

CDOT Red-lines

Kimley-Horn Responses

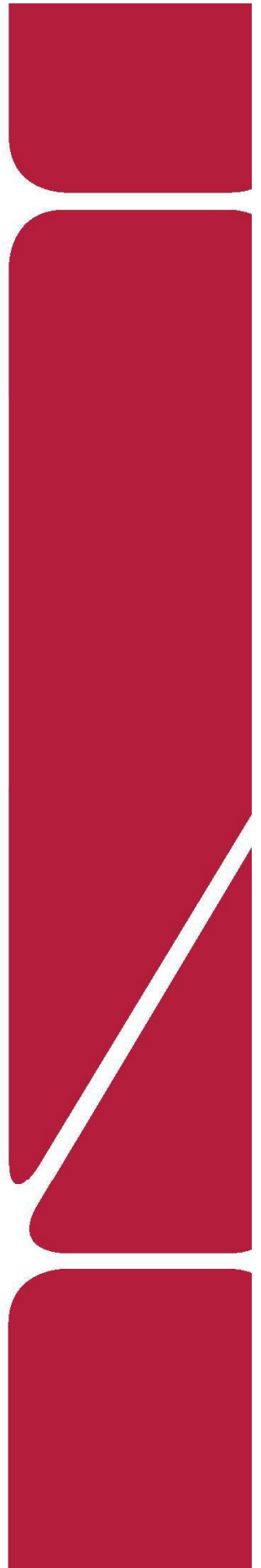


Traffic Impact Study

## Colfax and Peoria Aurora, Colorado

Prepared for:  
Grubb Properties, Inc.

**Kimley»Horn**



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

## Colfax and Peoria

Aurora, Colorado

**Prepared for**  
**Grubb Properties, Inc.**  
4601 Park Road  
Suite 450  
Charlotte, NC 28209

**Prepared by**  
**Kimley-Horn and Associates, Inc.**  
4582 South Ulster Street  
Suite 1500  
Denver, Colorado 80237  
(303) 228-2300



July 2020

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Questionable assumptions about a 100% rental development. I believe way more residents than 25% of the total units will leave & return from work each day. I also have to believe that many units will have more than one working resident. Current bus ridership is way down in metro Denver (pre covid)

Street intersection As directed by the City of Aurora and CDOT, the access along Oswego

Response: Interesting thoughts. The trip generation calculation is based directly out of the ITE Trip Generation. For this project it is mid-rise multifamily (ITE Code 221), which is no longer separated for rental or ownership units (we use the same equations for both). The trip generation equations have been developed by ITE based on data collected of many residential developments similar to this project. This is our best procedure to approximate trip generation, which is accepted across the United States. Curtis has developed trip generation equations for ITE and has conducted data collection for uses, and believes and trusts this information. Regarding transit, it is understood that bus ridership is down currently due to COVID-19, however we are hopeful that this pandemic does not continue long term. Eventually, life will return to normal (right?), and transit ridership will increase once again.

development scenarios: Scenario 1 allowing entering and exiting full turning movements with two-way traffic.

is expected to generate approximately 2,240 weekday daily trips. 172 trips are expected to occur during the morning peak hour and 172 trips are expected during the evening peak hour.

The street system was based on the area street system and anticipated surrounding development in the area, and the project. Assignment of project traffic was based upon the traffic volumes and the distributions developed.

Based on the analysis presented in this report, Kinross Peoria project will be successfully incorporated into the area. The proposed project development and expected traffic volumes and recommendations and conclusions:

This does not make sense why CDOT would be so concerned with the one or two-way access from the Apartment development onto Oswego, unless it has an effect on the north-to-eastbound right turn movement at Colfax. Where is the conclusion of the evaluation stated in this TIS?

- As directed by the City of Aurora and CDOT, the project was evaluated under two development scenarios: Scenario 1 allowing entering and exiting full turning movements only and Scenario 2 allowing full two-way access. It is believed that an access permit for the south leg of Oswego Street at Colfax Avenue (US-40) will be required by CDOT in association with this project under the entrance only scenario (Scenario 1) or the full two-way access scenario (Scenario 2). In addition, an access permit will be required for the existing full movement access to be converted to right-in/right-out access along Colfax Avenue. Of note, it is believed that an access permit will not be required for the south leg of Peoria Street at the intersection with Colfax Avenue (US-40) because traffic volumes are not anticipated to increase by more than 20 percent with development of the project.

Response: We apologize for the miscommunication here. The City requested the two scenario evaluation. The developer has decided, and the City has agreed, that this access along Oswego Street will be entrance only.

However, I advocate that a permit is needed for the west leg of the intersection if that new east-to southbound lane is not part of the CDOT project.

- CDOT has planned improvements at the intersection that will be completed prior to the buildout. These improvements include three eastbound through lanes and a

Response: Understood, Any work performed within the CDOT ROW will be accompanied with the required permits. So an Access Permit for Peoria Street will also be provided with the Eastbound Right Turn Lane. This has been clarified.

Response: CDOT has planned improvements for this intersection which include dual left turn lanes on all approaches and three through lanes on the eastbound approach. These improvements have been identified "by others" in the revised study. The project provided improvement include construction of the additional eastbound right turn lane and closure of the median within Colfax Avenue.

The short-term improvements at the Peoria-Colfax intersection needs to be illustrated if not in this TIS, then on the site plan as improvements "by others" I do not believe the existing center median - to be closed & restored is part of that project, and needs to be done in conjunction with the Right-in/out access permit.

You are creating a dichotomy by first stating that an Access Permit is not needed at the Peoria & Colfax intersection, then stating that an auxiliary EB to SB turn lane will go in. This has to be by a permit, and makes most sense for CDOT, to tie this aux lane to the Colfax-Peoria intersection. It may be necessary to do a "change-order" of sorts to add this to the intersection-project

Response: Understood, any work performed within the CDOT ROW will be accompanied with the required permits. This was clarified.

Understood that an eastbound right turn lane is requested to be constructed between the project frontage for this intersection. Based on 2023 traffic volumes, the right turn lane will require a length of 325 feet. Based on the proposed access location being 325 feet west of Peoria Street (measured edge to edge), it is recommended that this eastbound right turn lane be constructed as a continuous lane between the project driveway along Colfax Avenue and Peoria Street.

Clarify that you are speaking of the proposed right in/out driveway

- The project access along Colfax Avenue is recommended that the northbound approach of the Colfax Avenue Access operate with stop control with the installation of an R1-1 "STOP" sign. The existing raised median with Colfax Avenue is recommended to be reconstructed through this access intersection to restrict left turn movements. A R3-5(R) Right Turn Only sign could be installed underneath the "STOP" sign on the driveway approach and a R6-1(R) "ONE WAY" sign could be installed within the modified raised median if desired by CDOT.

Response: As requested the access will be clarified as RIRO.

An accurate assumption that it will be required with the Access permit for the right i/o driveway.

- Under access Scenario 2 (full movement two-way access), it is recommended that the westbound approach of the Oswego Street access operate with stop control with the installation of an R1-1 "STOP" sign. Single shared movement lanes should be sufficient on all approaches of this intersection.
- The access along 14<sup>th</sup> Avenue is proposed to be an unsignalized full movement access. The southbound exiting access approach to 14<sup>th</sup> Avenue should provide stop control with the installation of a R1-1 "STOP" sign. A single shared movement lane should be sufficient on all approaches of this access intersection.
- The existing 100-foot northbound right turn lane at the Colfax Avenue and Peoria Street intersection was found to require additional storage length. Based on this, it is recommended that the northbound right turn lane be constructed with a length of 225 feet by 2023 and 375 feet by 2040, which would be the full length along Peoria Street between Colfax Avenue and 14<sup>th</sup> Avenue. Incorporation of this northbound right turn lane is needed with or without the addition of project traffic. The redevelopment occurring on the southeast corner of the intersection is the

Response: Thanks, agreed.

Response: Understood, any work performed within the CDOT ROW will be accompanied with the required permits. This was clarified.

?? the first bullet says no permit needed for the south leg of Peoria? This is a dichotomy

CDOT staff is unclear what will be done "by others" at the Colfax-Peoria project, and what needs to be done as a result of this Multi-family project. That is why we ask for a map-graphic illustrating this and "by whom"

Response: CDOT has planned improvements for this intersection which include dual left turn lanes on all approaches and three through lanes on the eastbound approach (by others). The project provided improvement is the additional eastbound right turn lane. We have provided additional clarification in the report text and the figures.

et intersection, it is recommended to extend the to 250 feet by 2023 and 300 feet by 2040. This turn lane along Peoria Street between Colfax approximately 575 feet of back-to-back storage space

along Peoria Street. If the southbound left turn is restriped to 300 feet, then the taper between the back-to-back left turn lanes could be reduced from 250 feet to 150 feet to maintain the existing 125-foot northbound left turn lane at 16<sup>th</sup> Avenue. This left turn lane extension is independent of this project and is likely being coordinated through the improvements being conducted at this intersection.

- If future volumes materialize by 2040, Peoria Street may need to provide three through lanes in each direction in order to achieve acceptable operations. Likewise, to accommodate future right turning volume demands, right-turn overlap phasing may be needed on the northbound and southbound approaches of Peoria Street at the Colfax Avenue intersection by 2040.

- Any on-site and off-site roadway improvements should be incorporated into the Civil Drawing (as applicable) as well as the Manual (MUTCD).

Response: We believe the existing right-of-way is adequate to accommodate three eastbound through lanes along Colfax Avenue in the future if ever found to be needed.

ments should be OT standards (as – 2009 Edition

The future volumes on Colfax clearly spells out 3 through lanes, especially in the EB direction. You already advise right turn demands will exist at Peoria. Is there sufficient RoW and/or building setback between Oswego & the new right-in/out driveway to effectuate a new eastbound lane?

Noted: the out-parcel at the SEC of Oswego & Colfax is a limiting factor, but a that should not preclude the dedication of RoW from this property, and assurance to contribute a pro-rata share of a new EB lane.

Response: The project is already constructing a separate eastbound right turn lane to accommodate the three eastbound through lanes. By constructing this eastbound right turn lane, we believe the project has adequately contributed their fair share to any future three through lane eastbound approach.

## 3.0 EXISTING AND FUTURE CONDITIONS

### 3.1 Existing Study Area

The existing site is comprised of retail stores, a motel, and vacant land. North of the project site across Colfax Avenue is a 7-11 convenience store. To the south of the project site is industrial uses and an apartment complex further south beyond 14<sup>th</sup> Avenue. A Fitzsimons Gateway Hotel is being developed directly east of the project site on the southeast corner of the Colfax Avenue and Peoria Street intersection. A motel is located west of the project. Further to the northeast of the project site is the University of Colorado Hospital, Anschutz Medical Campus. The extended area surrounding the project site is mainly comprised of residential and commercial uses. The land uses and roadway network surrounding the site are shown in **Figure 2**.

### 3.2 Existing and Future Roadway Network

Colfax Avenue provides two through lanes eastbound and westbound with a 35 mile per hour posted speed limit and a raised median. Colfax Avenue provides three through lanes in each direction east of Peoria Street. Peoria Street provides two lanes of travel in each direction, northbound and southbound, with a speed limit of 35 miles per hour and a raised median from 14<sup>th</sup> Avenue to Colfax Avenue. Peoria Street provides three through lanes in each direction north of Colfax Avenue. Oswego Street and 14<sup>th</sup> Avenue both provide one lane of travel in each direction while not providing visible lane striping or a posted speed limit.

Colfax Avenue and Oswego Street is a four-leg unsignalized intersection with stop control along the northbound and southbound approaches. The eastbound and westbound approaches consist of an exclusive left turn lane, a through lane, and a shared through/right turn lane. The northbound and southbound approaches provide one shared lane for all movements.

Colfax Avenue and Peoria Street is a four-leg signalized intersection. The eastbound, northbound approaches consist of an exclusive left turn lane, two through lanes, and an exclusive right turn lane. The southbound approach consists of dual left turn lanes, and an exclusive right turn lane. The intersection currently has improvement plans to include dual left turn lanes on the eastbound approaches in the near future. A third eastbound through lane so be provided as part of these improvements.

Response: CDOT has planned improvements for this intersection which include dual left turn lanes on all approaches and three through lanes on the eastbound approach (by others). The project provided improvement is the additional eastbound right turn lane.

Response: The intent of Figure 2 is to show the site location with surrounding development. The existing lane configuration is shown in Figure 3.

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096973000 – Colfax and Peoria

Important to include a figure showing what is planned "by others"

Existing lanes of traffic (as described) should be better illustrated on Fig 2



This graphic should also show (white lines) all of the existing lanes of traffic

Response: The intent of Figure 2 is to show the site location with surrounding development. The existing lane configuration is shown in Figure 3.

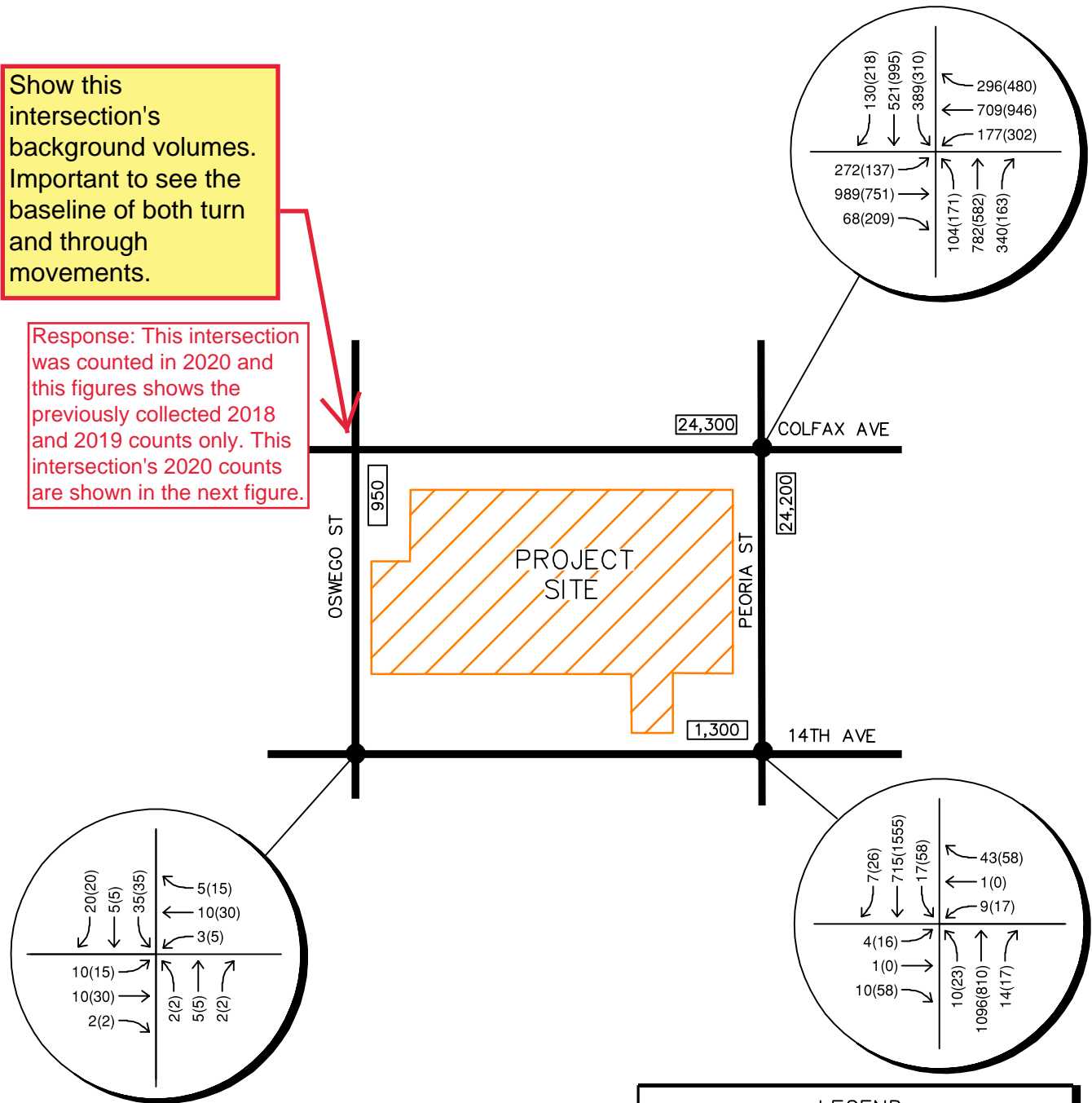


COLFAX AND PEORIA  
AURORA, CO  
SITE AREA

FIGURE 2

Show this intersection's background volumes. Important to see the baseline of both turn and through movements.

Response: This intersection was counted in 2020 and this figures shows the previously collected 2018 and 2019 counts only. This intersection's 2020 counts are shown in the next figure.



Source: Traffic data along Peoria Street from counts collected on October 25, 2018 and January 15, 2019

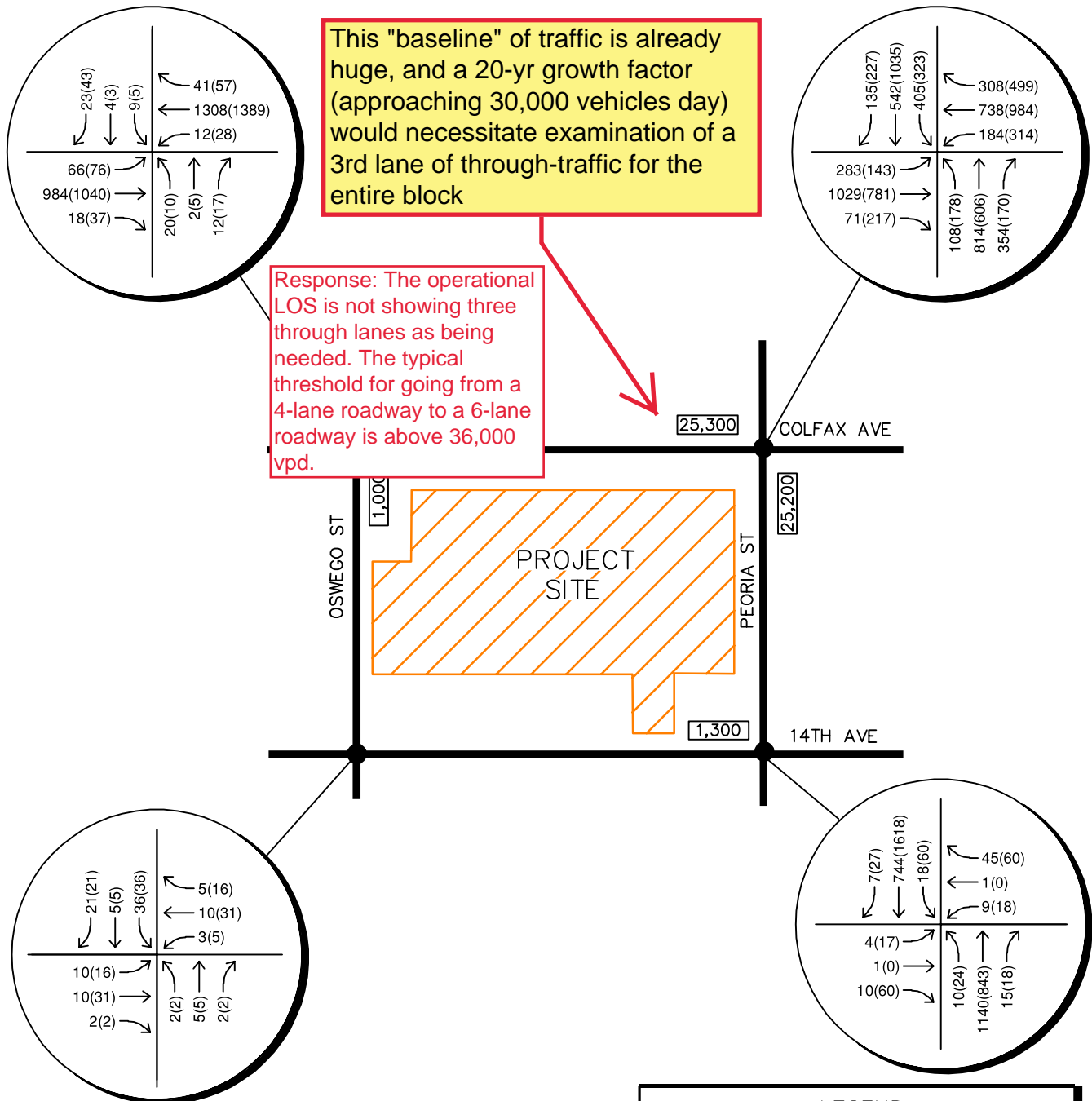
**LEGEND**

- Study Area Key Intersection
- xxx(xxx) Weekday AM(PM) Peak Hour Traffic Volumes
- xx,x00 Estimated Daily Traffic Volume

COLFAX AND PEORIA  
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2018 EXISTING TRAFFIC VOLUMES

FIGURE 4



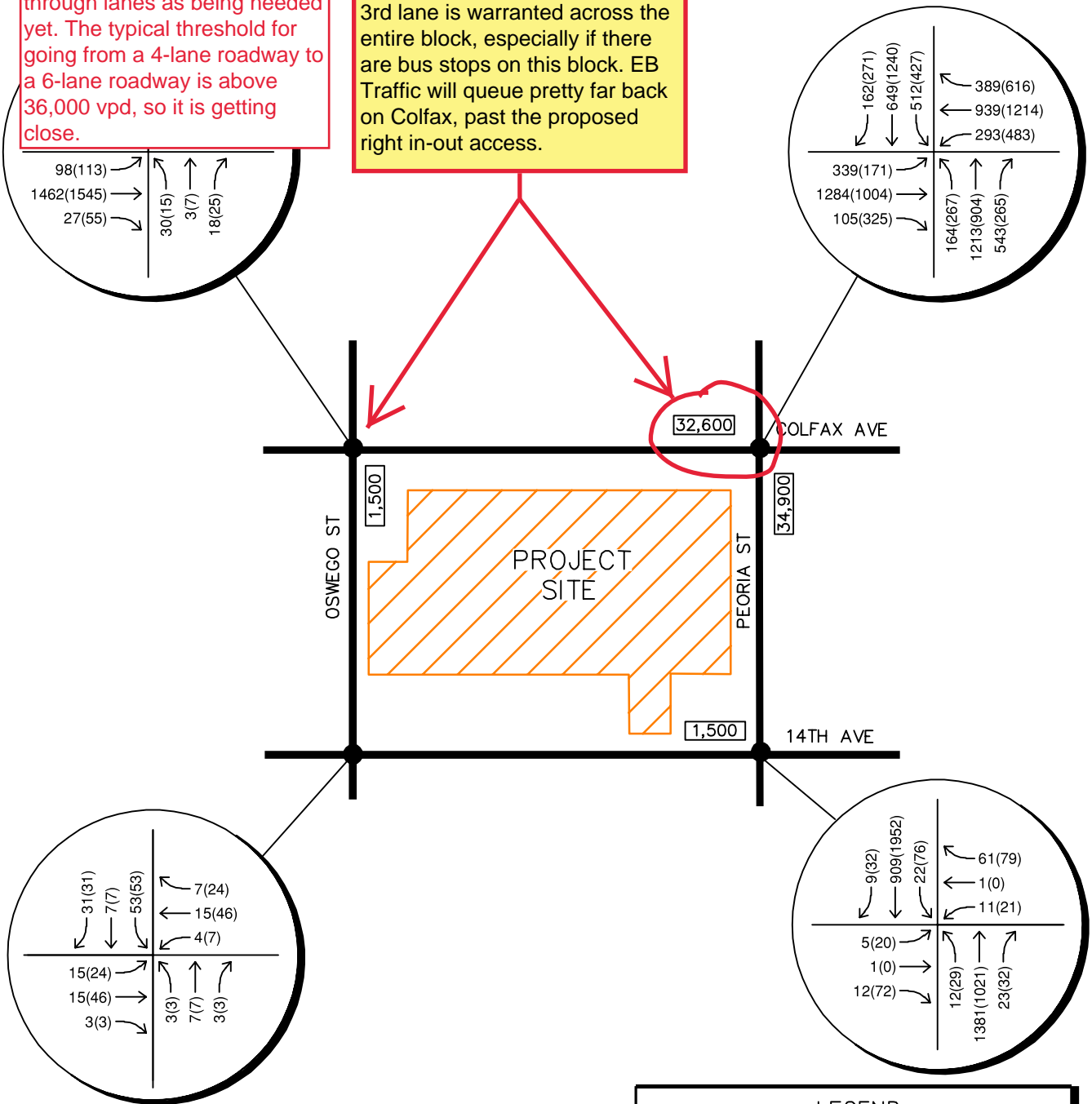


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2020 EXISTING ADJUSTED  
TRAFFIC VOLUMES

FIGURE 5

Response: The operational LOS is not showing three through lanes as being needed yet. The typical threshold for going from a 4-lane roadway to a 6-lane roadway is above 36,000 vpd, so it is getting close.

This is why 3 lanes of through traffic are needed. What are the counts at Oswego? I suspect a 3rd lane is warranted across the entire block, especially if there are bus stops on this block. EB Traffic will queue pretty far back on Colfax, past the proposed right in-out access.



**LEGEND**

- Study Area Key Intersection
- xxx(xxx) Weekday AM(PM) Peak Hour Traffic Volumes
- xx,x00 Estimated Daily Traffic Volume

COLFAX AND PEORIA  
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2040 BACKGROUND TRAFFIC VOLUMES

FIGURE 7

## 4.0 PROJECT TRAFFIC CHARACTERISTICS

### 4.1 Trip Generation

Site-generated traffic estimates are determined through a process known as trip generation. Rates and equations are applied to the proposed land use to estimate traffic generated by the development during a specific time interval. The acknowledged source for trip generation rates is the *Trip Generation Manual*<sup>1</sup> published by the Institute of Transportation Engineers (ITE). ITE has established trip rates in nationwide studies of similar land uses. For this study, Kimley-Horn used the ITE Trip Generation fitted curve equations that apply to Mid-Rise Multifamily Housing (ITE Code 221) for traffic associated with the development.

The Colfax and Peoria project is expected to generate a total of approximately 2,240 daily weekday external driveway trips. Of these, a total of 137 weekday morning peak hour and 172 weekday afternoon peak hour trips peak hour trips are expected. Calculations were based on the procedure and information provided in the ITE *Trip Generation Manual, 10<sup>th</sup> Edition – Volume 1: User's Guide and Handbook*, 2017. The trip generation calculations are included in **Appendix B**. These calculations illustrate the equations used and directional distribution of trips based on ITE studies. **Table 1** provides the estimated external trip generation for the Colfax and Peoria project.

**Table 1 – Colfax and Peoria Traffic Generation**

Land Use	Size	Weekday Vehicle Trips						
		Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Mid-Rise Multifamily Housing (ITE 221)	411 DU	2,240	36	101	137	105	67	172

I must ask where this number is derived from?

ITE manual shows 6.63 daily rate x 411 = 2725/day Under what premise (not the CDOT access code) is a further reduction or variance applied?

This seems extremely light - half of what rule-of-thumb would require. The 10th edition ITE does not appear to state ADT

<sup>1</sup> Institute of Transportation Engineers, *Trip Generation Manual*, 10<sup>th</sup> Edition – Volume 1: User's Guide and Handbook, Washington DC, 2017.

Response: These calculations are directly from the ITE Trip Generation 10th edition. They were double checked and are correct. The trip generation calculations are included in the appendices and data charts have been added for your reference.

?? what numbers are generated from the out-parcel at the SW corner?

Response: The Church's Chicken traffic is represented in the existing count data. Since this is a Fast-Food restaurant w/ Drive-Thru of approximately 1,500 SF that equates to approximately 49 afternoon peak hour trips for your reference.

On page 27, it says motorist will AVOID choosing the left turn movement here and instead divert to other signalized access locations for making a left turn movement. By your own assessment, I believe these numbers are backwards as to the number of motorist turning right -v- left at peak hour.

Response: These volumes are correct based on the desire of driver's movements. We estimate 15% of exiting trips will be turning left at this intersection. It is also important to note that these also represent background traffic. If driver's determine there is too much delay on the left turn during the peak hours, they may turn right instead and reroute on the surrounding street network.

COLFAX AND PEORIA  
AURORA, CO  
SCENARIO 2 2040 TOTAL TRAFFIC  
(FULL MOVEMENT AT OSWEGO ACCESS)

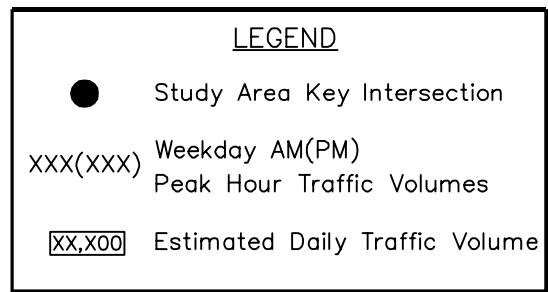
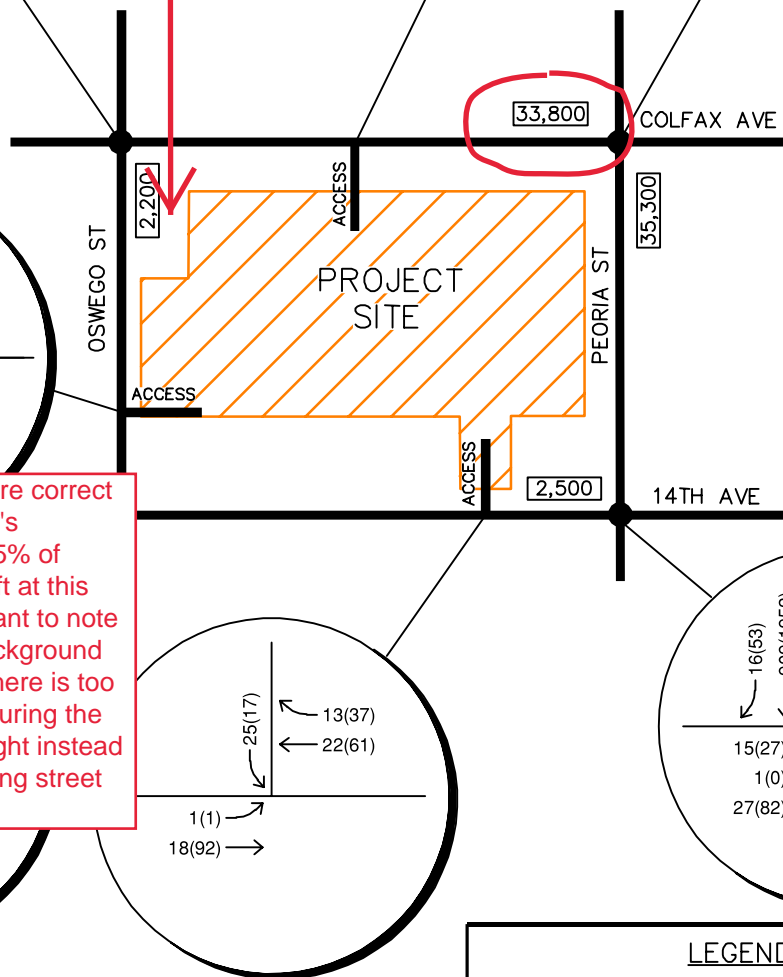


FIGURE 15

## 5.2 Key Intersection Operational Analysis

Calculations for the level of service at the key intersections for the study area are provided in **Appendix C**. The existing year analysis is based on the lane geometry and intersection control shown in **Figure 3**. Based on national attention on appropriate yellow and all-red clearance intervals to improve intersection safety, these have been calculated and are applied for the approaches to the signalized intersections. The increase in the yellow and all red time sacrifices intersection capacity for improved safety. Existing peak hour factors were used for the existing and 2023 conditions, and the recommended HCM urban area peak hour factor of 0.92 was used for the 2040 analysis. Synchro traffic analysis software was used to analyze the study area intersections and access drives for level of service. The Synchro Highway Capacity Manual (HCM) methodology reports were used to analyze intersection delay and LOS.

### Colfax Avenue and Oswego Street

The Colfax Avenue and Oswego Street intersection is unsignalized and operates with stop control along the northbound and southbound Oswego Street approaches. The movements at this intersection are expected to be currently operating acceptably with LOS C or better during the morning and afternoon peak hours. With or without the addition of project traffic, all movements at this intersection are anticipated to operate with LOS C or better during peak hours in 2023 for both scenarios

With or without project traffic by 2040, the northbound left turn movements are expected to operate with LOS F during the morning and afternoon peak hours. As such, eight-hour, four-hour, and a peak hour vehicle volume signal warrants were performed for this intersection and calculations are included in **Appendix D**. This intersection is not anticipated to meet any of the three vehicle volume warrants in 2023 or 2040. Vehicles will likely reroute to the signalized intersections of Colfax Avenue/Moline Street and Colfax Avenue/Peoria Street if delays are experienced at this intersection during the peak hours. Further, CDOT does not typically install traffic signals one-eighth of a mile from an arterial to arterial intersection. This intersection provides the results of the level of service at this intersection.

Response: The study was updated so that the Oswego Street access is entrance only. If longer delays are experienced, it is believed that drivers may reroute to signalized intersections to turn left to avoid delays.

On page 2 of this TIS, it states that two scenarios were studied for Oswego, with one way and two way mid-block access to the project from Oswego. This paragraph does not offer any description - findings of the assessment. I wish to know how outbound traffic will find it more convenient to turn right at Colfax (since left turns are problematic) and if/ how that warrants a new aux lane from Oswego heading east.

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0969 73000 – Colfax and Peoria

The numbers presented on Figure 15 do not align with this assumption.

Response: The volumes in Figure 15 are correct. This represents the desire of 15% of exiting trips turning left at this intersection. Important to note too that the volumes shown are from other developments.

### Colfax Avenue and Peoria Street

Colfax Avenue and Peoria Street is a four-leg signalized intersection which operates with protected/permissive left turn phasing on the northbound, eastbound, and westbound approaches. This intersection currently operates with LOS D during the morning peak hour and the afternoon peak hour under the existing lane configuration and signal control. By 2023, CDOT has planned improvements for this intersection which include dual left turn lanes at all approaches and three through lanes on the eastbound approach. With these improvements and under both access scenarios, this intersection is anticipated to operate acceptably with LOS D during both the morning and afternoon peak hours in 2023. Without the addition of project traffic in the 2040 horizon, the intersection is expected to operate unacceptably with LOS F during the morning peak hour and LOS E during the afternoon peak hour. If future 2040 traffic volumes materialize, three through lanes in the northbound and southbound direction along with overlap right turn phasing on the northbound and southbound approaches would be needed in order for this intersection to operate acceptably during the peak hours. With these improvements, the intersection is anticipated to operate at LOS D during both the morning and afternoon peak hours in 2040 under both access scenarios. **Table 4** provides level of service at this intersection.

**Table 4 – Colfax Avenue and Peoria Street LOS Results**

Scenario	AM Peak Delay (sec)	Level of Service	PM Peak Delay (sec)	Level of Service
2020 Existing	43.7		43.7	
2023 Background #	48.1		48.1	
2023 Total Traffic: Scenario 1 # (Entrance Only at Oswego St Access)	52.6	D	48.2	
2023 Total Traffic: Scenario 2 # (Two-Way at Oswego St Access)	52.6	D	48.1	D
2040 Background #	89.4	F	67.7	E
2040 Total Traffic: Scenario 1 ## (Entrance Only at Oswego St Access)	49.4	D	53.1	D
2040 Total Traffic: Scenario 2 ## (Two-Way at Oswego St Access)	53.9	D	53.0	D

# = Three eastbound through lanes and dual left turn lanes at all approaches

## = Three northbound and southbound through lanes, permissive plus overlap northbound and southbound right turn phasing

Response: Clarification was provided. The delay here would have been much worse had the CDOT planned improvements not occurred.

This wording is confusing. Why would CDOT do an intersection project that results in a LOS E/F? This TIS does not offer any clarity what is planned under the separate CDOT project, and how this (Link Apartment) project is going to improve that intersection and what/when/how that supplemental list of improvements are to occur. I wish to see it both graphically & by the numbers.



Response: Yes, an ADA ramp and ADA acceptable crossing of the access will be provided.

Would not an ADA crosswalk be prudent as well?

### Colfax Avenue Right-In/Right-Out Movement Access

With development of the project, a right-in/right-out movement access is proposed to be located along Colfax Avenue to align with the existing left turn median opening within Colfax Avenue to the west of the intersection of Colfax Avenue and Peoria Street, this median is proposed to be closed with construction of this project. It is recommended that the northbound approach of the access operate with stop control with the installation of an R1-1 "STOP" sign.

With completion of the proposed development, all movements at this access intersection are anticipated to operate acceptably at LOS C or better during the peak hours for 2023 and 2040. Table 7 provides the results of the level of service at this intersection.

**Table 7 – Colfax Avenue Right-In/Right-Out Movement Access LOS Results**

Scenario	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
<b>2023 Total Traffic: Scenario 1 (Entrance Only at Oswego St Access)</b> Northbound Right	13.7	B	11.7	B
<b>2023 Total Traffic: Scenario 2 (Two-Way at Oswego St Access)</b> Northbound Right	13.7	B	11.7	B
<b>2040 Total Traffic: Scenario 1 (Entrance Only at Oswego St Access)</b> Northbound Right	17.6	C	13.8	B
<b>2040 Total Traffic: Scenario 2 (Two-Way at Oswego St Access)</b> Northbound Right	16.7	C	13.8	B

Response: It is understood at times the eastbound queue of cars caused at the intersection of Colfax and Peoria could extend to and past this RIRO access. Any delays caused by this will be representative of vehicles on-site waiting to exit the driveway. As an alternative, project traffic has the ability to exit out to 14th Ave during periods of higher delay.

I am skeptical of this. The volume of EB vehicles approaching Peoria will queue back beyond and in-front of this proposed access at peak hour. I doubt LOS B can be achieved.

I do not believe the majority of EB traffic on Colfax passing the new mid-block right in/out access can be attributed to the turn movements at Oswego, although clearly I question your presumptive numbers of right-turn movements as shown on figure 15

I believe that the new EB to SB lane at Peoria will require an access permit for the EB approach - unless it becomes part of the "CDOT project"

### 5.3 CDOT Turn Lane Requirement Analysis

Response:  
Understood, any work performed within the CDOT ROW will be accompanied with the required permits.

The threshold for requiring an access permit a days occurs when project traffic is anticipated to increase the existing access tr more than 20 percent. Based on traffic projections, the addition of project traffic g of Oswego Street at Colfax Avenue (US-40) is anticipated to increase ex ffic volumes by more than 20 percent during the peak hour for either the entrance only access scenario along Oswego Street (Scenario 1) or full two-way entrance and exit access scenario along Oswego Street (Scenario 2). Therefore, it is believed that an access permit for the south leg of Oswego Street at Colfax Avenue (US-40) will be required by CDOT in association with this project. It is believed that an access permit will not be required on the south leg of Peoria Street at the intersection with Colfax Avenue (US-40) because traffic volumes are not increased by 20 percent with the addition of project traffic. In addition, an access permit will be required for the existing full movement access to be converted to right-in/right-out access along Colfax Avenue.

Agree

The City of Aurora has directed Kimley-Horn to use the Colorado Department of Transportation (CDOT) State Highway Access Code (SHAC) guidelines to determine if turn lanes are warranted for intersections not along CDOT highways. CDOT classifies their state highways based on roadway types. According to the CDOT Online Transportation Information System (OTIS), Colfax Avenue is classified as a NR-C: Non-Rural Arterial. The Non-Rural Arterial Category NR-C (low to moderate travel speeds and moderate volumes) was assigned to Peoria Street based on matching the characteristics of the CDOT roadways.

According to the State Highway Access Code for category NR-C roadways with a speed limit of 40 miles hour or less, a left turn lane with storage length plus taper length is required for any access with a projected peak hour left ingress turning volume greater than 25 vehicles per hour, and a right turn lane with storage length plus taper is required for any access with a projected peak hour right ingress turning volume greater than 50 vehicles per hour.

Both Colfax Avenue and Peoria Street currently have a posted speed limit of 35 miles per hour within the project limits. Based on the current speed limits and 2023 traffic volume projections, turn lane requirements at the project intersections along Colfax Street and Peoria Street are as follows:

As previously mentioned, page 2 of this TIS, it states that two scenarios were studied for Oswego, with one way and two way mid-block access to the project from Oswego. This paragraph also does not reveal the findings of the assessment. I do think that north-outbound traffic will be more inclined to turn right at Colfax (since left turns are problematic) and if/ how that warrants a new aux lane from Oswego heading east. Furthermore, what assumptions were plugged in for the eventual redevelopment of the out-lot at the SE corner?

Scenario 1: One Way Access (Oswego) and Oswego Street

Response: This can be studied further if and when the Church's Chicken redevelops on the southeast corner of the intersection.

- A westbound left turn lane exists and is warranted for the Colfax Avenue and Oswego intersection based on projected 2023 background plus project traffic volumes being 77 westbound left turns during the peak hour and the threshold being 25 vehicles per hour. With a requirement of one (1) foot of storage length per vehicle during the peak hour, the existing approximately 75-foot westbound left turn lane is expected to accommodate the projected left turning demand.
- An eastbound right turn lane is not warranted for the Colfax Avenue and Oswego Street intersection based on projected 2023 background plus project traffic volumes being 44 eastbound right turns during the peak hour and the threshold being 50 vehicles per hour.

Colfax Avenue (US-40) Right-In/Right-Out Access

- An eastbound right turn lane is not warranted for the Colfax Avenue Access intersection based on projected 2023 background plus project traffic volumes being 16 eastbound right turns during the peak hour and the threshold being 50 vehicles per hour.

This is why a new access permit is instructed for the EB approach to Peoria - accommodate a new EB to SB auxiliary turn lane at the Colfax & Peoria intersection.

14<sup>th</sup> Avenue and Peoria Street

- A northbound left turn lane exists and is warranted for the 14<sup>th</sup> Avenue and Peoria Street intersection based on projected 2023 background plus project traffic volumes being 40 northbound left turns during the peak hour and the threshold being 25 vehicles per hour. With a requirement of one (1) foot of storage length per vehicle during the peak hour, the existing 350-foot northbound left turn lane is expected to accommodate the projected left turning demand.
- A southbound right turn lane is not warranted for the 14<sup>th</sup> Avenue and Peoria Street intersection based on projected 2023 background plus project traffic volumes being 48 southbound right turns during the peak hour and the threshold being 50 vehicles per hour.

Response: Understood, an access permit at Colfax and Peoria will be provided for the proposed construction of the eastbound right turn lane.

Unless it is to become part of the intersection project

Response: Figures 16 and 17 show the improvements and applicable turn lane lengths.

Which figure-map illustrates all these improvements?

Also, on the same map, please ID if/when/where auxiliary turn lanes are recommended to be lengthened

## 5.4 Turn Bay Vehicle Queuing Analysis

A vehicle queuing analysis was conducted for turn lanes at the study area intersections. The queuing analysis was performed using the Synchro analysis software presenting the results of the 95th percentile queue length. Results of the vehicle queuing analysis are shown in the following **Table 10** with calculations provided in the intersection operational outputs located in **Appendix C** for unsignalized intersections and vehicle queuing analysis worksheets in **Appendix E** for signalized locations.

**Table 10 – Turn Lane Length Analysis Results**

Intersection Turn Lane	Existing Turn Lane Length (feet)	2023 Total Queue Length (feet)	2023 Recommended Turn Lane Length (feet)	2040 Total Queue Length (feet)	2040 Recommended Turn Lane Length (feet)
<b>Colfax Ave &amp; Peoria St</b>					
Eastbound Left	200'	173'/173'	200' DL	248'/247'	200' DL
Eastbound Right	175'	98'/98'	325'	214'/185'	325'
Westbound Left	300'	186'/186'	300' DL	260'/260'	300' DL
Westbound Right	400'	Free	400'	Free	400'
Northbound Left	250'	113'/113'	250' DL	154'/153'	250' DL
Northbound Right	100'	217'/217'	225'	382'/382'	C
Southbound Left	200' DL	231'/231'	250' DL	361'/361'	300' DL
Southbound Right	C	84'/84'	C	169'/169'	C
<b>Colfax Ave &amp; Oswego St</b>					
Eastbound Left	50'	25'/25'	50'	50'/25'	50'
Westbound Left	75'	25'/25'	75'	50'/25'	75'
<b>14<sup>th</sup> Ave &amp; Peoria St</b>					
Northbound Left	350'	25'/25'	350'	25'/25'	350'
Southbound Left	100'	25'/25'	100'	25'/25'	100'
<b>Colfax Avenue Access</b>					
Northbound Right	DNE	25'/25'	50'	25'/25'	50'
<b>Oswego Street Access</b>					
Westbound Approach	DNE	-/25'	25'	-/25'	25'
<b>14<sup>th</sup> Avenue Access</b>					
Southbound Approach	DNE	25'/25'	25'	25'/25'	25'

DL = Dual Left Turn Lanes; DNE = Does Not Exist; C = Continuous Turn Lane;  
XX'/XX' = Scenario 1/Scenario 2; Blue text reflects modifications/recommendations

By 2023, CDOT has planned to construct dual left turn lanes at all approaches at the intersection of Colfax Avenue and Peoria Street. As shown in the queuing table, all vehicle queues are anticipated to be accommodated or managed within the existing and proposed turn bay lengths by buildout in 2023 with exception of the northbound right turn and southbound left turn movements at the Colfax Avenue and Peoria Street intersection.

Not clear. Is this "exception" before or after the CDOT intersection project?

Therefore, the existing 100-foot northbound right turn lane at the Colfax Avenue and Peoria Street intersection was found to require additional storage length. Based on this, it is recommended that the northbound right turn lane be constructed with a length of 225 feet by 2023 and 375 feet by 2040, which would be the full length along Peoria Street between Colfax Avenue and 14<sup>th</sup> Avenue. Incorporation of this northbound right turn lane is needed with or without the addition of project traffic and may currently be underway by the redevelopment occurring on the southeast corner of the intersection.

Are these to be done by the "CDOT project" ? If not, by whom and when?

Likewise, at the Colfax Avenue and Peoria Street intersection, it is existing 200-foot southbound left turn lane to 250 feet by 2023 and turn lane is a striped back-to-back left turn lane along Peoria Street 16<sup>th</sup> Avenue. There is approximately 575 feet of back-to-back s Street. If the southbound left turn is restriped to 300 feet, then the back left turn lanes could be reduced from 250 feet to 150 feet to maintain the existing 125-foot northbound left turn lane at 16<sup>th</sup> Avenue. This left turn lane extension is independent of this project and is likely being coordinated through the improvements being conducted at this intersection.

Response: We believe that this northbound right turn lane extension should be planned by the hotel being constructed on the southeast corner of the intersection. The southbound left turn lane extensions is recommended to be considered by either the City or CDOT. Neither of these movements is anticipated to include project traffic.

Reading this is quite confusing. What is "this project"? is that the Link Apartment development, or the CDOT intersection project?

It is understood that an eastbound right turn lane along Colfax Avenue project frontage for the Peoria Street intersection. Based on traffic volumes, this eastbound right turn lane will require a length of 325 feet. Based on the proposed access location being 325 feet west of Peoria Street (measured edge to edge), it is recommended that this eastbound right turn lane be constructed as a continuous lane between the project driveway along Colfax Avenue and Peoria Street. Of note, the storage calculations identify 71 feet of storage needed in 2023 and 135 feet of storage used in 2040 for this eastbound right turn.

Response: "this project" is referring to the Link Apartments Fitzsimons project. The report was updated to clarify this.

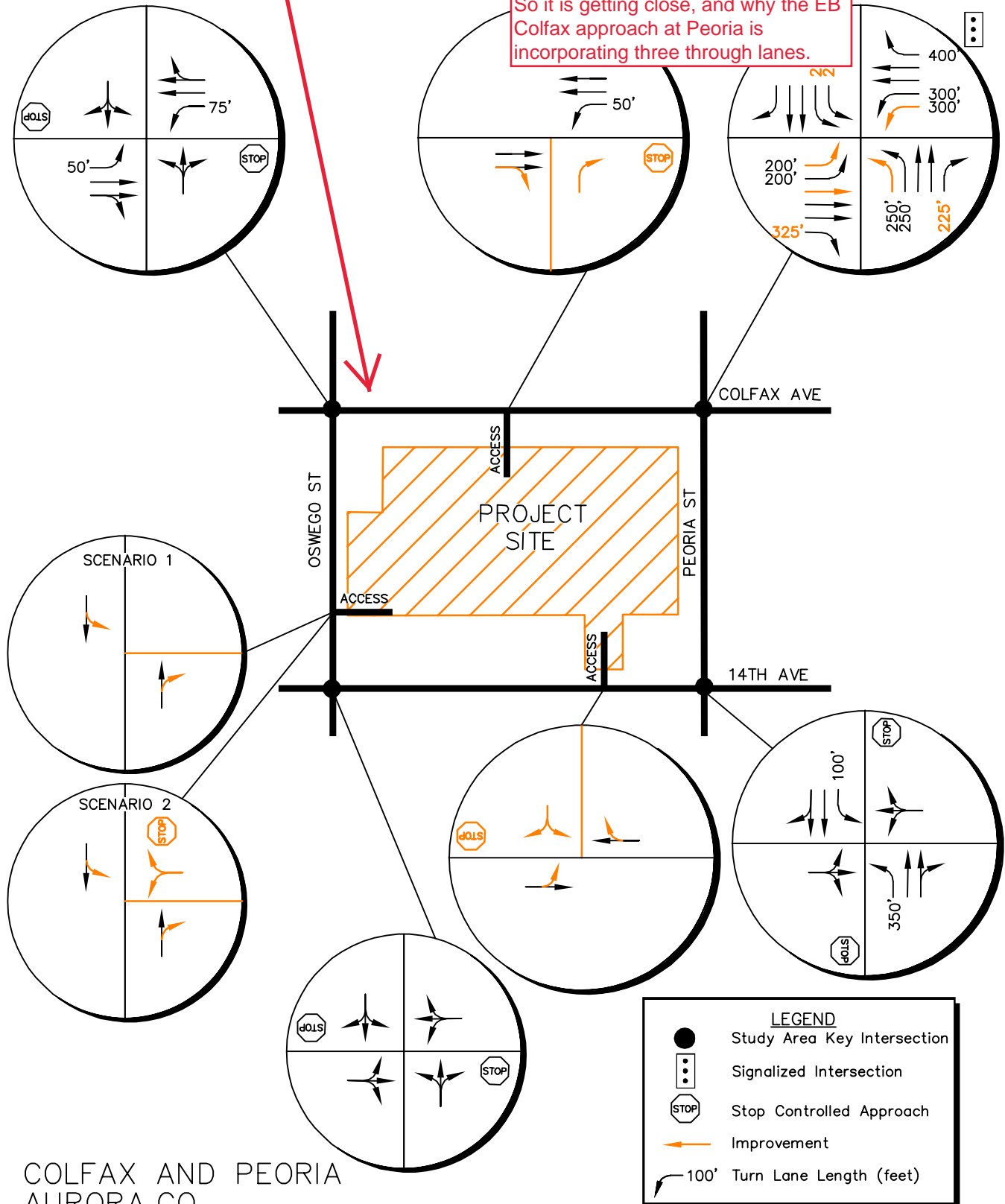
Based on the results of the intersection operational and turn lane analysis, the recommended lane configurations and control of the study key intersections are shown for the 2023 project buildout year in **Figure 16**. The improvements that may be needed in the 2040 long term horizon are shown in **Figure 17**.

To repeat the remark: this EB right turn lane should be by an access permit, if not integrated into the "CDOT project"

Response: Understood, any work performed within the CDOT ROW will be accompanied with the required permits.

I seriously question how only 2 through lanes are to handle +27,000 vehicles/day in 2023, and +32,000 vehicles/day in 2040 along this segment of Colfax immediately east of Oswego.

Response: The operational LOS is not showing three through lanes as being needed. The typical threshold for going from a 4-lane roadway to a 6-lane roadway is above 36,000 vpd. So it is getting close, and why the EB Colfax approach at Peoria is incorporating three through lanes.



COLFAX AND PEORIA  
AURORA, CO

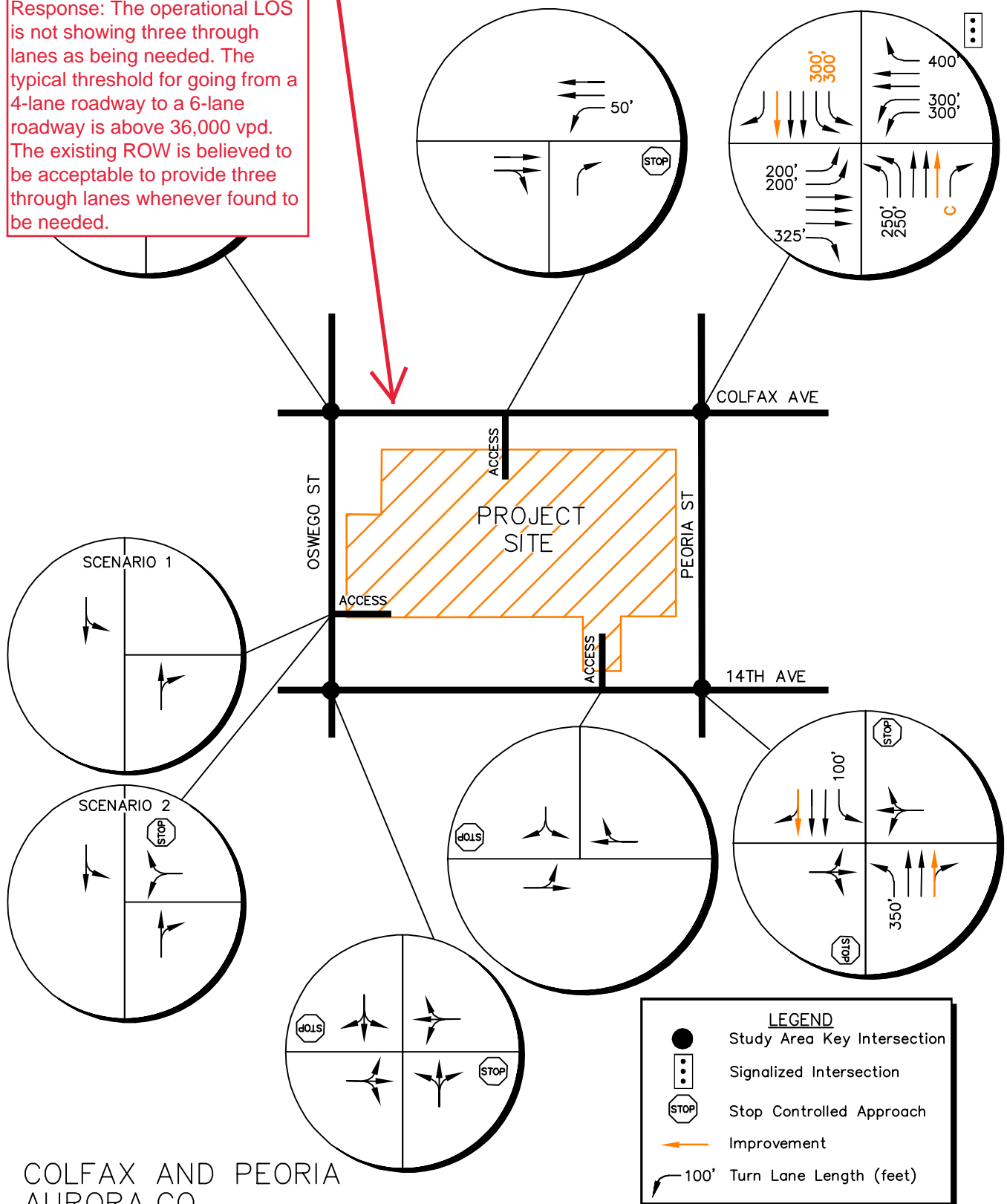
2023 RECOMMENDED LANE CONFIGURATIONS AND CONTROL (ALL SCENARIOS) FIGURE 16





Comment from Figure 16 is repeated. Two lanes of through-traffic along this segment of Colfax will not sufficiently handle +32,000 vehicles/day

Response: The operational LOS is not showing three through lanes as being needed. The typical threshold for going from a 4-lane roadway to a 6-lane roadway is above 36,000 vpd. The existing ROW is believed to be acceptable to provide three through lanes whenever found to be needed.



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2040 RECOMMENDED LANE CONFIGURATIONS AND CONTROL (ALL SCENARIOS) FIGURE 17



## 6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis presented in this report, Kimley-Horn believes the proposed Colfax and Peoria project will be successfully incorporated into the existing and future roadway network. The proposed project development and expected traffic volumes resulted in the following recommendations and conclusions:

- As directed by the City of Aurora and CDOT, the access along Oswego Street was evaluated under two development scenarios: Scenario 1 allowing entering one-way movements only and Scenario 2 allowing full two-way entering and exiting movements. It is believed that an access permit for the south leg of Oswego Street at Colfax Avenue (US-40) will be required by CDOT in association with this project under the entrance only scenario (Scenario 1) or the full two-way access scenario (Scenario 2). In addition, an access permit will be required for the existing full movement access to be converted to right-in/right-out access along Colfax Avenue. Of note, it is believed that an access permit will not be required for the south leg of Peoria Street at the intersection with Colfax Avenue (US-40) because traffic volumes are not anticipated to increase with the development of the project.

ILLUSTRATE THIS ! Important to see what is "by others" and what the Link Apartment project is planning to add to it.

- CDOT has planned improvements at the intersection of Colfax and Peoria that will be completed prior to the buildout year 2023 of this project. These improvements include three eastbound through lanes along with dual left turn lanes. Likewise, it is understood that an eastbound right turn lane is recommended along Colfax Avenue project frontage for this intersection. Based on this, this eastbound right turn lane will require a length of 325 feet from the proposed access location being 325 feet west of Peoria Street (measured edge to edge), it is recommended that this eastbound right turn lane be constructed as a continuous lane between the project driveway along Colfax Avenue and Peoria Street.

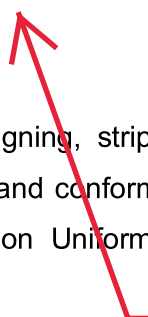
Response: CDOT has planned improvements for this intersection which include dual left turn lanes on all approaches and three through lanes on the eastbound approach (by others). The project provided improvement is the additional eastbound right turn lane. This has been clarified

But not along the entire block-length, and not on the approach to the right in/out access proposed

- The project access along Colfax Avenue is proposed to allow right-in/right-out movements. It is recommended that the northbound approach of the Colfax Avenue be controlled with stop control with the installation of an R1-1 "STOP" sign. The existing Colfax Avenue is recommended to be reconstructed through this access.

Response: True, the right turn lane to be constructed is for the Colfax and Peoria intersection. This is the fourth lane. An eastbound right turn lane was not found to be warranted at the project access. It is believed ROW and possibly even the existing pavement width are sufficient to provide three eastbound through lanes whenever found to be needed.

- If future volumes materialize by 2040, Peoria Street may need to provide three through lanes in each direction in order to achieve acceptable operations. Likewise, to accommodate future right turning volume demands, right-turn overlap phasing may be needed on the northbound and southbound approaches of Peoria Street at the Colfax Avenue intersection by 2040.
- Any on-site and off-site roadway, signing, striping, and signal improvements should be incorporated into the Civil Drawings, and conform to City of Aurora or CDOT standards (as applicable) as well as the Manual on Uniform Traffic Control Devices – 2009 Edition (MUTCD).



As previously ID, +32,000 vehicles on Colfax by 2040 will also warrant another EB through-lane along the entire block between Oswego & Peoria.

Response: The operational LOS is not showing three through lanes as being needed. The typical threshold for going from a 4-lane roadway to a 6-lane roadway is above 36,000 vpd. But it is getting close. The existing ROW and possibly even the existing pavement width is sufficient to provide three eastbound through lanes if and when needed.