

Table 3-17 Projected 2042 Build Synchro Analyses Results with Mitigation

Intersection	Lane Movement / Approach	AM Peak Hour			PM Peak Hour		
		LOS	Delay (sec)	V/C Ratio	LOS	Delay (sec)	V/C Ratio
Peach Ridge Avenue NW & 4 Mile Road NW (SB Left-turn Lane)	EB Left	B	10.3	0.035	A	9.1	0.056
	EB Approach	A	0.4	N/A	A	0.8	N/A
	NB Approach	E	38.0	0.235	C	16.0	0.075
	WB Left	A	9.0	0.01	A	8.5	0.012
	WB Approach	A	0.1	N/A	A	0.2	N/A
	SB Left	F	381.2	1.472	F	64.5	0.60
	SB Thru/Right	C	18.1	0.177	B	13.7	0.073
	SB Approach	F	245.0	N/A	F	50.0	N/A
	Overall	N/A	N/A	N/A	N/A	N/A	N/A
Walker Avenue NW & 4 Mile Road NW (Signal & EB Right-turn Lane)	EB Left	B	19.9	0.05	C	21.3	0.13
	EB Thru	B	19.2	0.61	B	18.3	0.57
	EB Right	C	24.5	0.74	B	14.9	0.33
	EB Approach	C	21.9	N/A	B	17.4	N/A
	NB Left	D	41.0	0.85	C	24.6	0.61
	NB Thru/Right	D	37.3	0.81	D	47.2	0.92
	NB Approach	D	39.3	N/A	D	38.0	N/A
	WB Left	C	34.9	0.58	D	37.7	0.69
	WB Thru/Right	B	18.7	0.58	B	19.1	0.61
	WB Approach	C	22.9	N/A	C	25.0	N/A
	SB Left	C	23.2	0.18	C	24.8	0.14
	SB Thru/Right	D	50.2	0.85	D	37.9	0.63
	SB Approach	D	45.6	N/A	D	35.5	N/A
	Overall	C	30.0	N/A	C	28.0	N/A

4.0 CONCLUSIONS

This report assessed the traffic impacts that the new Gracewil residential development is expected to have on the adjacent roadways and study area intersections. The traffic impacts and mitigation described in this report are based on existing and future no build traffic volumes and anticipated projected traffic generated at Phase 1 of the proposed development in the year 2023, the approximate mid-point of development in the year 2032, and at full build out in the year 2042. A comparison of future no build conditions to the projected build conditions for each of these future years was used to determine the traffic impacts of the proposed development upon the adjacent street system.

4.1 Existing Conditions

The existing conditions analyses revealed that the study area intersection approaches and all individual movements operate at an acceptable level of service during the weekday morning and afternoon peak hours, with the exception of the eastbound shared through/right-turn movement and the overall eastbound approach at the 4 Mile Road and Walker Avenue intersection. During the

weekday morning peak hour, the shared through/right-turn movement as well as the overall eastbound approach operates at a level of service F. These both operate acceptably during the weekday afternoon peak hour. Field visits during the weekday morning and afternoon peak hours confirmed lengthy vehicle delay and queuing for the eastbound 4 Mile Road approach to Walker Avenue. During the capacity analysis, the addition of an eastbound right turn lane was found to mitigate delay and provide acceptable levels of service.

4.2 Future No Build Conditions

Traffic volumes for the future no build 2023, 2032, and 2042 conditions were estimated by applying traffic growth rates to the existing traffic volumes to develop the future 2023, 2032, and 2042 traffic volumes and adding traffic from approved developments in the area which included English Hills, Walkerview, and the Northridge East IPUD.

4.2.1 Future 2023 No Build Conditions

The future 2023 no build conditions revealed that both study area intersections will have movements that operate at an unacceptable level of service during the weekday morning and weekday afternoon peak hours.

The southbound Peach Ridge Avenue approach to 4 Mile Road is expected to operate at level of service E during the weekday morning peak hour. It is not uncommon for unsignalized side-street approaches onto major roadways to operate poorly during peak hours. The southbound queues are expected to be minimal under the future no build 2023 conditions and the volume to capacity ratio is 0.508, therefore no further mitigation would be required under the future 2023 no build conditions.

Improvements are needed at the intersection of Walker Avenue and 4 Mile Road in order to mitigate the existing conditions and future no build conditions. The existing conditions recommendation of an eastbound right turn lane was first examined and found to not provide enough capacity to improve the level of service to an acceptable level under the future 2023 no build conditions. The mitigation strategy to install a traffic signal (the peak hour signal warrant is met under 2023 no build volumes) was investigated. Signalization would result in acceptable levels of service for all intersection movements. It should be noted that given the misalignment of the Walker Avenue approaches to the intersection, the northbound and southbound approaches were examined with a split-phase traffic signal operation.

4.2.2 Future 2032 No Build Conditions

Since no improvement strategies discussed under existing or future no build 2023 conditions were assumed to be in place for the future 2032 no build conditions analyses, the two study area intersections will continue to have the same movements operate with unacceptable levels of service (with greater delays) during the weekday morning and weekday afternoon peak hours. Additional

movements at the Walker Avenue and 4 Mile Road intersection will also begin to operate at unacceptable levels of service by the year 2032.

Similar to the future no build 2023 conditions, the southbound Peach Ridge Avenue approach to 4 Mile Road is expected to operate at a poor level of service during the weekday morning peak hour. As long as the volume to capacity ratio remains less than 1.0 and queuing is minimal, no improvements are typically necessary to mitigate these movements. The expected V/C ratio of 0.674 is still well under 1.0 and queues are expected to be minimal for this approach with a 95th percentile queue length of 68 feet expected. The addition of an auxiliary left turn lane on the southbound Peach Ridge Avenue approach to 4 Mile Road was investigated as a remedial measure in order to improve the delays and level of service for this approach. It was found that implementing a 100' southbound left turn lane on the Peach Ridge Avenue approach to 4 Mile Road would reduce delay and queuing on the approach. Although the southbound left-turn lane is still expected to operate at a level of service F, no further mitigation should be required at this intersection for the future 2032 no build conditions.

At the intersection of Walker Avenue at 4 Mile Road, converting the intersection to traffic signal control would continue to provide acceptable levels of service for all intersection movements. No further mitigation is required at this intersection for the future no build 2032 conditions.

4.2.3 Future 2042 No Build Conditions

Since none of the improvement strategies discussed under existing, future no build 2023 conditions, or future no build 2032 conditions were assumed to be in place for the future 2042 no build conditions analyses, the two study area intersections will continue to have the same operational issues during the weekday morning and weekday afternoon peak hours with significant delays. In addition, other movements at the Walker Avenue and 4 Mile Road intersection will also begin to operate at unacceptable levels of service by the year 2042.

Similar to 2023 and 2032 no build conditions, it was found that implementing a southbound left turn lane on the Peach Ridge Avenue approach to 4 Mile Road would reduce delay and queuing on the approach and result in a V/C ratio below 1.0. However, the southbound left turn movement and overall approach will still operate at a level of service F. As the traffic volumes remain relatively low on this approach and the V/C ratio remains less than 1.0, no further mitigation should be required for the future 2042 no build conditions.

At the intersection of Walker Avenue at 4 Mile Road, additional mitigation was found to be required beyond installing a traffic signal. During the signalized analysis, it was determined that an auxiliary right-turn lane on the eastbound approach would need to be added to provide acceptable levels of service for each movement and approach at the intersection. Installing a traffic signal at the intersection and adding an eastbound right turn lane will result in acceptable levels of service for all

movements under the future 2042 no build conditions. It should be noted that the traffic signal control continued to be examined with a split-phase for the northbound/southbound approaches due to the existing misalignment for the north/south approaches at the intersection.

4.3 Projected Build Conditions

The projected build out years examined included the following:

- The year 2023 when Phase 1 of the proposed residential development (91 units) is expected to be complete with construction of the site access to 4 Mile Road also completed.
- The year 2032 at an approximate mid-point of the residential development (322 units) with construction of the second site access to Walker Avenue also completed.
- The year 2042 when the proposed residential development is expected to be fully built out (590 units) and construction of the third site access to Peach Ridge Avenue is completed.

The study area intersections were evaluated with the future build traffic volumes to determine the future intersection operations with the proposed residential development project. Traffic volumes for the projected 2023 build, 2032 build, and 2042 build conditions were derived from developing the trip generation, distribution, and assignment for the proposed residential development and adding these trips to the no build traffic volumes projected for 2023, 2032, and 2042 without the proposed project.

4.3.1 Projected 2023 Build Conditions

The capacity analysis for the projected 2023 build conditions under Phase 1 of development revealed that the same improvements identified under the no build 2023 conditions would be required under the projected build conditions. No further mitigation would be needed at the primary study intersections, beyond the mitigation recommended under the future no build 2023 conditions, to accommodate the traffic generated by the proposed residential development in the year 2023.

Turn lane warrants were examined to determine if a right or left turn lane would be needed along 4 Mile Road at the proposed site access with Phase 1 of development. Based on the volume warrants, a right turn taper only is recommended at the proposed site access on 4 Mile Road and has been included in the proposed site plan. A left-turn lane on 4 Mile Road is not warranted at the proposed site access with Phase 1 of development. The capacity analyses for the proposed site access revealed that all movements at its intersection with 4 Mile Road are expected to operate acceptably with levels of service D or better during the morning and afternoon peak hours.

4.3.2 Projected 2032 Build Conditions

The study area intersections were again evaluated with the future 2032 build traffic volumes to determine the intersection operations at the approximate mid-point of the residential development. The capacity analysis for the projected 2032 build conditions revealed that additional improvements beyond those identified under the no build 2032 conditions would be required at the Walker Avenue and 4 Mile Road intersection due to the traffic generated by the proposed residential development.

The construction of a left turn lane on the southbound Peach Ridge Avenue approach to 4 Mile Road is expected to improve the weekday morning peak hour approach delay by 22.6 seconds, but the approach is still expected to operate at level of service F, as is the southbound left-turn movement. The expected volume to capacity ratio of 0.736 is still below 1.0 and queues are expected to be minimal for this approach. The results of the SimTraffic analysis indicate that a 95th percentile queue length of 95 feet can be expected during the weekday morning peak hour for the southbound left-turn movement. No further mitigation should be required at this intersection for future 2032 build conditions.

The initial analysis at the intersection of Walker Avenue at 4 Mile Road determined that signalization alone would not provide acceptable levels of service under the 2032 build conditions as it did under the 2032 no build conditions. It was found that an auxiliary eastbound right turn lane would also need to be constructed along 4 Mile Road at Walker Avenue to provide acceptable levels of service at the intersection.

Turn lane warrants were again examined to determine if a right or left turn lane would be needed along 4 Mile Road at the proposed site access as well as along Walker Avenue at the second proposed site access. Based on the volume warrants, right and left turn lanes are warranted along 4 Mile Road at the site access to the development, while neither a right nor left turn lane are warranted along Walker Avenue at the second site access to the development. The capacity analyses for the proposed site accesses revealed that all movements at the intersections are expected to operate acceptably, with the exception of the southbound left turn movement from the site access to 4 Mile Road. This movement will operate at a level of service F during the weekday morning peak hour and the overall southbound approach from the site access to 4 Mile Road will operate at a level of service E during the weekday morning peak hour. It is common for unsignalized side-street approaches onto major roadways to operate poorly during peak hours. The southbound left-turn queues are expected to be minimal, with mitigation at the Walker Avenue and 4 Mile Road intersection, and the volume to capacity ratio is 0.554, therefore no further mitigation should be required at this site access.

4.3.3 Projected 2042 Build Conditions

The study area intersections were finally evaluated with the future 2042 build traffic volumes to determine the future intersection operations at full build out of the proposed residential

development. The capacity analysis for the projected 2042 build conditions revealed that additional improvements beyond those identified under the no build 2042 conditions would be required at the 4 Mile Road and Peach Ridge Avenue intersection due to the traffic generated by the proposed residential development.

The installation of a left turn only lane on the southbound Peach Ridge Avenue approach to 4 Mile Road is expected to improve weekday morning peak hour approach delay by 120.7 seconds, but the approach is still expected to operate at level of service F. However, it is not uncommon for unsignalized side-street approaches onto major roadways to operate poorly during peak hours. While a volume to capacity ratio above 1.0 is expected for the southbound left turn lane, the anticipated 95th percentile queue length is minimal at 143 feet. Thus, a southbound left-turn lane providing 150 feet of storage is recommended. This is an additional 50 feet in length from the 2042 no build conditions due to the project traffic. Signalizing the intersection of Walker Avenue and 4 Mile Road will provide the necessary gaps for traffic to enter 4 Mile Road from Peach Ridge Avenue. Additionally, signalizing the intersection of 4 Mile Road at Walker Avenue provides a more efficient intersection for southbound study area traffic to utilize, therefore it is reasonable to assume that vehicles heading south from 6 Mile Road to 4 Mile Road may instead use Walker Avenue rather than Peach Ridge Avenue. In addition, traffic from the proposed development heading east on 4 Mile Road may utilize the Walker Avenue access instead of the Peach Ridge Avenue access if the delay for the southbound left-turn movement onto 4 Mile Road becomes lengthy. Improvements at the 4 Mile Road and Walker Avenue intersection may encourage site traffic to utilize the Walker Avenue access.

At the intersection of Walker Avenue at 4 Mile Road, the movements/approaches that were found to operate poorly due to the proposed development traffic were already deficient movements for the other scenarios examined and were already identified as requiring mitigation. The traffic signal control mitigation scenario was investigated under a three-phase signal operation with the north/south approaches split-phased, as well as an auxiliary eastbound right turn lane. This mitigation scenario that was recommended under the projected build 2032 conditions will continue to provide acceptable levels of service under the projected build 2042 conditions. No further improvements are required for this mitigation scenario.

Turn lane warrants were again examined to determine if a right or left turn lanes would be needed along Walker Avenue at the second proposed site access and along Peach Ridge Avenue at the third proposed site access. Right and left turn lanes were warranted along 4 Mile Road at the first site access to the development under projected 2032 build conditions. A right turn lane or taper is not required on Walker Avenue at the second site access nor on Peach Ridge Avenue at the third site access. A left turn lane is warranted along Walker Avenue at the second site access, while a left turn lane is not warranted at the Peach Ridge Avenue site access. The capacity analyses for the proposed site accesses revealed that all movements at the intersections are expected to operate acceptably,

with the exception of the southbound left turn movement from the site access to 4 Mile Road which will operate at a level of service F during the weekday morning peak hour and level of service E during the weekday afternoon peak hour, and the overall southbound approach which will operate at a level of service F during the weekday morning peak hour. As long as the volume to capacity ratio remains less than 1.0 and queuing is minimal, no improvements are typically necessary to mitigate these side-street movements from driveways. While the southbound left turn movement from the site access to 4 Mile Road is expected to operate at a poor level of service during the weekday morning peak hour, the expected V/C ratio of 0.904 for the left turn movement is still under 1.0. In the analysis of mitigation strategies, it was found that converting the intersection of Walker Avenue at 4 Mile Road to traffic signal control will result in an expected 95th percentile queue length on the site access approach to 4 Mile Road of 90 feet during the morning peak hour. In addition, drivers from the development can choose to access Walker Avenue and utilize the improved Walker Avenue and 4 Mile Road intersection instead of attempting to turn left onto 4 Mile Road during the peak hours. No further mitigation should be required at the site access to 4 Mile Road.

4.4 Summary

Improvements that are needed in order to mitigate the future 2023, 2032, and 2042 no build conditions are as follows:

4.4.1 Future 2023 No Build Conditions

- Installation of a traffic signal at Walker Avenue and 4 Mile Road. Due to the existing misalignment of the intersection, the traffic signal operation would require a split-phase operation.

4.4.2 Future 2032 No Build Conditions

The following additional improvements will be needed under future 2032 no build conditions:

- A 100' southbound left-turn lane along Peach Ridge Avenue at 4 Mile Road.

4.4.3 Future 2042 No Build Conditions

The following additional improvements will be needed under future 2042 no build conditions:

- Construction of an eastbound right-turn lane along 4 Mile Road at Walker Avenue.

Additional improvements that are needed in order to mitigate the projected 2023 Phase 1 build conditions, projected 2032 mid-point build conditions, and projected 2042 full build out stages of the development due to the addition of project traffic are as follows:

4.4.4 Projected 2023 Build Conditions

- Westbound right turn taper along 4 Mile Road at the proposed site access.

4.4.5 Projected 2032 Build Conditions

- Construction of an eastbound right-turn lane along 4 Mile Road at Walker Avenue.
- Construction of a westbound right turn lane along 4 Mile Road at the proposed site access.
- Construction of an eastbound left-turn lane along 4 Mile Road at the proposed site access.

4.4.6 Projected 2042 Build Conditions

- A 150' southbound left-turn lane along Peach Ridge Avenue at 4 Mile Road (additional 50 feet of turn lane storage compared to no build conditions).
- Construction of a northbound left-turn lane along Walker Avenue at the proposed site access.