



MEMORANDUM

To: Saratoga Springs City
From: Avenue Consultants
Date: November 2, 2023
Subject: Quailhill at Mt. Saratoga Subdivision Traffic Study

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1 INTRODUCTION

Avenue Consultants was asked by the city to perform a traffic study of the Quailhill at Mt. Saratoga Subdivision and the surrounding area in Saratoga Springs due to citizen concerns about excessive traffic volumes due to pass-through traffic and high vehicle speeds. The study area is focused on the area just north of Pony Express Parkway between Mt. Saratoga Boulevard and Foothill Boulevard. Specifically, the roads of concern for which complaints were received are Quailhill Road and Midland Drive with issues associated with traffic using subdivision roads to access Foothill Boulevard via Fairfield Road. Traffic volumes, speeds and travel times were collected as part of the study to understand the travel patterns in the study area. In addition, traffic projections were analyzed for future conditions with the completion of planned developments and potential mitigations.

A unique challenge associated with this study is what is considered an acceptable volume for the subdivision streets. Local residential roads are different than all other road classifications as the acceptable standards are not based on the capacity of the roadway but are rather on providing a satisfactory environment for the residents that live on the street. While this acceptable threshold can vary and is somewhat dependent on local expectations and goals, it was found that the general consensus of this threshold is 1,500-2,000 vehicles per day after a review of available literature on the subject.

2 EXISTING CONDITIONS

Avenue analyzed data that was collected for travel times, speeds, and traffic volumes, which included both daily tube counts and peak period intersection turning-movement counts. Additionally, Avenue analyzed the traffic impacts of potential near-term mitigation measures.

2.1 Pass-Through Traffic

To determine the approximate amount of pass-through traffic on Quailhill Road and Midland Drive, the expected number of vehicle trips that would be generated by the Quailhill Subdivision was estimated. Pass-through traffic is defined as a vehicle trip that utilizes the local roads of Quailhill Road and Midland Drive but does not originate or have a destination within the Quailhill Subdivision. Whereas local traffic is defined as any trip that originates or has a destination within the Quailhill Subdivision.

The trip generation estimate was based on the Institute of Transportation Engineer's (ITE) publication, *Trip Generation, 11th Edition*. The ITE Single-Family Detached Housing land use was used for the trip generation and resulted in 2,903 daily trips for the 308 houses within the subdivision. Based on the traffic count volumes and field observations, it was determined that there are approximately 500-600 daily pass-through trips using Quailhill Road and Midland Drive with most going to or coming from the north on Foothill Boulevard. The daily traffic volumes, including the estimated local and pass-through vehicles are shown in **Figure 1** on page 2.

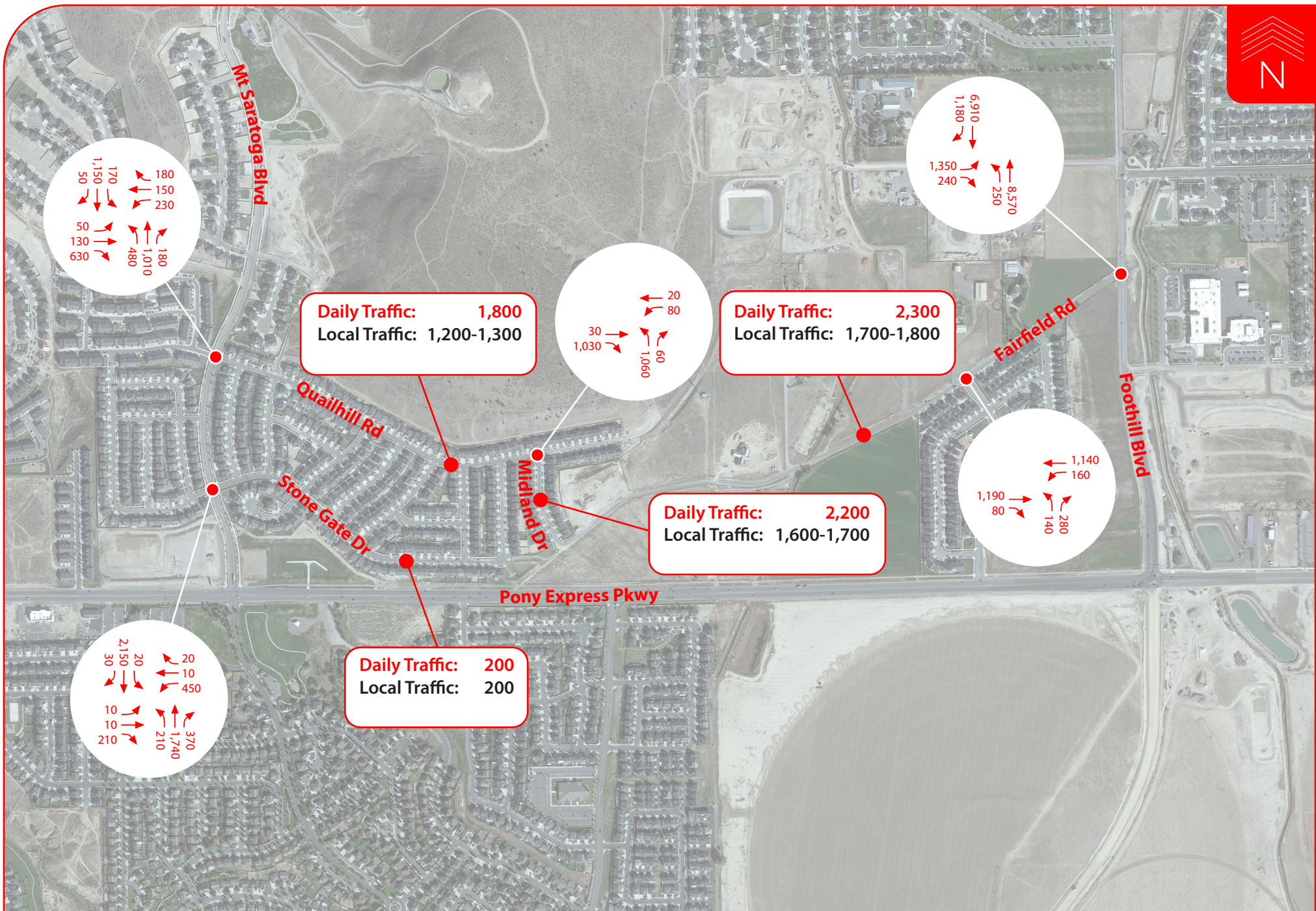


Figure 1
Estimated Existing Daily Traffic Volumes

2.2 Travel Times

Travel times were collected to understand if there was a benefit from using the local roads as opposed to the alternate route using arterial roads. The travel times were measured in both the eastbound and westbound directions during the AM and PM periods (i.e., rush hours). The travel time segments that were collected and analyzed are shown in **Figure 2**.



Figure 2. Travel Time Routes

The results from the travel time data collection are shown in **Tables 1 and 2**. As shown, the most extreme difference in travel time between the two routes occurs during the AM peak period in the eastbound direction. This is due to the congestion on northbound Foothill Boulevard between Pony Express Parkway and 400 North. It typically takes two cycles to make an eastbound left turn at Pony Express Parkway & Foothill Boulevard during the AM peak period. Additionally, the queue on northbound Foothill Boulevard extends back to Pony Express Parkway which is mostly avoided when taking the local roads. During the PM peak, without the congestion on northbound Foothill Boulevard, the local road route still saves about a minute of travel time compared to the arterial road route, likely due to the delay caused by the traffic signals when making a left turn. In the westbound direction, the arterial roads provide a travel time benefit as right turns are not subject to the same delays at the traffic signals, but the benefit is relatively minor with travel time savings of less than 30 seconds during both periods.

Table 1. AM Travel Time Data

Route	Eastbound		Westbound	
	Average (mm:ss)	Max (mm:ss)	Average (mm:ss)	Max (mm:ss)
Local Roads (Blue)	5:06	6:14	3:46	3:53
Arterial Roads (Green)	8:01	9:29	3:17	3:25
Additional Arterial Roads Travel Time	+2:55	+3:15	-0:29	-0:28

Table 2. PM Travel Time Data

Route	Eastbound		Westbound	
	Average (mm:ss)	Max (mm:ss)	Average (mm:ss)	Max (mm:ss)
Local Roads (Blue)	4:11	4:48	3:45	3:59
Arterial Roads (Green)	5:04	6:00	3:29	3:48
Additional Arterial Roads Travel Time	+0:53	+1:12	-0:16	-0:11

2.3 Speeds

Vehicle speeds were collected at the following three locations along the local roads in the study area:

1. Quailhill Road between Granite Park Drive & Lasalle Drive
2. Midland Drive between Quailhill Road & Fairfield Road
3. Fairfield Road between Midland Drive & 1000 West

The average and 85th percentile speeds are presented for each location in **Table 3**. The posted speed limit for each location is 25 MPH. As shown, the 85th percentile speeds do not exceed the posted speed limit at the Quailhill Road and Midland Drive locations. These two locations that are within the residential neighborhood were observed to consistently have low speeds due to the narrow streets (~24-feet wide) and parked vehicles along the road which made vehicles slow down through these areas, often waiting for opposing vehicles to pass in the areas with parked cars. The speeds on Fairfield Road are higher which is expected due to the lack of houses along the roadway.

Table 3. Speed Data

Location	Average (mph)	85 th Percentile (mph)
Quailhill Road	20	24
Midland Drive	21	25
Fairfield Road	28	32

2.4 Potential Near-Term Mitigations

Avenue analyzed the following three potential near-term mitigation measures that could reduce pass-through traffic on Quailhill Road and Midland Drive:

1. Speed management measures to reduce vehicle speeds on Quailhill Road, Midland Drive and Fairfield Road
2. Closing the roadway connection between Midland Drive and Fairfield Road
3. Adding a roadway connection between Stone Gate Drive and Fairfield Road

2.4.1 Speed Management

There are multiple speed management measures that can be utilized to holistically reduce speeds depending on the roadway characteristics. However, given the already low speeds and the three minutes of travel time difference between the local and arterial roads, additional speed management measures on the study roads would not eliminate the travel time benefit provided by the local roads and are not recommended as a mitigation measure for the pass-through traffic.

2.4.2 Road Closure

Closing the roadway between Midland Drive and Fairfield Road would clearly mitigate the traffic volume concerns on Quailhill Road and Midland Drive. However, Avenue desired to understand the traffic impacts of the road closure, which would leave Pony Express Parkway as the only access point for the Quailhill Subdivision and the adjacent neighborhoods that connect to Mt. Saratoga Boulevard. Avenue performed a peak hour analysis of the signalized intersections on Pony Express Parkway at Mt. Saratoga Boulevard and Foothill Boulevard. Under the road closure conditions, it is anticipated that during the AM peak hour an additional 150-200 vehicles would make a southbound left turn from Mt. Saratoga Boulevard to Pony Express Parkway and a subsequent eastbound left turn to Foothill Boulevard. This increase in vehicle demand would cause an additional five minutes of delay per vehicle for the two left-turn movements when compared to the existing conditions. This results in travel times of at least 14 minutes for the eastbound travel time segment (a 55% increase) which would be felt by the hundreds of users of these movements, not just the additional 150-200 vehicles that would be rerouted, the majority of which would be residents of the Quailhill Subdivision. For this 1.9-mile travel time segment, the average speed would be less than 10 MPH.

There has been a lot of emphasis in Utah County about building out a roadway “grid system” over the last few years. Overall, transportation networks function best when multiple options are available, often providing optimal network performance. Therefore, closure of the Quailhill Subdivision access via Fairfield Road is not recommended due to reduced network connectivity leaving a single access point for a large collection of homes and the resulting significant increase in delay for all users of the affected movements at the two traffic signals in the study area.

2.4.3 Connection of Stone Gate Drive to Fairfield Road

Another potential mitigation for the high traffic volumes on Quailhill Road would be to add another option for traffic to access Fairfield Road to distribute the traffic demand across multiple routes. Avenue analyzed a scenario wherein the east terminal of Stone Gate Drive would be extended to Fairfield Road creating a three-leg intersection with Midland Drive, Stone Gate Drive, and Fairfield Road. An estimate was developed of how daily traffic volumes would change under this scenario, which are shown in **Figure 3** with existing volumes provided for reference. As shown, Stone Gate Drive becomes viable as an alternate route to Quailhill Road and likely becomes more attractive as a straighter route. This scenario greatly reduces traffic volumes on Quailhill Road and Midland Drive but does not solve the pass-through traffic problem and may even increase the amount of pass-through traffic, which would likely use Stone Gate Drive rather than Quailhill Road. This scenario also substantially increases traffic volume on the east end of Stone Gate Drive where there are currently less than 200 daily vehicles.

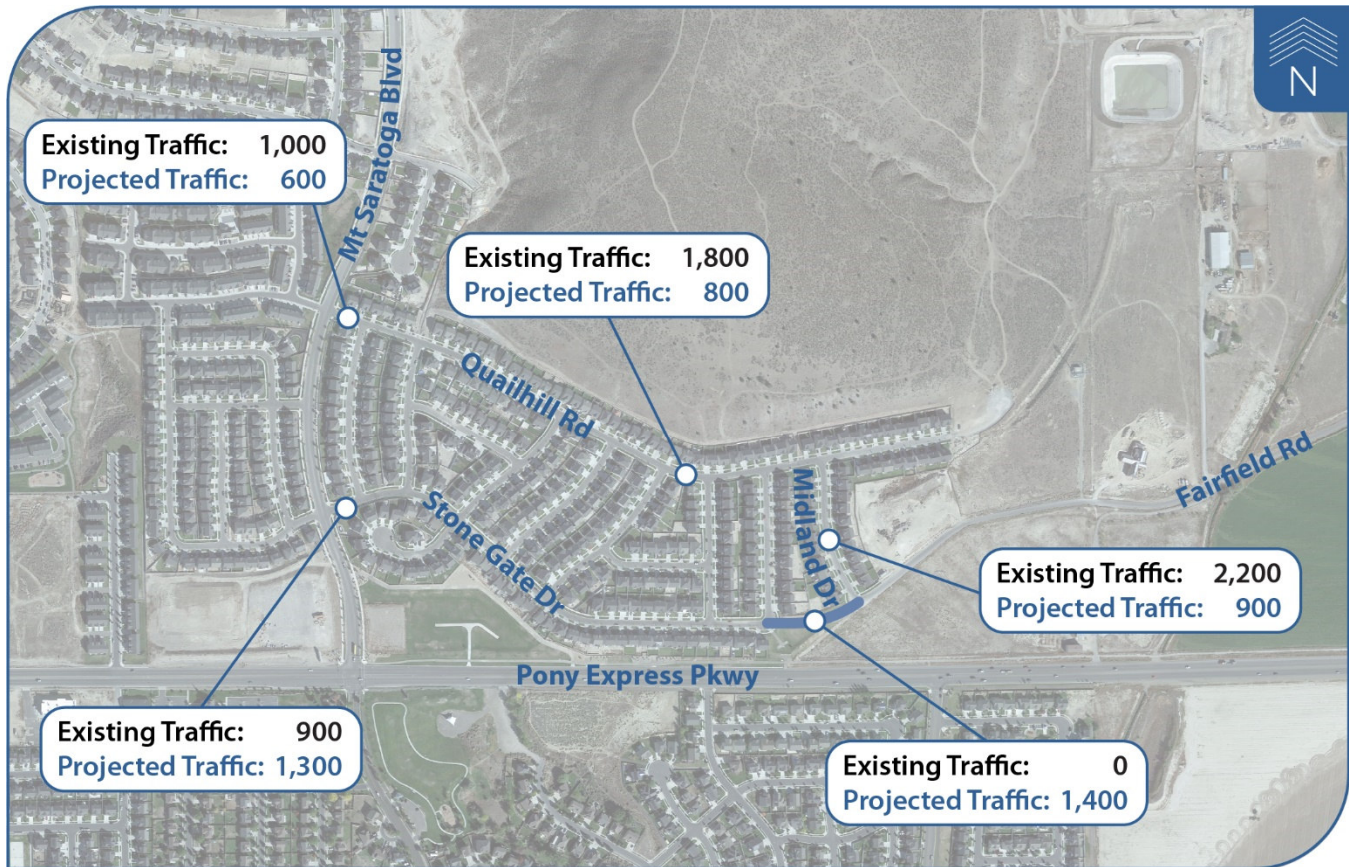


Figure 3. Estimated Daily Traffic Volumes with Stone Gate Drive Connection

2.4.4 Road Closures on Quailhill Road & Stone Gate Drive

Another potential mitigation to reduce the pass-through traffic in the Quailhill Subdivision would be to close segments of Quailhill Road and Stone Gate Drive, increasing the travel time through the subdivision. The proposed closures are shown in **Figure 4** along with the associated daily traffic volumes that are projected for this scenario. It is anticipated that the pass-through traffic would be reduced by 60 to 80 percent in this scenario with the added travel time and distance. However, this scenario also makes it more difficult for local residents to leave and enter the neighborhood and residents on the east side of the subdivision would likely use Midland Drive and Fairfield Road as their primary access to and from the neighborhood regardless of their origin or destination. This scenario also moves traffic from Quailhill Road and Stone Gate Drive to more minor residential roads such as Holland Drive and Lasalle Drive, which currently experience almost no traffic demand but would suddenly have over 500 daily vehicles. It is expected that this scenario would substantially increase traffic demand on the west end of Stone Gate Drive from 900 daily vehicles to 1,900 daily vehicles.



Figure 4. Estimated Daily Traffic Volumes with Quailhill Road & Stone Gate Drive Closures

2.4.5 Right-In Right-Out Intersection at Fairfield Road & Foothill Boulevard

Another potential mitigation is to convert the intersection at Fairfield Road & Foothill Boulevard to a right-in right-out (RIRO) intersection. It is expected that this would reduce the daily traffic demand on Fairfield Road and Midland Drive by approximately 50 percent as half of the possible movements are removed at the intersection. It is expected that the pass-through trips would be greatly reduced in the AM peak period as it was observed that most of the pass-through trips were going north. However, this would have a similar effect as the road closure scenario during the AM peak period with travel times along the arterial routes increasing by approximately five minutes due to failing left-turn movements at the two signalized intersections. It would also be impactful to the residents of the Lexington Green subdivision on Fairfield Road by forcing many of them to turn left onto Pony Express Parkway and then left again onto Foothill Boulevard.

2.4.6 Dual Left for Southbound Approach at Mt. Saratoga Boulevard & Pony Express Parkway

The intersection at Mt. Saratoga Boulevard & Pony Express Parkway becomes a concern when shifting traffic demand away from Fairfield Road as it adds to the southbound approach at this intersection. The current lane configuration for the southbound approach has one right-turn lane, one through lane, and one left-turn lane. The southbound left-turn movement is expected to account for approximately two minutes of the added delay in the Fairfield Road closure scenario. A potential mitigation to this increase in delay for the southbound left would be to adjust the lane configuration making the through lane a shared through-left turn lane. This would require split phasing for the northbound and southbound approaches, meaning that the approaches could not be served at the same time, so each approach would go one at a time.

Based on a limited conceptual analysis of the dual left turn lanes, this could reduce the added delay by approximately 50 percent for the southbound left-turn movement, however it may increase overall delay at the intersection. This analysis is limited since traffic counts were not performed at this intersection, so volumes are based on detectors at the signal which are not always reliable. Specifically, the northbound right-turn volumes appeared to be greater during observations than what is reported by the detectors. This is important because currently the northbound right-turn volumes and the southbound left-turn volumes are served at the same time, but with dual southbound left-turn lanes, these movements would be served separately requiring additional time. Split phasing requires additional time to serve the minor streets (Mt. Saratoga Boulevard & Silver Lake Parkway) and therefore reduces the available green time for the major east-west movements. This adjustment would likely increase delay for the eastbound through movement which currently has more than 1,600 vehicles during the AM peak hour.

2.4.7 Pedestrian Crosswalks

The possibility of adding pedestrian crosswalks at intersections along Quailhill Road was evaluated for its feasibility and impacts. Pedestrian crosswalks perpendicular to Quailhill Road could be installed at the existing all-way stops but are not recommended at other locations within the subdivision due to a lack of logical crossing locations and pedestrian attractions. Pedestrian crosswalks parallel to Quailhill Road are more useful for pedestrians traveling along Quailhill Road. The installation of crosswalks could provide additional visibility for pedestrians and may slightly reduce vehicle speeds; however, it would not appreciably reduce traffic demand on Quailhill Road.

3 SHORT-TERM PROJECTIONS

This section analyzes the projected travel patterns with Mt. Saratoga Boulevard completed to the north connecting to SR-73. In addition, the projected short-term traffic volumes with the Stone Gate Drive connection to Fairfield Road are analyzed.

The completion of Mt. Saratoga Boulevard would provide an alternate route for traffic to and from the north to access the subdivisions via SR-73. This is expected to eliminate most of the current pass-through traffic as Mt. Saratoga Boulevard provides a direct route to the north with few to no stops. The estimated daily volumes are presented in **Figure 4** which assumes 100 daily pass-through trips on Quailhill Road and Midland Drive that are mostly associated with the schools on the east side of Foothill Boulevard. As shown, traffic volumes are expected to decrease on Quailhill Road and Midland Drive with most of the drop being a result of removing pass-through trips. It is also expected that some trips from the Quailhill Subdivision would shift from Fairfield Road to Mt. Saratoga Boulevard, especially from homes on the west side of the subdivision.

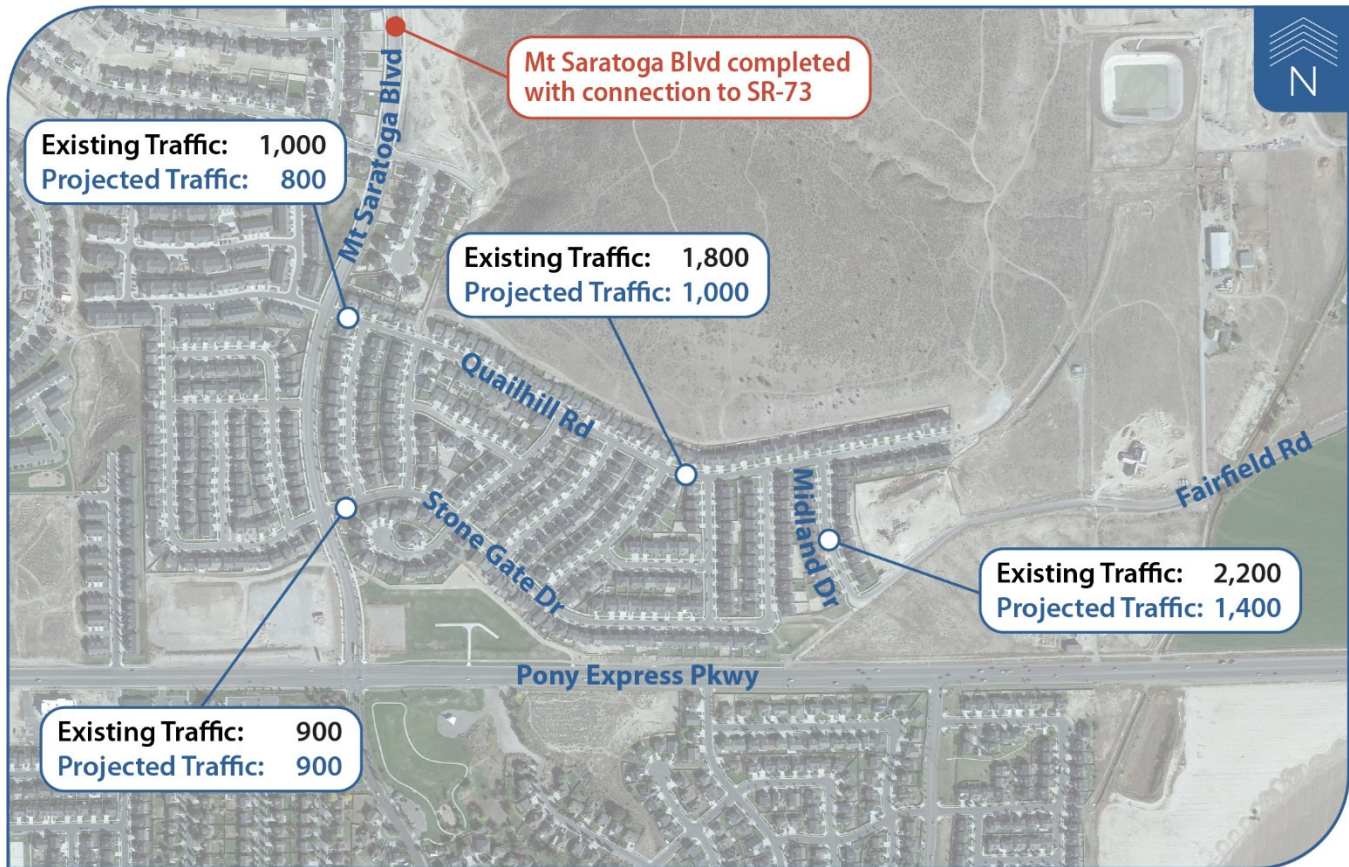


Figure 5. Estimated Daily Traffic Volumes for Short-Term Scenario

3.1 Stone Gate Drive Connection

A scenario that would connect Stone Gate Drive to Fairfield Road was also evaluated for the short-term projections that include the completion of Mt. Saratoga Boulevard. The projected daily traffic volumes for this scenario are presented in **Figure 5**. As mentioned previously, this provides an attractive alternative to access Fairfield Road and distributes the traffic demand across Quailhill Road and Stone Gate Drive. By distributing the traffic demand among Mt. Saratoga Boulevard, Quailhill Road and Stone Gate Drive, it reduces the maximum projected traffic volume at any location within the subdivision to 1,100 daily vehicles.

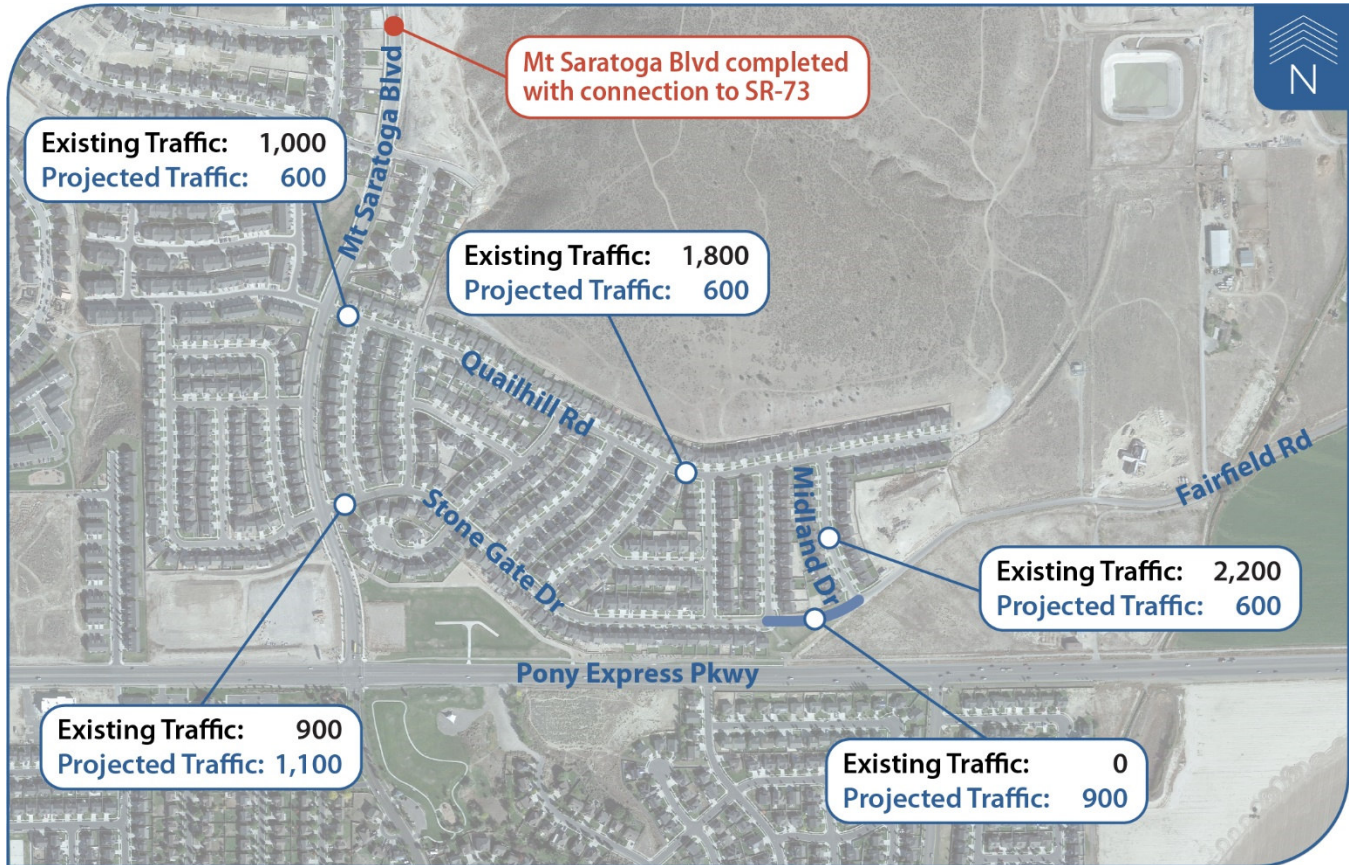


Figure 6. Estimated Daily Traffic Volumes for Short-Term Scenario with Stone Gate Drive Connection

4 MEDIUM-TERM PROJECTIONS

This section builds on the short-term scenario and analyzes the projected travel patterns with a future planned roadway that connects the east terminal of Quailhill Road to the north to Talus Ridge Drive via Grand Tour Drive. In addition, the trips generated from future developments to the north and east were included in this analysis. These projections also include the completion of Mt. Saratoga Boulevard. The projected medium-term traffic volumes were analyzed with several potential roadway network adjustments to mitigate traffic volume concerns. The three possible roadway network scenarios that were analyzed for the medium-term are shown in **Figure 6**. It should be noted that these are conceptual scenarios and there may be physical challenges or other limitations that could affect their feasibility.



Figure 7. Potential Medium-Term Roadway Network Modifications

This analysis assumed the completion of approximately 180 residential homes to the north of Quailhill Road and the completion of the Rider's Station development that is located between Fairfield Road and Pony Express Parkway. The planned Rider's Station development includes a mixture of office, retail, and restaurant land uses. The vast majority of the trips generated by Rider's Station are expected to access the development from Pony Express Parkway, but it is expected that some trips from the surrounding residential neighborhoods will use the Quailhill subdivision roads to access the development.

The additional connection to Foothill Boulevard via the future roadway and Talus Ridge Drive is expected to reduce traffic demand on Midland Drive and Fairfield Road by providing an alternate, more direct route. The projected medium-term daily traffic volumes are shown in **Figure 7**. As shown, the traffic demand on Quailhill Road increases slightly from the short-term projection due to the trips generated by the future developments, which are anticipated to increase daily traffic demand on Quailhill Road by 200-300 trips. However, the maximum projected daily volume at any location within the subdivision is expected to be about 1,200 vehicles.



Figure 8. Estimated Daily Traffic Volumes for Medium-Term Scenario

4.1 Stone Gate Drive Connection

Traffic volumes were estimated for the medium-term scenario with the previously mentioned possible connection from Stone Gate Drive to Fairfield Road. The estimated daily traffic volumes from this analysis are shown in **Figure 8**. As mentioned previously, this connection distributes the traffic demand across both Quailhill Road and Stone Gate Drive with the latter expected to be the preferred route to access Fairfield Road. This would further reduce the estimated maximum volume at any location within the subdivision to about 1,000 vehicles per day.



Figure 9. Estimated Daily Traffic Volumes for Medium-Term Scenario with Stone Gate Drive Connection

4.2 Alternate Connection between Quailhill Road & Fairfield Road

Traffic volumes were projected for the medium-term scenario with an alternate connection between Quailhill Road and Fairfield Road east of Midland Drive that would reduce volumes on Midland Drive. The estimated daily traffic volumes for this scenario are shown in **Figure 9**. It is expected that this alternate route would remove nearly all the traffic from Midland Drive, leaving just the local traffic from the homes on Midland Drive. While this scenario does greatly reduce volumes on Midland Drive, it slightly increases volumes on Quailhill Road when compared to the medium-term scenario without any roadway network modifications.



Figure 10. Estimated Daily Traffic Volumes for Medium-Term Scenario with Alternate Connection

An additional scenario considered was a combination of the Stone Gate Drive connection and the alternate connection between Quailhill Road and Fairfield Road east of Midland Drive. These two options address separate problems with the Stone Gate Drive connection reducing volumes on Quailhill Road while the alternate connection east o would reduce volumes on Midland Drive. While a full analysis was not performed for this scenario, it is expected that the volumes would be similar to the scenario with the Stone Gate Drive connection but would shift most of the volume from Midland Drive to the new connection.

4.3 Evans Lane Extension

The extension of Evans Lane to connect to the future north-south roadway as shown in **Figure 6** was considered for what benefits it could provide to the Quailhill Subdivision. Prior to a full traffic volume analysis, it was determined that while this alternative may provide benefit to the neighborhoods along Talus Ridge Drive, it would provide little benefit to the local roads within the Quailhill Subdivision. Therefore, while this may be of benefit to the overall transportation network, it was not analyzed further due to the lack of benefit to the local roads in the study area. Additionally, shortly before finalizing this memo, Avenue learned that a subdivision plat

has been approved that precludes extending Evans Lane to the west without having to acquire residential parcels and/or homes, which makes it very unlikely that such a connection will ever occur.

5 CONCLUSION

The local roads of Quailhill Road, Midland Drive and Fairfield Road were studied for existing and future traffic volumes due to concerns of speeding and pass-through traffic. It was determined that there are approximately 500-600 daily pass-through trips on Quailhill Road and Midland Drive. These pass-through trips are incentivized by the travel time savings on the local roads in the eastbound direction which reduces travel times by approximately three minutes during the AM peak period and one minute during the PM peak period when compared to Pony Express Parkway. The travel time savings are not due to excessive speeds on the local roads as the 85th percentile speeds on Quailhill Road and Midland Drive do not exceed 25 MPH, rather the reduction in travel time is due to the congestion on Pony Express Parkway. Therefore, speed management measures are not recommended as the vehicle speeds are at or below the posted speed limit and are not likely to reduce the pass-through traffic. Additionally, the closure of the roadway connection between Midland Drive and Fairfield Road was analyzed but is not recommended as it would reduce roadway connectivity and increase travel times for many users by more than five minutes and reduce their average speed to less than 10 MPH. Similar AM traffic impacts would be anticipated if the intersection of Foothill Boulevard and Fairfield Road were converted to a right-in right-out configuration. Closing portions of Quailhill Road and Stone Gate Drive would force vehicles to meander their way through the subdivision and would likely result in largely bifurcating the local traffic with roughly half of the traffic using Mt. Saratoga Boulevard as their primary access and the other half using Fairfield Road and Foothill Boulevard. Many of the 500-600 pass-through trips would be eliminated to impact traffic on Mt. Saratoga Boulevard and Pony Express Parkway while local traffic would be redistributed throughout the subdivision with traffic decreasing on some streets and increasing on others.

Future conditions were analyzed with the completion of various planned projects near the study area. In the short-term scenario with the completion of Mt. Saratoga Boulevard to the north connecting to SR-73, pass-through traffic is expected to decrease dramatically leaving approximately 100 pass-through trips on Quailhill Road and Midland Drive that would mostly be school related. Additional volume reductions are expected on Midland Drive and some locations on Quailhill Road as trips from within the Quailhill Subdivision would elect to travel to and from the north via Mt. Saratoga Boulevard. The medium-term scenario assumed the completion of a road connecting Quailhill Road to Talus Ridge Drive to the north and planned developments to the north and east of the Quailhill Subdivision. While these developments are expected to generate some pass-through trips on Quailhill Road and Midland Drive, the additional access via Talus Ridge Drive is expected to reduce the traffic demand on Midland Drive.

Multiple roadway network adjustments were also analyzed to determine their potential impact on traffic demand for the local roads within the Quailhill Subdivision. The Stone Gate Drive connection to Fairfield Road would distribute the traffic demand across Quailhill Road and Stone Gate Drive which would reduce traffic volumes on Quailhill Road but increase volumes on Stone Gate Drive at locations that currently experience less than 200 daily trips. An alternate connection between Quailhill Road and Fairfield Road mainly addresses the traffic demand on Midland Drive but has little effect on the Quailhill Road volumes. Traffic demand on Midland Drive would likely drop below 200 daily trips with this connection.

The trip generation analysis of the Quailhill Subdivision shows that approximately 3,000 daily trips are locally generated by the 308 residential homes. With three accesses to the subdivision in existing conditions, an ideal distribution of trips with no pass-through trips would result in 1,000 daily trips on each access. Under future conditions with an additional access, this ideal trip distribution results in over 700 daily trips on each access.

These values provide context for a minimum possible daily volume on the local access roads. Any reduction on one of these accesses would result in an increase for other accesses.

As discussed in the introduction, a review of the available literature provided a maximum threshold of 1,500-2,000 daily vehicles on local residential roads to achieve a satisfactory environment for residents. It is expected that the daily volumes would be below this threshold under each of the future conditions and that the alternatives presented would further reduce the expected traffic volumes.