



MEMORANDUM

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FROM: Stephen Simon, Mike Rocha
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DATE: June 30, 2023

SUBJECT: 72nd & Vasquez Kum & Go #2300 Development – Roadway Improvements

This memorandum is provided to summarize our assessment of potential roadway and intersection improvements in order to mitigate long-term projected poor levels of service pursuant to the previously prepared Traffic Impact Study (TIS)¹ for the 72nd & Vasquez Kum & Go development.

This assessment is also provided to identify possible challenges associated with said roadway and intersection improvements which may limit or prohibit their implementation at this time. It is noted that improvements which cannot be reasonably constructed with site development will require a variance request pursuant to City standards.

Analysis Objective

- Evaluate potential roadway and intersection improvements to mitigate projected long-term (Year 2042) poor levels of service at study intersections.
- Identify potential challenges or limitations that may prevent roadway and intersection improvements from being reasonably implemented with site development.

Site Development Summary

Commercial development is being considered on the occupied parcel of land located near the southeast corner of the intersection of E 72nd Avenue with Eudora Drive in Commerce City, Colorado. The site is currently occupied by an existing excavation equipment and vehicle supplier/rental business and is surrounded by a mix of industrial and commercial land uses.

¹ Traffic Impact Study 72nd & Vasquez Kum & Go #2300, SM Rocha LLC, June 2022.

Primary access to site development is being considered at the following locations:

- One full-movement access onto Eudora Drive (referred to as Access A in the previously prepared TIS)
- One full-movement access onto Elm Drive (referred to as Access B in the previously prepared TIS)

Background Traffic Intersection Operations – Year 2042

As detailed in the prepared TIS, background traffic is the traffic projected to be on area roadways without consideration of the proposed development. Background traffic may include traffic generated by development of vacant parcels in the area or redevelopment of occupied parcels.

By Year 2042, and without the proposed development, projected background traffic volumes are noted to result in various poor intersection Levels of Service (LOS), as identified in Table 3 of the TIS. These are identified as follows:

E 72nd Avenue & Vasquez Boulevard (US 6) – Signalized

- Overall PM peak traffic hour operations of LOS F with an average control delay of 160.0 seconds per vehicle.

E 72nd Avenue & Eudora Drive – Stop-Controlled

- Northbound turning movements operate at LOS E during the AM peak traffic hour and LOS F during the PM peak traffic hour.
- Southbound turning movements operate at LOS F during both the AM and PM peak traffic hours.

It is to be noted that it is not uncommon for unsignalized (stop-controlled) movements to or from an arterial roadway, in urban areas, to operate with noticeable delays during peak traffic hours. This is primarily due to the potential for high through traffic volumes along the arterial roadway (E 72nd Avenue) to reduce possible gaps for turning vehicles to utilize when entering the roadway from a side street (Eudora Drive).

Total Traffic Intersection Operations – Year 2042

As detailed in the prepared TIS, total traffic is the traffic projected to be on area roadways with consideration of the proposed development and is identified as the addition of site-generated traffic to background traffic volumes.

By Year 2042, and upon development build-out, projected total traffic volumes are noted to result in continued poor intersection Levels of Service (LOS), as identified in Table 8 of the TIS. These are identified as follows:

E 72nd Avenue & Vasquez Boulevard (US 6) – Signalized

- Overall PM peak traffic hour operations of LOS F with an average control delay of 176.8 seconds per vehicle.

E 72nd Avenue & Eudora Drive – Stop-Controlled

- Northbound turning movements operate at LOS F during both the AM and PM peak traffic hours.
- Southbound turning movements operate at LOS F during both the AM and PM peak traffic hours.

E 72nd Avenue & Elm Drive – Stop-Controlled

- Northbound turning movements operate at LOS E during the AM peak traffic hour.

Compared to background traffic analysis, the traffic generated by the proposed development is not expected to significantly change the operations of the study intersections. Specifically for stop-controlled intersections, it is again noted that due to the presence of high through traffic volumes along the E 72nd Avenue corridor, poor intersection operations are not considered to be an uncommon occurrence during peak hours. However, as discussed in the Queue Length Analysis of the prepared TIS, it is likely that as vehicles begin to experience extended delays and growing vehicle queues, drivers will self-regulate by choosing alternate routes to avoid said delays.

Potential Roadway & intersection Improvements & Feasibility Assessment

Based on the above identified poor intersection operations, the following are potential mitigation measures that may be implemented in order to improve projected delays. Additionally, an assessment of feasibility in implementing each mitigation method is provided.

E 72nd Avenue & Vasquez Boulevard (US 6) – Signalized

The LOS F operation projected during the PM peak traffic hour is primarily attributed to the westbound right turn volumes, northbound through volumes, and southbound left turn volumes.

- Westbound right turn volumes are projected to be as much as 845 vehicles during the PM peak hour by Year 2042. In order to assist with delays associated with this movement mitigation methods are limited to provision of additional acceleration lanes along Vasquez Boulevard. Given that the existing right turn movement is a free-flowing channelized movement no adjustments to signal timings are recommended.

However, it is noted that the existing right-turn acceleration lane provided is less than current CDOT standards for length which require at least 712 feet given the roadway classification and posted speed limit. Drivers are expected to be hesitant to enter the flow of traffic due to the short length available thereby eliminating the benefits of a free-flowing movement. This hesitation is likely to result in the movement operating as a yielded turn, particularly for large vehicles. Extending the existing acceleration lane is likely to help in maintaining a free-flow movement, however with more than 800 vehicles projected by Year 2042, the most beneficial mitigation for this movement would likely be provision of two (2) right turn acceleration lanes.

In either case, the primary limitation in providing the above identified improvement is the limited available right-of-way (ROW) along Vasquez Boulevard and the close proximity to north Eudora Drive. In order to implement this mitigation method coordination with CDOT and the City would be required in order to establish the necessary ROW and potentially relocate Eudora Drive further east to allow for the expansion. Given these conditions, a large-scale improvement of this type is considered beyond the scope of what is feasible for the proposed Kum & Go development. Furthermore, the TIS identifies that these volumes are expected to occur without the development, which only contributes an estimated 51 vehicles to the total volume. As such, the proposed development is not considered a significant contributor to the projected delay.

- Northbound through volumes are projected to be as much as 2,067 vehicles during the PM peak hour by Year 2042. Of these volumes, it is noted that the proposed development is likely to provide a benefit to operations rather than a detriment given the effects of pass-by trips. Existing pass-by trips along Vasquez Boulevard are expected to exit onto E 72nd Avenue in order to access the development thereby reducing the total through volumes. In order to assist with delays associated with these through volumes mitigation methods are limited to extension of available green time or further roadway widening from four to six through lanes (three lanes in each direction).

Of these mitigation methods, both are considered unachievable with regard to the proposed development for the following reasons. Firstly, any extension of available green time for the through volumes will in turn require a reduction of green time for other movements. As identified in the prepared TIS, future signal timings were optimized in order to account for future regional transportation demands and as such further adjustments to timings or phase splits are expected to further degrade the overall intersection operations rather than improve them. Secondly, widening of the roadway to accommodate three through lanes in the northbound direction would require additional ROW and may require relocation of Eudora Drive due to its close proximity. A project of this scale would require involvement from both CDOT and the City and exceeds what may be considered feasible for the proposed development.

- Southbound left turn volumes are projected to be as much as 615 vehicles during the PM peak hour by Year 2042. Of these volumes, the proposed development is noted to contribute an estimated 54 vehicles. It is further noted that dual left turn lanes are already provided, and additional turn lanes cannot be provided due to ROW limitations and safety with regard to typical intersection design methods per AASHTO and the MUTCD. As such potential mitigation for this movement is likely limited to future grade-separation of the intersection from E 72nd Avenue resulting in a highway interchange.

This mitigation method is considered a significant roadway design project involving CDOT and City Staff and would require a substantial effort to acquire necessary property to provide sufficient ROW. Although such an improvement would likely be beneficial to future corridor operations, it is considered beyond the scope of the proposed development to provide specific input on such an undertaking.

Based on the above considerations for primary poor movements at the study intersection of E 72nd Avenue and Vasquez Boulevard (US 6), it is concluded that the proposed development does not significantly contribute to future projected volumes. Furthermore, all identified mitigation methods to improve projected poor levels of service are considered beyond what is feasible or reasonable for the proposed development to implement. Therefore, no mitigation measures are currently proposed for this development. It is recommended that City and CDOT Staff continue to monitor the study intersection as area development occurs in order to identify when specific improvement methods are feasible.

E 72nd Avenue & Eudora Drive – Stop-Controlled

As previously noted the LOS E and F operations identified for the northbound and southbound turning movements at the study intersection are primarily due to the high through volumes along E 72nd Avenue and the stop-controlled nature of the intersection.

- As identified in the prepared TIS, provision of an exclusive northbound left turn lane may assist with operations and would help shorten potential vehicle queues, however it is likely that this would not entirely reduce delays. In order to mitigate long-term operations solutions are limited to signalization of the intersection or potential restriction of access.

Signalization of the study intersection is considered to be unachievable due to the proximity to the Vasquez Boulevard intersection and associated safety concerns from operating signals adjacent to each other. Such conditions are likely to lead to confusion for drivers unfamiliar with the roadway network, and result in increased delays for other movements which are currently free flowing.

Alternatively, restriction of allowable movements at the intersection may provide mitigation by forcing drivers to utilize alternative routes. However, such restrictions would impact other businesses along Eudora Drive and limited access may interfere with these development's ability to equally distribute traffic within the site and out to available roadways. These limitations may then further impact existing and future traffic in the surrounding area and potentially causing the adjacent roadway network to be used in a manner not intended or cause additional delay that could impact emergency response times.

Based on the above considerations for primary poor movements at the study intersection of E 72nd Avenue and Vasquez Boulevard (US 6), it is concluded that the proposed development may consider providing additional turn lanes if available ROW allows to assist with vehicle queues. However, other mitigation methods are generally not recommended at this time due to proximity of intersections and limitations on other business accesses or emergency vehicle access.

E 72nd Avenue & Elm Drive – Stop-Controlled

Similar to conditions at the intersection of E 72nd Avenue with Eudora Drive, the projected LOS E operation during the AM peak traffic hour at Elm Drive is primarily attributed to the high through volumes along E 72nd Avenue and the stop-controlled nature of the intersection.

- As with the Eudora Drive intersection, mitigation for the identified LOS E operation is generally considered to be limited to signalization of the intersection or restriction of allowable movements. However, given the close proximity of Elm Drive to the intersections with Eudora Drive and Vasquez Boulevard, signalization may not be beneficial due to added driver confusion leading to safety concerns, as well as additional delays or congestion for previously free-flowing movements. Restriction of access may impact existing and future traffic in the surrounding area, including adjacent business access, and potentially causing the adjacent roadway network to be used in a manner not intended or cause additional delay that could impact emergency response times.

Based on the above considerations for primary poor movements at the study intersection of E 72nd Avenue and Vasquez Boulevard (US 6), it is concluded that the identified mitigation methods are generally not recommended at this time due to proximity of intersections and limitations on other business accesses or emergency vehicle access. Additionally, pursuant to the performed Queue Analysis in the prepared TIS, it is noted that vehicle queues for the intersection are not significant, and although northbound vehicles may experience some delays during peak hours, no other negative impacts to the intersection are noted.

Analysis Conclusion

An assessment of potential roadway and intersection improvements to mitigate poor levels of service was made in order to determine the feasibility of such improvements. Based on the assessment performed it is concluded that poor operations along the E 72nd Avenue corridor are not significantly contributed to by the proposed Kum & Go development, and poor levels of service are projected to occur without the development by Year 2042. Additionally, possible mitigation methods are generally not considered feasible at this time due to numerous limitations including available ROW constraints, intersection and roadway proximity, interference with adjacent business access, and potential for added driver confusion resulting in the roadway network being using in a manner not intended or cause additional delay for emergency response times. Based on these observations, said roadway improvements are considered to be beyond the scope of what may reasonably be required of the proposed development. It is recommended that City and CDOT Staff continue to monitor the study corridor in order to determine when specific mitigation methods may be best implemented. It is noted that improvements which cannot be reasonably constructed with site development will require a variance request pursuant to City standards.