



## Traffic Impact Study

# Bioscience 5 Aurora, Colo

Comments 7/14/2021:

1) Regarding outstanding comments on SHAC criteria (from previous review) - It is acknowledged that in this context (collector/collector intersections) presence and design requirements such as storage length would be best evaluated in the criteria of operational analysis as well as roadway context and design. With that in mind, the AWSC analysis for 23rd/Racine indicates a LOS E in the PM peak hour for the design that does not include right turn aux lanes. If an option is desired that does not include right turn aux lanes, the analysis would support a roundabout at this location that can handle the higher volumes without the need for right turn aux lanes. At this point, the analysis included in this TIS is acceptable to illustrate the performance of the two intersection controls.

2) See comments on right turn lanes and requirements/waivers thereof on Figure 12. Some locations have heavy right turn volumes on free thru/right movements and warrant right turn lanes. Some others, the volumes are not high and a waiver can be supported by traffic. Care must be taken to balance both the driver expectation and pedestrian crossing factor. Most pedestrians are also drivers and behave differently once they are in the car. In the case of proportionally similar volumes between thru and right turn movements at an uncontrolled approach, thru drivers tend to weave, or aggressively accelerate around right turning vehicles, which results in a less safe environment for pedestrians (and bicyclists, as right turners tend to utilize the bike lanes as pseudo right turn lanes, when they are absent), regardless of the longer crossing distances. Further conversation on the identified movements may be necessary with accompany re-wording of some text in this report to accommodate any changes.

Thank you for providing comments to the Bioscience 5 traffic study. Please see individual comments throughout this document.

P  
F 1) It is believed that the project is moving forward with design of a roundabout at the intersection of 23rd Avenue and Racine Street. To remain consistent with the previous submittal and for the purposes of this analysis, all-way stop control has also been evaluated at this intersection. However, with the all-way stop control scenario, southbound and westbound right turn lanes have been incorporated at this intersection in the revised traffic study.

K 2) Thank you for waiving the need for several right turn lanes at the project intersections. Based on additional meetings and correspondence with the City and re-evaluation of traffic volumes, it is greatly appreciated that the need for a westbound right turn lane at 22nd Ave/Revere Street and an eastbound right turn lane at 23rd Ave/Revere Street have also been waived.

# T R A F F I C   I M P A C T   S T U D Y

## **Bioscience 5 (Fitzsimons)**

Aurora, Colorado

**Prepared for**  
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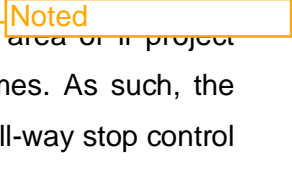
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be installed along the southbound approach of this intersection. By 2040, Revere Street is expected to extend south of 22<sup>nd</sup> Avenue and have a connection with Montview Boulevard. When Revere Street connects with Montview Boulevard, it is recommended that the northbound and southbound approaches of the 22<sup>nd</sup> Avenue and Revere Street intersection provide stop control while the eastbound and westbound approaches of this intersection will be uncontrolled. The 2017 Fitzsimons MTIS identified all-way stop control at this intersection; therefore, all-way stop control warrants were evaluated for this intersection. All-way stop control warrants are met at this intersection with 2040 traffic volume projections. It should also be noted that the City of Aurora requested that 2040 traffic volumes from the 2017 Fitzsimons MTIS be utilized as background traffic in this study; therefore, the addition of project traffic is double counting at several movements as the previous use assumed in the same development area of Bioscience 5 was also accounted for in the original MTIS. As such, all-way stop control would not be warranted at this intersection if traffic volumes from the original MTIS did not include this development area or if project traffic volumes were not added on top of the original MTIS traffic volumes. As such, the intersection of 22<sup>nd</sup> Avenue and Revere Street was also evaluated under all-way stop control and roundabout control. This intersection is expected to operate acceptably during the peak hours in 2040 under two-way stop, all-way stop or roundabout control.



- The intersection of 23<sup>rd</sup> Avenue and Racine Street is not expected to contain any vehicular travel at buildout of the proposed development as only the east and south legs will be constructed at this intersection. All-way stop control warrants are met at this intersection with 2040 traffic volume projections. The 2017 Fitzsimons MTIS identified a single lane roundabout at this intersection; therefore, was evaluated as such in this study. When the full street sections of 23<sup>rd</sup> Avenue and Racine Street are constructed, it is recommended that this intersection either operate with all-way stop control or roundabout control and will be determined through further coordination with City staff. The project team is currently coordinating with the City of Aurora the potential layout of the roundabout at this intersection.
- The 2017 Fitzsimons MTIS identified two-way stop all-way stop control at the 22<sup>nd</sup> Avenue and Racine Street intersection. When the full street sections of 22<sup>nd</sup> Avenue and Racine Street are constructed, it is recommended that the eastbound and westbound approaches of

See comments on ability of roundabout to provide operations supportive of waiver of RT lane requirement.

Right turn volume very high, exceeds even through volume. Need a right turn lane here.

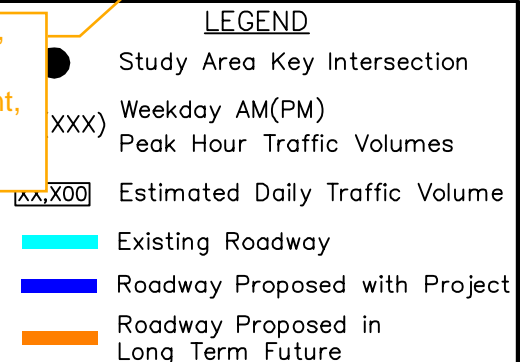
With the all-way stop control scenario, southbound and westbound right turn lanes have been incorporated at this intersection in the revised traffic study.

Thank you for waiving the need for several right turn lanes at the project intersections. Based on additional meetings and correspondence with the City and re-evaluation of traffic volumes, it is greatly appreciated that the need for a westbound right turn lane at 22nd Ave/Revere Street and an eastbound right turn lane at 23rd Ave/Revere Street have also been waived.

These volumes exceed criteria for needing a SB/NB right turn lane. In the case of this intersection, volumes are not heavy, and requirement for right turn aux lane may be waived.

These two intersections may meet warrants for AWSC in 2040. Analysis for that control also provided, and operates acceptably. TWSC is acceptable until AWSC can be confirmed to be warranted in the future.

Heavy AM volume, almost as high as free thru movement, right turn lane warranted here.









BIOSCIENCE 5 – FITZSIMONS  
2040 TOTAL TRAFFIC VOLUMES

FIGURE 12

HCM 6th AWSC  
6: Racine Street & 23rd Avenue

PM peak hour analysis is demonstrating that AWSC capacity is beginning to be exceeded with this design.

10 Background PM.syn  
05/11/2021

Intersection										
Intersection Delay, s/veh	32.6									
Intersection LOS	D									
Movement	EBL	EBT	EBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations										
Traffic Vol, veh/h	105	175	4	45	195	30	75	220	100	
Future Vol, veh/h	105	175	4	45	195	30	75	220	100	
Peak Hour Factor	0.92	0.92	0.9	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles, %	2	2		2	2	2	2	2	2	
Mvmt Flow	114	190	4	49	212	33	82	239	109	
Number of Lanes	1	1		1	1	0	1	1	0	
Approach	EB			NB			SB			
Opposing Approach	WB			EB			NB			
Opposing Lanes	2			2			2			
Conflicting Approach Left	SB			NB			WB			
Conflicting Lanes Left	2			2			2			
Conflicting Approach Right	NB			SB			WB			
Conflicting Lanes Right	2			2			2			
HCM Control Delay	19.5			50.8			31.7			
HCM LOS	C			F			D			

With the all-way stop control scenario, southbound and westbound right turn lanes have been incorporated at this intersection in the revised traffic study.

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%	
Vol Thru, %	0%	87%	0%	81%	0%	71%	0%	69%	
Vol Right, %	0%	13%	0%	19%	0%	29%	0%	31%	
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	
Traffic Vol by Lane	45	225	105	215	35	380	75	320	
LT Vol	45	0	105	0	35	0	75	0	
Through Vol	0	195	0	175	0	270	0	220	
RT Vol	0	30	0	40	0	110	0	100	
Lane Flow Rate	49	245	114	234	38	413	82	348	
Geometry Grp	7	7	7	7	7	7	7	7	
Degree of Util (X)	0.126	0.59	0.291	0.552	0.093	0.924	0.203	0.793	
Departure Headway (Hd)	9.309	8.691	9.164	8.508	8.78	8.052	8.95	8.204	
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Cap	384	413	391	423	408	450	400	442	
Service Time	7.081	6.463	6.937	6.28	6.542	5.814	6.714	5.968	
HCM Lane V/C Ratio	0.128	0.593	0.292	0.553	0.093	0.918	0.205	0.787	
HCM Control Delay	13.4	23.3	15.7	21.3	12.4	54.3	14	35.9	
HCM Lane LOS	B	C	C	C	B	F	B	E	
HCM 95th-tile Q	0.4	3.7	1.2	3.2	0.3	10.5	0.7	7.1	

Shared thru/right movements result in failing LOS