Chapter 21: Construction Impacts

Constructing the Mountain View Corridor (MVC) would cause a number of temporary impacts from disturbing the ground and operating construction equipment. Construction could cause impacts to air quality, water quality, wetlands, noise and vibration levels, visual resources, light levels, cultural resources, wildlife, the flow of vehicles (business operations and traffic delays), utility service, and hazardous material sites. In addition, the project could cause impacts from the use of sand and gravel pits and hauling these materials by truck to the construction site. Most construction-related impacts to the public would be associated with travel delays on local streets.

21.1 No-Action Alternative

Under the No-Action Alternative, the MVC would not be constructed, so there would be no construction-related impacts.

21.2 Action Alternatives

The action alternatives would require new construction in both developed and undeveloped areas. The following discussion of impacts is common to all of the action alternatives unless otherwise stated.

A comprehensive public information program would be implemented to inform the public about construction activities and to minimize impacts. Information would include the periods when construction is scheduled to take place, work

hours, and alternate routes. Construction signs would be used to notify motorists about work activities and changes in traffic patterns such as detours. In addition, night and weekend work could be scheduled to shorten the duration of construction as long as permit requirements are satisfied.

For some properties construction easements might be necessary. These properties are not included in the right-of-way analysis conducted for this EIS. These properties are outside the right-of-way but might be affected by cut or fill required during roadway construction or require that the access be modified to fit within the proposed MVC design. UDOT would temporarily use these properties during construction, and compensation would be provided to the landowner for the temporary use. The property would be fully returned to the owner when the use of the property is no longer required, typically when construction is complete. These properties might be affected, but no long-term impacts would be expected.

21.2.1 Construction Phasing

The Preferred Transit Alternative (5600 West Transit Alternative with Dedicated Right-of-Way Option) would be built in phases as funding becomes available consistent with the phasing timeframes identified in WFRC's long-range transportation plan. The Preferred Roadway Alternatives (5800 West Freeway Alternative and 2100 North Freeway Alternative) would also be built in phases. The Utah Transportation Commission has identified partial funding for the north-south portions of the MVC in Salt Lake County and the east-west portions in Utah County. For more details on construction phasing, see Chapter 36, Project Implementation (Phasing).

21.2.2 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 MVC construction activity

Because the MVC would be constructed as funding becomes available, it is difficult to determine the emissions associated with construction. The proposed improvements would occur over an extended period, and construction would be localized and short-term. Thus, any impacts to individual air quality receptors would also be short-term. The largest source of air pollution during construction would be PM_{10} (particulate matter with a diameter of 10 microns or less). Potential construction-related air quality mitigation is described below.

21.2.2.1 Air Quality Mitigation

Air emission mitigation measures for construction will be developed as part of the Emission Control Plan submitted to the State of Utah. Mitigation measures will include the following:

- **Fugitive Dust Emission-Control Plan.** The contractor will be required to submit a fugitive dust emission-control plan to the Utah Department of Environmental Quality. The plan will outline project-specific activities for emission control and monitoring throughout construction in accordance with state and federal requirements. UDOT expects that strategies to control fugitive dust will include wetting excavation areas, unpaved parking and staging areas, and onsite stockpiles of debris, dirt, or dusty material; chemical stabilization; planting vegetative cover; providing synthetic cover and wind breaks; reducing construction equipment speed; covering loads; using conveyor systems; and washing haul trucks before leaving the loading site.
- **Street Sweeping.** The contractor will use street-sweeping equipment at paved site-access points.
- **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 construction equipment.
- Install emission-control equipment on diesel construction equipment (such as particulate filters or traps, oxidizing soot filters, and oxidation catalysts) to the extent that is technically feasible.
- Reroute truck traffic away from schools and communities when possible.
- Evaluate the use of alternate engines and diesel fuels such as electric engines, engines that use liquefied or compressed natural gas, diesel

engines that meet the U.S. Environmental Protection Agency's 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 parts per million sulfur).

21.2.3 Water Quality Construction Impacts

Excavation, grading, and other construction activities could increase sediment levels in stormwater runoff, and this sediment could enter nearby waterways. Sediment levels would be increased until the proposed project is completed and permanent soil-protection measures are installed.

The main water body of concern is the Jordan River, although water quality in Utah Lake and many of the drainages along the proposed alternatives could also be affected. Measures for mitigating these temporary construction impacts on water quality are described in Chapter 14, Water Quality. A Utah Pollution Discharge Elimination System stormwater construction permit and a Stormwater Pollution Prevention Plan would be required for construction activities. Best management practices specified in the Stormwater Pollution Prevention Plan would be used during construction to minimize impacts to surface water.

21.2.4 Wetland Construction Impacts

Construction-related wetland impacts and mitigation are identified in Chapter 15, Ecosystem Resources. During construction, some erosion might occur outside the specific roadway construction zone, and this erosion might increase sediment levels in adjacent wetlands. If any construction activities affect wetlands, the contractor would be required to identify the additional amount of wetlands that is temporarily affected. The contractor would also be responsible for obtaining the necessary authorization from the U.S. Army Corps of Engineers and all other environmental clearances before affecting these areas.

21.2.5 Noise and Vibration Construction Impacts

21.2.5.1 Noise Impacts

Noise during construction could be an inconvenience to nearby residents and businesses. All of the action alternatives would generate similar types of noise that would occur sporadically in different locations throughout the construction period. The most common noise source in construction areas would be from engine-powered machinery such as earth-moving equipment (bulldozers), material-handling equipment (cranes), and stationary equipment (generators). Mobile equipment (such as trucks and excavators) operates in a sporadic manner, while stationary equipment (generators and compressors) generates noise at fairly

constant levels. The loudest and most disruptive construction activities would be pile driving (including driving sheet pile).

Typical noise levels from construction equipment range from 69 dBA (decibels on the A-weighted scale) to 106 dBA at 50 feet from the source; however, the majority of typical construction activities fall within the 75 dBA to 85 dBA range at 50 feet. Peak noise levels from pile driving associated with structures such as interchanges and overpasses are about 106 dBA at 50 feet. The use of drilled or vibrated piles could reduce peak noise levels by between 15 dBA and 25 dBA. To the human ear, noise at 65 dBA is intrusive and 80 dBA is disruptive. At 80 dBA, people must shout to be heard. Hearing protection is recommended at noise levels above 90 dBA. Noise levels between 110 dBA and 120 dBA are typical of a rock concert.

Construction noise at locations farther away than 50 feet would decrease by 6 dBA to 8 dBA for each doubling of the distance from the source. For example, if the noise level is 90 dBA at 50 feet from a jackhammer, it would decrease to about 83 dBA at 100 feet and 76 dBA at 200 feet.

21.2.5.2 Vibration Impacts

The Federal Transit Administration's *Transit Noise and Vibration Impact Assessment* suggests a damage threshold for fragile buildings (such as historic structures) of 5 mm/sec (millimeters per second), or 0.2 in/sec (inches per second) (Miller 2006). Based on this study, a threshold of 5 mm/sec (0.2 in/sec) for isolated vibration events such as trucks passing by or pile driving is a conservative standard to apply to the MVC project.

Truck Traffic. The following research regarding vibrations from construction truck traffic generally indicates the vibration levels at a specified distance from the vibration source.

- The above-mentioned Federal Transit Administration study indicates that the vibration impact from loaded trucks is 1.9 mm/sec (0.076 in/sec) at a distance of 25 feet (Miller 2006). This equals about 2.4 mm/sec to 2.7 mm/sec (0.095 in/sec to 0.106 in/sec) at 20 feet from the road, which is below the 5 mm/sec (0.2 in/sec) threshold used by the Federal Transit Administration.
- A study by the City of Jacksonville monitored vibration levels from truck traffic (gravel trucks, logging trucks, and commercial trucks). The monitors were placed on buildings that were located only a few feet from the edge of the road. In most cases, the vibration levels associated with truck traffic were less than 1 mm/sec (0.04 in/sec) and in all cases were less than 2 mm/sec (0.08 in/sec) (Hee 1994, Executive Summary, page 1).

Based on the results of these studies, UDOT expects that vibration from trucks would be below the 5 mm/sec (0.2 in/sec) threshold and, therefore, would not affect structures.

Pile Driving. Earth-borne vibration levels from impact pile driving range from 1.1 mm/sec to 38.5 mm/sec (0.04 in/sec to 1.5 in/sec), depending on the force of the pile driver, the distance from the pile driver to the receptor, and the type of soil between the pile driver and the receptor. Earth-borne vibrations from sonic pile driving and vibratory pile driving are generally less that those from impact pile driving. However, construction contractors in Utah generally use impact pile driving to construct highway overpasses. In some cases, the contractor can pre-drill piles, which eliminates the need for impact pile driving.

Vibrations from impact pile-driving activities generally do not exceed the threshold for damage to historic buildings of 5 mm/sec (0.2 in/sec) farther than 200 feet from the pile driver, even with poor soil conditions. Pile-driving activities more than 75 feet from newer, non-historic buildings would not exceed the risk criterion for these buildings.

21.2.5.3 Noise and Vibration Mitigation

Construction noise would be minimized by following UDOT's Standard Specifications for Environmental Protection and by complying with noise variances for the cities in which construction takes place. Construction noise would be minimized by the use of mufflers on construction equipment. Air compressors would meet federal noise level standards and would, if possible, be located away from or shielded from residences and other sensitive noise receptors. Other mitigation measures that could be used include constructing temporary noise barriers or curtains around equipment or work areas and equipping construction equipment engines with adequate mufflers and intake silencers.

The most appropriate method for reducing vibration from pile driving would be to use drilled shafts or auger cast piles in areas where vibration-sensitive buildings or utilities are located near the proposed foundation.

21.2.6 Visual and Light Construction Impacts

Construction-related visual impacts would be essentially the same under all proposed action alternatives. 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 would be temporarily reduced during construction. Until construction is completed and the right-of-way is revegetated, the construction area would visually stand out. Also, lights used for nighttime construction could affect people within one or two blocks of construction or staging areas.

21.2.6.1 Visual and Light Mitigation

Impacts from lights used during nighttime construction will be minimized by aiming construction lights directly at the work area and/or shielding the lights to avoid disturbing nearby residences and mink farms.

21.2.7 Cultural Resource Construction Impacts

During construction, additional archaeological, paleontological, or historical resources might be discovered other than those identified during the cultural resource surveys (see Chapter 17, Historic, Archaeological, and Paleontological Resources).

21.2.7.1 Cultural Resources Mitigation

If cultural resources are discovered during construction, activities in the area of the discovery will immediately stop. The contractor will notify UDOT of the nature and exact location of the finding and will not damage or remove the resource. Work immediately adjacent to the discovery would be delayed until UDOT evaluates the extent and cultural significance of the site. The course of action and the construction delay would vary depending on the nature and location of the discovery. Construction would not resume until the contractor receives written authorization from UDOT to continue.

21.2.8 Wildlife Construction Impacts

Construction activity tends to have a large, though temporary, effect on wildlife in or near the right-of-way because of higher noise levels, construction equipment activity, lights, and other effects. Such activities are of particular concern during nesting periods for migratory birds near the right-of-way. For more information, see Chapter 15, Ecosystem Resources.

21.2.9 Vehicle, Pedestrian, Bicyclist, and Business Construction Impacts

21.2.9.1 Vehicle, Pedestrian, and Bicyclist Impacts

The primary construction impacts that would affect vehicle traffic, pedestrians, and bicyclists during construction of any of the action alternatives would be 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 of roads, and temporary lane shifts. These conditions could occur both on major cross streets such as SR 201 or 3500 South and on minor roads. Detours and road closures would temporarily increase vehicle commute times, fuel usage, and air pollutant emissions.
- Access to residential and commercial areas would be temporarily disrupted, resulting in longer commute times and a potential loss of business to some businesses. Most of these types of impacts would occur under the 5800 West Freeway and 7200 West Freeway Alternatives in Salt Lake County, although impacts are also expected from construction of the transit line along 5600 West and construction of arterial streets through developed areas in Utah County.

21.2.9.2 Business Impacts

Construction activities could temporarily affect access to businesses in the area of construction. 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 area of construction.

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 high-impact businesses (the businesses that would experience the most impacts from construction). Destination businesses that have extensive competition, such as grocery stores, hardware stores, and sit-down restaurants, are the group that would experience the second-most impacts and are therefore considered moderate-impact businesses. Low-impact businesses include specialty and unique stores, because 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 expected to be negligibly 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.

21.2.9.3 Vehicle, Pedestrian, Bicyclist, and Business Mitigation

The contractor will be required to develop a maintenance-of-traffic plan that defines measures to minimize construction impacts on traffic. A requirement of this plan will be that, to the extent possible, access to businesses and residences will be maintained and existing roads will be kept open to traffic unless alternate routes are provided. Signs will be placed to notify motorists that businesses are open and accessible during construction. The signs will also provide directions for accessing the businesses. Finally, information will be made available by phone and Internet 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 around the construction area. Street closures would be short-term and limited to the closures that are specified in the maintenance-of-traffic plan as approved by UDOT before the start of construction.

UDOT and the contractor will coordinate with emergency service providers such as police, fire protection, and ambulance service before construction to ensure that access for their vehicles will be maintained.

21.2.10 Utility Service Construction Impacts

Utility service could be temporarily disrupted during construction. The affected utilities could include electrical, gas, water, sewer, phone, cable, and storm drainage. UDOT would consult with all utilities affected by construction to complete utility agreements before construction. Utility service would be maintained throughout most construction activity. There could also be temporary impacts to some railroad operations. For more information regarding utilities, see Chapter 6, Community Impacts.

21.2.10.1 Utility Service Mitigation

The construction contractor will coordinate with all utility providers to minimize utility service interruptions. UDOT will coordinate with railroad companies to ensure that operations are not affected by construction. This mitigation could require the construction of temporary tracks in the area of construction.

21.2.11 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 the proposed MVC. 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.

21.2.11.1 Hazardous Materials Mitigation

If contamination is discovered during construction, mitigation will be coordinated according to UDOT Standard Specification 01355, Environmental Protection, which directs the contractor to stop work and notify the project engineer of the possible contamination. Any hazardous materials will be disposed of according to applicable state and federal guidelines.

21.2.12 Impacts from Sand and Gravel Sources and Truck Hauling

Sand and gravel sources for highway construction projects can include existing commercial sand and gravel pits (also referred to as material borrow sources) or new sources developed for a specific project. Since UDOT does not specify particular sand and gravel sources for the contractors bidding on a project, it is unknown whether a new sand and gravel pit would be developed for constructing the MVC. However, commercial pits already exist near the proposed alternatives, and this could reduce the need for new locations. The following paragraphs discuss the typical impacts to be expected from the procurement of sand and gravel based on other construction activities similar to those required for building the MVC.

UDOT does not specify particular sand and gravel sources for its contractors because this would eliminate competition from non-specified sources and would be inconsistent with the State of Utah’s procurement guidelines which are designed to control costs of publicly funded projects. Therefore, private contractors bidding on UDOT projects need to determine the source of the sand and gravel to be used on the project and how the material would be transported.

Typically, contractors use dump trucks to haul the material from commercial sand and gravel pits to various staging areas along the project route. The environmental effects of the sand and gravel sources are addressed during the permitting process for a particular site. Local governments regulate localized impacts from operation of a sand or gravel mine; these impacts can include noise, dust, congestion, traffic, zoning, and erosion runoff. The Utah Department of Environmental Quality also regulates dust and water quality impacts from mines.

Typical impacts from sand and gravel pit operations include noise, increased truck traffic on local routes, and air quality and water quality impacts caused by fugitive dust, erosion, and suspended sediments. For existing active commercial sand and gravel pits, these impacts are already present and mitigation measures are in place. If an existing sand and gravel pit were to provide material for construction of the MVC, this could increase the quantity of material mined at the pit for a limited time. Increasing the quantity of material mined at a particular pit would not necessarily increase impacts to air quality or water quality because air and water quality impacts depend on the surface area of earth that is disturbed, and mining activities would most likely extend vertically instead of horizontally. Noise and truck traffic associated with the sand and gravel pit would increase temporarily.

For all alternatives, trucks would most likely be the primary mode for transporting materials either into or out of the project site, though rail cars might also be used. All of the alternatives would increase the number of trucks in the area since equipment, soil, and materials would be trucked into and out of the area. Trucks would increase noise levels in neighborhoods during construction and could also increase congestion on local streets.

21.3 References

Hee, Edgar J.

1994 *City of Jacksonville Traffic-Induced Vibration Study*. Report No. MAI 1-5259. Marquess & Associates, Inc. Consulting Engineers. October 25.

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