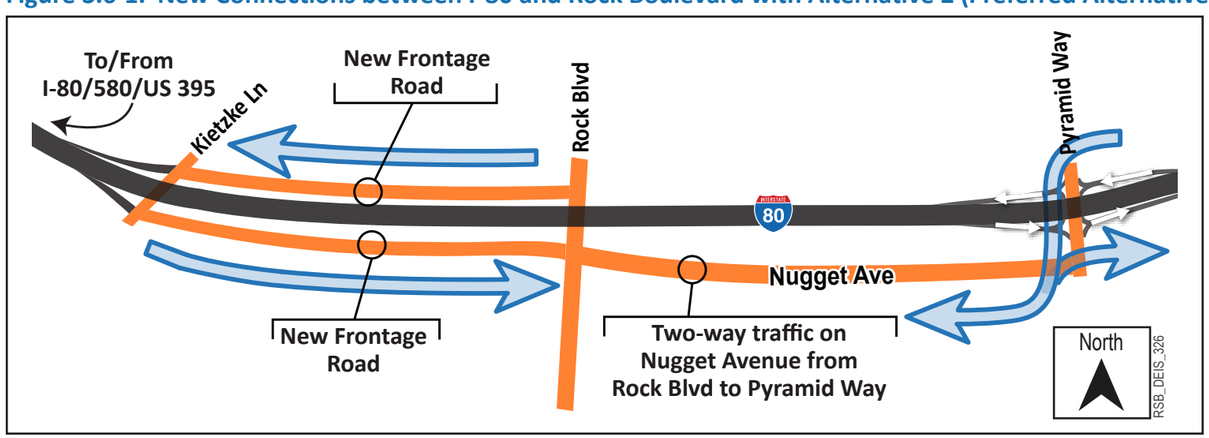


Figure 3.6-2. Airport Access Changes with Alternative 1

Alternative 1 would remove two freeway access ramps.

Table 3.6-2. Transportation Changes (continued)

	No Build	Alternative 1	Alternative 2 (Preferred Alternative)	Alternative 3
		Pedestrians and Bicyclists		
Changes to sidewalks, pedestrian trails, bicycle lanes, and shared-use paths	No change	• Closes Ninth Street at US 395 underpass. Bicyclists and pedestrians would have to travel 0.5 mile north to Oddie Boulevard or 0.25 mile south to Prater Way/Fourth Street. • Closes Victorian Avenue to bicyclists and pedestrians at Pyramid Way. • Adds sidewalks along Rock Boulevard south from Victorian Avenue to Nugget Avenue, and along Nugget Avenue from Rock Boulevard to 15th Street. • Adds bike lanes along Glendale Avenue/Second Street through the interchange area. • Accommodates planned shared-use path under I-580 at the Truckee River.	• Connects Ninth Street east of US 395 underpass to Tenth Street west of the freeway. Through travel maintained. • Adds sidewalks along Rock Boulevard south from Victorian Avenue to Nugget Avenue, and along Nugget Avenue from Rock Boulevard to 15th Street. • Adds bike lanes along Glendale Avenue/Second Street through the interchange area. • Accommodates planned shared-use path under I-580 at the Truckee River.	• No change to Ninth Street pedestrian or bicycle travel. • Removes the Center Street bridge over I-80. Travel over I-80 maintained via Virginia Street, Sierra Street, and Evans Street. • Adds bike lanes along Glendale Avenue/Second Street through the interchange area. • Accommodates planned shared-use path under I-580 at the Truckee River.
Construction impacts	None	Construction could affect the routes taken by pedestrians and bicyclists along the streets in the study area. Pedestrian and bicycle traffic along the street network adjacent to I-80/I-580/US 395 could be restricted or detoured during demolition and construction. The Truckee River Trail/Tahoe-Pyramid Bikeway would have short-term closures and would require a detour for a few blocks where it crosses under the freeway. NDOT would work with the City of Reno to plan this detour route while the trail is closed.		

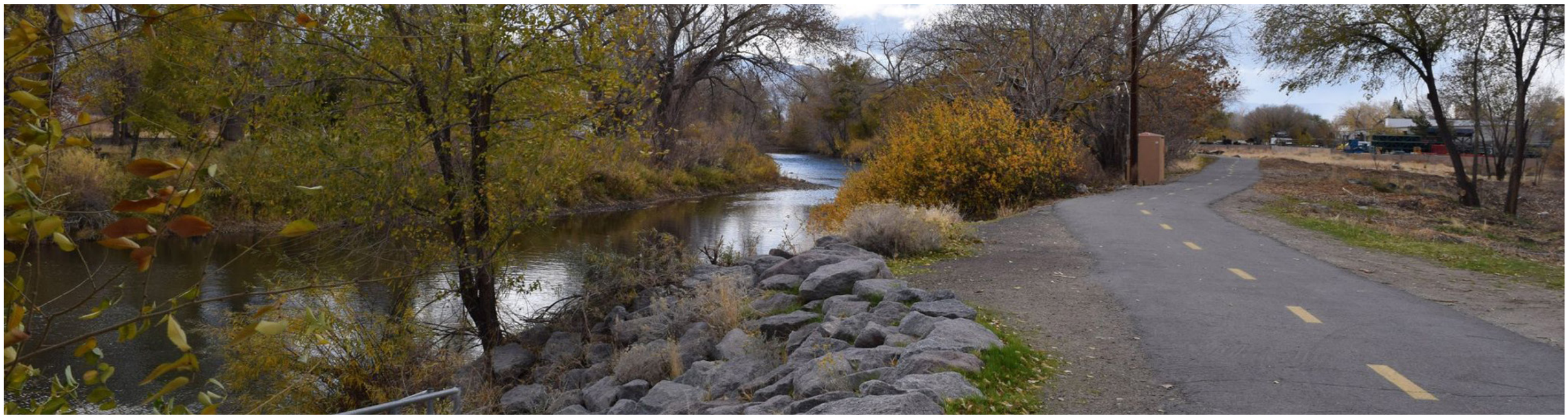


Table 3.6-2. Transportation Changes (continued)

	No Build	Alternative 1	Alternative 2 (Preferred Alternative)	Alternative 3
Bus Transit				
Impacts to bus routes, buildings, stations, or stops	No changes	Displaces the RTC Villanova Bus Maintenance Facility under I-580. According to the RTC, the recent improvements at the garage provide the necessary capacity for about 10 years. Beyond that, planned future expansion of the bus fleet will likely require more maintenance and storage space than the garage can provide, causing RTC to relocate to another, larger site or add a second maintenance and storage location even without the Spaghetti Bowl Project. Based on NDOT's current construction phasing plan, this segment of I-580 may not be reconstructed until the mid 2030s, so RTC may need to relocate the bus maintenance facility prior to that.		No changes
		• Displaces the Centennial Plaza in Sparks, affecting six intracity bus routes, the Reno-Sparks Indian Colony bus route, and two intercity bus routes. • Bus Routes 2 and 2s on Ninth Street would likely be diverted to Oddie Boulevard to cross the freeway. Route 21 along Victorian Avenue would divert north to C Street to cross Pyramid Way. Depending on where the RTC would divert these routes, riders may need to walk several blocks farther to the nearest bus stop.	• Diverts two bus routes along Ninth Street east of US 395 to Tenth Street west of the freeway. The new route could cause riders to walk from one to three blocks farther to reach the nearest bus stop. • Intercity buses that stop at Centennial Plaza would use new frontage roads between Kietzke Lane and Rock Boulevard and Nugget Avenue to access Centennial Plaza from I-80, much as they do today (see Figure 3.6-3).	
Construction impacts	None	Street closures and freeway entrance and exit ramp closures may require bus route modifications. Construction may intermittently impact RTC routes that cross over or under the freeway, as well as the intercity buses that use I-80 or I-580 to travel through the region. Construction may result in temporary bus stop relocations or closures, route detours, or suspensions of service on segments of routes operating on streets closed because of construction at interchange ramp terminals. NDOT and the RTC would reevaluate transit routes potentially affected by the project to minimize disruption to transit service.		
Rail				
Construction impacts	None	There may be minimal interruptions to freight and passenger rail service during construction of the I-580 bridge over the railroad tracks and reconstruction of the railroad bridge over I-80. For the Union Pacific Railroad tracks over I-80, service would remain on the existing bridge while a new bridge is built. There would be a short-term closure (a few days) of the tracks when the final connection between the old bridge and the new bridge is completed.		

Alternative 1 would have the greatest impact to bus transit. It would displace the Centennial Plaza and stops for the Reno-Sparks Indian Colony transit, RTC INTERCITY, and Silverado Mainline. It would also close Ninth Street beneath US 395, which would divert parts of Routes 21, 2, and 2s.

Figure 3.6-3. Intercity Transit Routes to Centennial Plaza under Alternative 2 (Preferred Alternative)

Buses would exit at Kietzke Lane, travel to Rock Boulevard along the frontage road, and then connect to Victorian Plaza Circle.

Table 3.6-2. Transportation Changes (continued)

	No Build	Alternative 1	Alternative 2 (Preferred Alternative)	Alternative 3
Local Street Changes				
Ninth Street under US 395 (Figure 3.6-4)	No change	Closed to traffic. Traffic would have to travel 0.5 mile north to Oddie Boulevard or 0.25 mile south to Prater Way/ Fourth Street. Both streets would have capacity for the small amount of traffic diverted from Ninth Street, which is only about 500 cars during the peak hour.	Ninth Street (east of US 395) would connect to Tenth Street (west of US 395) to maintain through traffic. The realignment would shift through traffic to Tenth, Eleventh, and Sage streets. These streets would have enough capacity for the small amount of traffic along Ninth Street, about 500 cars during the peak hour.	No change
Northeast of Spaghetti Bowl (Figure 3.6-4)	No change	Streets dead-ended: • Inyo Way/Trident Way • Orchid Way • Lilac Lane	Streets dead-ended: • Orchid Way • Lilac Lane	No change
Northwest of Spaghetti Bowl (Figure 3.6-4)	No change	Tenth Street ended at Goldfield Street. Streets dead-ended: • Manhattan Street • Butler Street	Manhattan Street ended at Tenth Street. Butler Street ended at Carville Street.	No change
Southeast of Spaghetti Bowl (Figure 3.6-4)	No change	Streets removed: • Depaoli Street • Ferrari Street • Tacchino Street Fifth Street dead-ended.	Tacchino Street removed. Depaoli Street dead-ended.	No change
Southwest of Spaghetti Bowl (Figure 3.6-4)	No change	No change		

Will Connected and Autonomous Vehicles Affect the Project?

Washoe County staff, Reno Neighborhood Advisory Boards, and University of Nevada, Reno staff suggested that NDOT consider the potential impacts of connected and autonomous vehicles (CAVs) on the freeways in its project planning. CAVs are not only "self-driving" but are also connected to a data network to help manage traffic congestion, vehicle and pedestrian safety, and emissions. There are theoretical advantages to traffic flow and safety once CAVs are a substantial percentage of freeway traffic. Common use of CAVs will likely increase highway capacity, because they reduce the distances between vehicles. Also, CAVs will greatly reduce the frequency of crashes and crash-related congestion. With autonomous control, agencies could build narrower lanes and provide more lanes (and more capacity) in the same width of roadway.

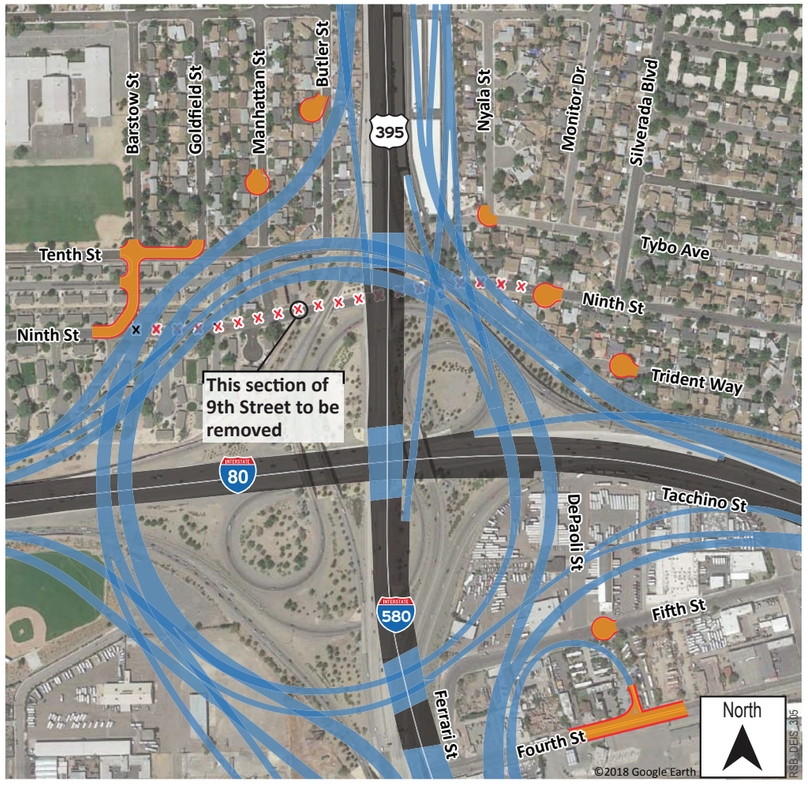
However, the timeline for CAVs to become more common and the impact on traffic operations cannot be fully assessed. In the short-term, a mix of CAVs and traditional vehicles could reduce highway capacity, because CAVs operate at lower speeds and because human drivers generally drive with more distance between vehicles than CAVs require. In addition, human driving behavior around CAVs could cause further traffic congestion. In the long-term, as CAVs become more common, the number of vehicles on the road could increase as travel patterns change. Longer trips, more frequent trips, and CAVs carrying no passengers or people who currently cannot drive are all likely to occur, which would increase traffic.

Another unknown is how the cost of CAVs could cause a shift in ownership. New, fail-safe technology could make CAVs more expensive to own, which could shift people away from private ownership and toward use of shared-ride services, such as Uber and Lyft. A change in car ownership could have a substantial but unknown effect on travel behavior and traffic operations.

In summary, there are many unknown factors that could determine how CAVs will affect traffic operations. Therefore, NDOT is relying on the latest traffic models and growth projections to design each alternative and to evaluate their future traffic conditions. Including infrastructure needed to support CAVs, such as data and power networks, in the design of the freeway system will be assessed as CAV technology progresses.

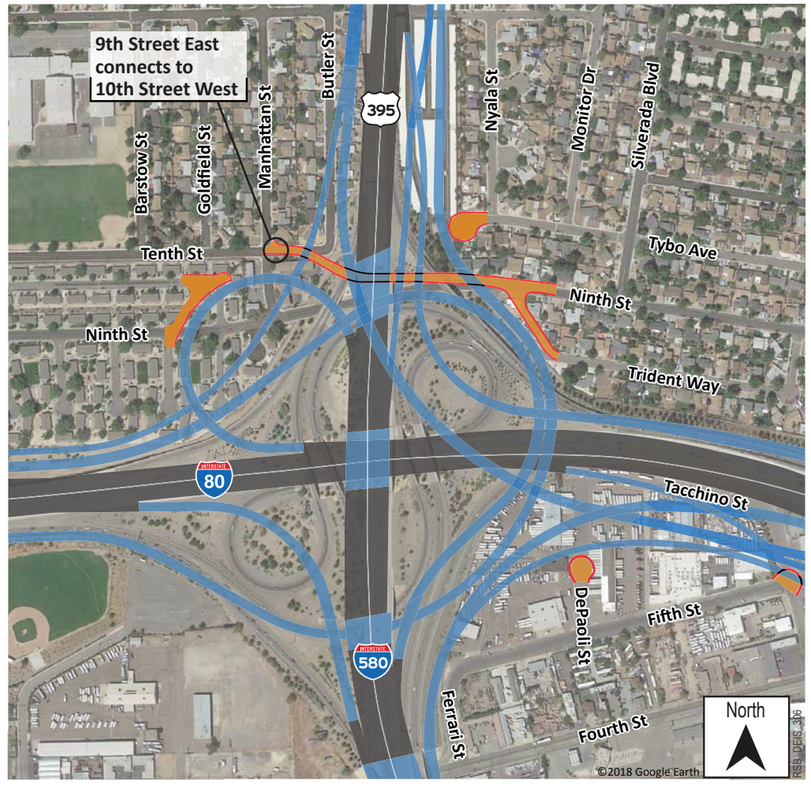
Figure 3.6-4. Local Street Changes Around Ninth Street

Alternatives



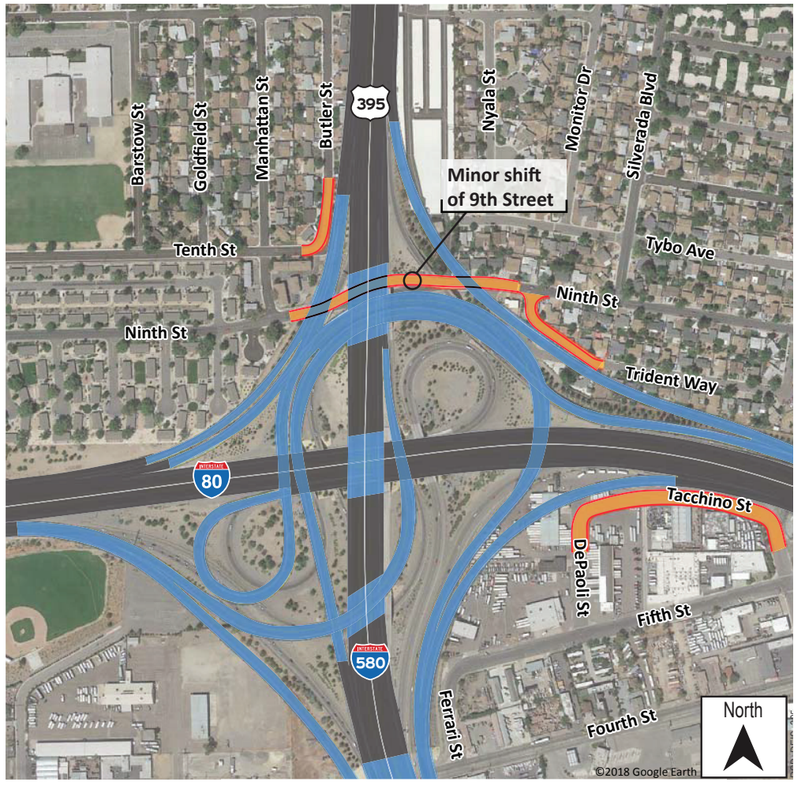
Alternative 1

Under Alternative 1, Ninth Street would no longer travel under US 395.



Alternative 2 (Preferred Alternative)

Under Alternative 2 (Preferred Alternative), through traffic would shift from Ninth Street to Tenth and Sage Streets.



Alternative 3

With Alternative 3, there would only be a minor shift of Ninth Street.

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Alternatives 1, 2, and 3 would partially or entirely remove some local streets, primarily around the Spaghetti Bowl. In most cases, the affected streets only provide access to properties that would be acquired for the project, so access would no longer be needed to these properties. Alternatives 1, 2, and 3 would preserve access to all remaining properties.

Table 3.6-2. Transportation Changes (continued)

	No Build	Alternative 1	Alternative 2 (Preferred Alternative)	Alternative 3
Local Street Changes (continued)				
South Leg (Figure 3.6-5)	No change	Matley Lane and Durham Road would become two-way streets that dead-end south of Villanova Drive to the Wooster High School parking lots to the west, and to the office building and hotel on the east side of I-580.	Matley Lane and Durham Road would become two-way streets that dead-end south of Villanova Drive to the Wooster High School parking lots to the west, and to the office building and hotel on the east side of I-580.	No change
West Leg (Figure 3.6-6 and Figure 3.6-7)	No change	No change	Seventh Street removed - Morrill Avenue to Sutro Street. Streets dead-ended: • Morrill Avenue • Spokane Street • Quincy Street	Seventh Street would end at Eureka Avenue west of Wells Avenue (Figure 3.6-6). Through traffic on Seventh Street would be diverted to Sixth Street, which would provide better traffic flow at the intersection with Wells Avenue. Sixth Street would still have adequate capacity for the additional traffic. Center Street bridge over I-80 would be removed (Figure 3.6-7). The remaining one block of Center Street north of I-80 would become a cul-de-sac similar to adjacent Lake Street. Sierra and Virginia streets would remain for north-south access across the freeway. Virginia Street would be widened for additional capacity to offset the removal of the Center Street bridge.
East Leg (Figure 3.6-8)	No change	"A" Street removed. Streets dead-ended: • 16th Street • 19th Street • 21st Street • 18th Street • 20th Street Victorian Avenue would be dead-ended west of Pyramid, and ended at Seventh Street east of Pyramid. Through traffic on Victorian Avenue would divert one block north to C Street (Figure 3.6-8). Intersections at C Street would be improved to compensate for the increased traffic. Nugget Avenue would be extended as a two-way street between Rock Boulevard and Pyramid Way.	Nugget Avenue would be extended as a two-way street between Rock Boulevard and Pyramid Way.	Alley between "A" Street and Victorian Way would be dead-ended east and west of Rock Boulevard.
Number of local streets removed or dead-ended	0	21	14	3
Construction impacts	None	Crossroads over or under the freeway may be closed for varying durations during construction. Access to residential and business driveways on the crossroads may be modified or closed for brief periods during construction as the driveway entrances are reconstructed. Temporarily closing freeway interchanges or streets diverts people from their normal routes and requires detours to get around construction. Designated detour routes control how people get around construction to maintain safety and keep traffic moving efficiently. Detour routes may require improvements to streets; on-street parking may be limited, restricted, or temporarily removed; and temporary traffic signals may be required at various street intersections to maintain acceptable traffic flow. Residences and businesses along these routes would see added congestion, traffic noise, and possibly parking limitations. Affected residents and business owners would be contacted by NDOT before construction with information on closures and detours.		

Figure 3.6-5. Local Streets at Villanova Drive and Plumb Lane under Alternatives 1 and 2

Alternative 1

Alternative 2

Frontage roads (Matley Lane and Durham Road) would be reconstructed for two-way access from Villanova Drive.

Figure 3.6-6. Seventh Street between Valley Road and Wells Avenue with Alternative 3

Part of Seventh Street would be closed to through traffic.

Figure 3.6-7. Center Street Bridge over I-80 Removed with Alternative 3

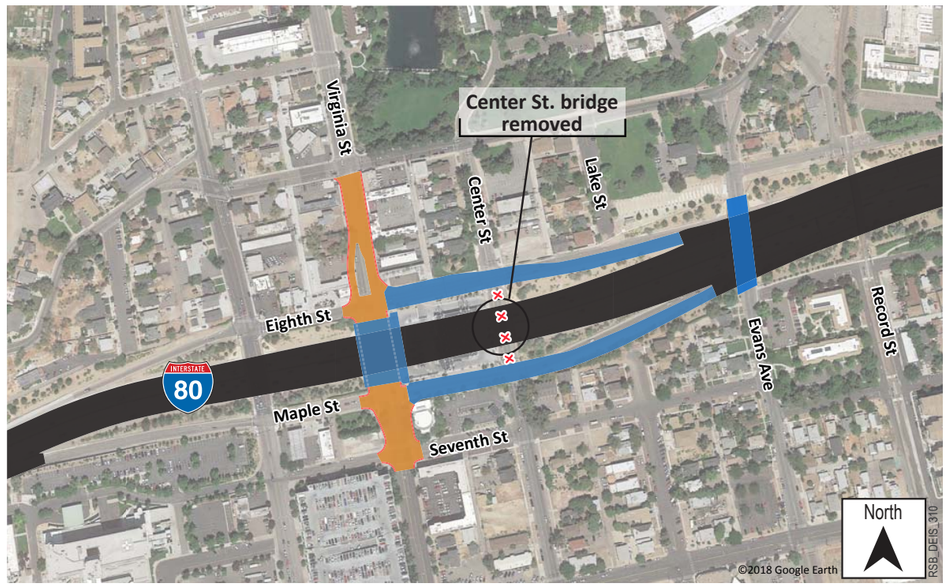

Figure 3.6-8. Victorian Avenue under Alternative 1

Through traffic on Victorian Avenue would shift to C Street.

Table 3.6-2. Transportation Changes (continued)

	No Build	Alternative 1	Alternative 2 (Preferred Alternative)	Alternative 3
		Construction Costs		
Cost in 2018 dollars	$0	$2.6 billion	$1.5 billion	$1.5 billion
Cost in year of expenditure dollars	$0 (The No Build Alternative would cost between $175 to $215 million in the short-term to replace the pavement and bridge decks most in need.)	$4.1 billion	$2.4 billion	$2.4 billion

MEASURES TO MINIMIZE AND MITIGATE ADVERSE TRANSPORTATION IMPACTS

From early in the alternatives development phase, NDOT has refined the design of Alternatives 1, 2, and 3 to avoid or minimize adverse effects on the transportation system while also meeting the project's goals. Table 3.6-3 summarizes potential transportation impact mitigation measures.

Table 3.6-3. Mitigation Measures for Transportation Impacts

	Alternative 1	Alternative 2 (Preferred Alternative)	Alternative 3
Pedestrian and Bicyclists	NDOT will coordinate with the RTC on planned pedestrian and bike improvements to incorporate them into Spaghetti Bowl Project design wherever practical. **Construction.** NDOT and FHWA will work with the cities of Reno and Sparks to identify pedestrian and bike route detours that may be needed during construction. Because the street network will remain largely unaffected by the proposed improvements, alternative routes for pedestrians and bicyclists will be readily available. NDOT, in coordination with the City of Reno, will temporarily move the affected portion of the Truckee River Trail/Tahoe-Pyramid Bikeway under I-580.		
Bus Transit	NDOT will assist the RTC to study potential new sites to relocate Centennial Plaza NDOT will work with the RTC, the Reno-Sparks Indian Colony, and intercity bus providers to relocate bus stations and routes.	NDOT will assist the RTC with modifying bus routes along Ninth Street, which could include modifying local streets and moving bus stops.	N/A
	NDOT will restore bus stops removed or relocated by the project, in cooperation with the RTC and in accordance with RTC standards, including Americans with Disabilities Act-compliant access. **Construction.** NDOT will avoid rerouting of heavily used transit routes, where feasible, and maintain Americans with Disabilities Act–compliant pedestrian access to transit stops and appropriate safe-street crossings.		
Freeways and Local streets	**Construction.** • NDOT will coordinate freeway and street lane closures to ease traffic disruptions to the extent possible. NDOT will not close consecutive service interchange ramps at the same time (e.g., southbound Second Street/Glendale Avenue exit and southbound Mill Street exit), and circulation between interchanges will be maintained. In addition, NDOT will not close consecutive streets crossing over or under the freeway at the same time. • NDOT may create temporary roadways to keep the Spaghetti Bowl ramps open or may use state routes for detours. • NDOT will schedule closures at night where possible to minimize traffic disruptions. Traffic control will also be coordinated with local agencies to consider special events. • During final design, NDOT will evaluate the diversion routes to determine if improvements to the routes are necessary. In addition to street improvements, it may use signal timing modifications, temporary signals, parking restrictions, intersection improvements, incident management, and demand management options during construction to ease potential congestion and delay. • NDOT will coordinate with utility companies and the cities of Reno and Sparks to avoid or minimize interruptions to sewer, water, and electricity during construction. • Prior to implementation, NDOT will conduct extensive public outreach to communicate any closures or detours to the public. It will post updates to the project website and social media, media outreach, and mailings to affected residences and businesses. NDOT will also work with local companies to provide updates on pedestrian and bicycle impacts.		
Airport Access	**Construction.** NDOT will provide signed detours for access to and from the airport if the Plumb Lane interchange or direct-connect ramps are closed. Either the Plumb Lane interchange or the direct-connect ramps will remain open during construction to provide efficient access to the airport. Under Alternative 1, NDOT will not remove the direct-connect ramps until after the Plumb Lane interchange is complete and re-opened. NDOT will work with the Reno-Tahoe Airport Authority to develop an access plan for the airport.		
Rail	**Construction.** NDOT will coordinate with the Union Pacific Railroad and Amtrak to minimize interruptions to rail service of the I-580 bridge over the railroad tracks. NDOT will work with Union Pacific to develop a plan to minimize disruption to freight rail service while replacing the railroad bridge over I-80.		

TRANSPORTATION SERVICE REFERENCES

Regional Transportation Commission of Washoe County (RTC). 2017. *2040 Regional Transportation Plan*. https://www.rtcwashoe.com/mpo-projects/rtp/. Adopted May 18.

Reno-Tahoe Airport Authority. 2018. *Reno-Tahoe International Airport Master Plan.* https://www.renoairport.com/airport-authority/supporting-community/airport-plans/master-plan. December.