Kimley»Horn

Memorandum

To: Matt Washburn
            Folsom Cordova Unified School District

From: Sean Houck, PE
            Molly Tremblay
            Matt Weir, PE, TE, PTOE, RSP1

Re: *Intersection Control Evaluation (ICE) Summary*
            FCUSD High School/Middle School
            Folsom Ranch – Folsom, California

Date: June 5, 2025

As requested and necessitated by the City of Folsom ("City"), Kimley-Horn recently prepared a comprehensive Intersection Control Evaluation (ICE)[1] to document our evaluation of offsite traffic, access, and circulation conditions anticipated to result from the completion of the FCUSD High School/Middle School project in Folsom Ranch (the "Proposed Project" or "Project"). The purpose of this memorandum is to provide a summary of the ICE findings to assist the Folsom Cordova Unified School District and the City with review of aforementioned comprehensive ICE deliverable.

Summary of Findings

As discussed herein, the impetus for this ICE was the City's desire to understand if the shift of the Folsom Ranch middle school site from its current Specific Plan location to the adjacent/combined site next to the high school site would create traffic access or circulation issues not previously contemplated as part of the Specific Plan traffic analyses. The ICE concludes that both the traffic signals and roundabouts operate acceptably during the weekday peak-hours. ***As a result, the proposed land use shift is not anticipated to create additional transportation concerns beyond the Specific Plan***. Furthermore, the ICE concludes that roundabout traffic control at all four study intersections is recommended due to both quantitative and qualitative measures as documented thoroughly within the ICE. The reader is encouraged to review the ICE for appropriate supporting material.

Overview

The following is a summary of the primary ICE components:

Study Intersections
The following intersections were included in this study to inform the recommended ultimate transportation network configuration:

1. Oak Avenue Parkway @ Mangini Parkway
2. Mangini Parkway @ Primary Site Driveway (East)
3. Mangini Parkway @ Site Driveway (West)
4. Oak Avenue Parkway @ Primary Site Driveway

---

[1] *Intersection Control Evaluation, Folsom Cordova Unified School District High School/Middle School, Folsom Ranch, Folsom, California*, Kimley-Horn, May 21, 2025.

Kimley»Horn

Development Assumptions and Trip Generation
The study assumes the following development and network parameters:

A. Near-Term (2025) plus Project
   o Scenario assumes full occupancy (including overflow) of both High School and Middle School sites
   o The localized transportation network is defined as follows:
      o No Oak Avenue Parkway connection to Alder Creek Parkway
      o No Mangini Parkway connection to Prairie City Road
B. Build-Out (2045) plus Project
   o Scenario includes Build-Out (2045) peak-hour volumes established using the City's Travel Demand Model (TDM), representative of build-out of planned development within the general project vicinity and the associated transportation network, combined with the assigned Project trips
   o Scenario assumes the previous location of the Middle School has swapped land uses with the single family residential that previously occupied Parcel 17B per the *Specific Plan*
   o Scenario assumes full occupancy (including overflow) of both High School and Middle School sites
   o The localized transportation network is defined as follows:
      o Oak Avenue Parkway connection to Alder Creek Parkway
      o Mangini Parkway connection to Prairie City Road

A custom trip generation was produced for the project representing the expected trip characteristics specifically associated with middle school and high school students at the combined Folsom Ranch site. Project trips were distributed across the surrounding transportation network based on the City's travel demand model (TDM) and professional judgment. Project trips generated by the middle school and high school were assigned to the appropriate project driveways as dictated by their mode and the access conditions shown on the project site plan. The complete Project is estimated to generate 2,594 AM peak-hour trips, 1,897 School-PM peak-hour trips, and 814 PM peak-hour trips.

Methodology
The following is a summary of the ICE study methodologies which are consistent with City's guidelines. Four key quantitative performance measures were used to determine the benefits of proposed improvements:

▪ Benefits
   o <u>Delay Reduction:</u> The delay reduction benefit is a measure of the societal cost associated with the number of person-hours of delay at the study intersection during the study period. Components used to calculate the delay reduction benefit include peak hour delay, average vehicle occupancy (AVO), and the value of travel time savings (VTTS).
   o <u>Safety:</u> The safety benefit is a measure of the societal cost associated with the predicted number and severity of crashes that may occur based on intersection control type, intersection configuration, physical setting, and volume of traffic.
▪ Costs
   o <u>Operations and Maintenance:</u> The operations and maintenance (O&M) cost is a measure of the added annual cost to operate and maintain the proposed intersection control alternative. These costs include annual power consumption for lighting, signal power consumption, traffic signal timing, equipment replacement, pavement management, and landscape maintenance amongst others.

    o <u>Initial Capital:</u> The initial capital cost is a measure of the added cost to construct the proposed improvements. A range of estimated order of magnitude costs was developed for the proposed improvements based on engineering judgement.

A Benefit-Cost (B/C) ratio was developed using the quantitative performance measures described above. The B/C ratio measures the expected return on investment when a traditionally controlled intersection (traffic signal) is compared relative to a proposed roundabout controlled intersection. The alternative with the greatest benefit compared to the cost was identified as the preferred alternative.

Table 1 summarizes the net present value of each of the four different performance measures, as well as the lifecycle benefit-cost ratio when comparing the roundabout to a signal. The preferred intersection control is based solely on the B/C score and the expected return on investment for the 20-year life cycle starting in 2025 and ending 2045.

Table 1 – Summary of Performance Measure Results & B/C Ratio Scoring

Intersection		Traffic Signal	Roundabout	Net Calculation	B/C Ratio*	Preferred Alternative**
INT 01 Oak Avenue Parkway @ Mangini Parkway	Safety	$ 7,520,176	$ 2,337,314	$ 5,182,862	-4.75	Roundabout
	Delay	$ 14,470,846	$ 13,916,301	$ 554,545		
			Total Benefits:	$ 5,737,407		
	O&M	$ 438,099	$ 230,079	$ (208,020)	N/A-R	
	Initial Capital	$ 6,000,000	$ 5,000,000	$ (1,000,000)		
			Total Costs:	$ (1,208,020)		
INT 02 Mangini Parkway @ Primary Site Driveway (East)	Safety	$ 7,558,288	$ 3,460,377	$ 4,097,911	-55.03	Roundabout
	Delay	$ 13,027,087	$ 5,419,730	$ 7,607,357		
			Total Benefits:	$ 11,705,268		
	O&M	$ 360,816	$ 148,099	$ (212,717)	N/A-R	
	Initial Capital	$ 3,000,000	$ 3,000,000	$ -		
			Total Costs:	$ (212,717)		
INT 03 Mangini Parkway @ Site Driveway (West)	Safety	$ 5,047,198	$ 829,680	$ 4,217,518	-30.59	Roundabout
	Delay	$ 3,515,921	$ 946,458	$ 2,569,463		
			Total Benefits:	$ 6,786,981		
	O&M	$ 379,497	$ 157,602	$ (221,895)	N/A-R	
	Initial Capital	$ 3,000,000	$ 3,000,000	$ -		
			Total Costs:	$ (221,895)		
INT 03 Oak Avenue Parkway @ Primary Site Driveway	Safety	$ 5,692,033	$ 1,526,308	$ 4,165,725	-39.49	Roundabout
	Delay	$ 4,455,215	$ 1,490,184	$ 2,965,031		
			Total Benefits:	$ 7,130,756		
	O&M	$ 364,089	$ 183,522	$ (180,567)	N/A-R	
	Initial Capital	$ 5,000,000	$ 5,000,000	$ -		
			Total Costs:	$ (180,567)		

*When the cost of a roundabout is less than the cost of a traffic signal and the roundabout provides benefits over the traffic signal, a B/C ratio cannot be computed. This special case is denoted by "NA-R" and indicates that a roundabout provides a better return on investment when compared to a stop/signal.

**The preferred intersection control type is based solely on the B/C Ratio.

Kimley»Horn

Consideration was given to qualitative measures at each study intersection. These measures include presence and width of sidewalks, presence and class of bike lanes, and required right-of-way acquisition. Table 2 summarizes qualitative factors that were considered in the design of each alternative. The traffic signal and TWSC have similar qualitative benefits compared to the roundabout; however, the roundabout minimized left-turn movements to improve safety at all intersections.

Table 2 – Summary of Qualitative Assessment

	Qualitative Assessment	Traffic Signal Feasibility	Roundabout Control Feasibility
	Oak Avenue Parkway at Mangini Parkway		
INT 01	Urban Environment Focus	N/A	N/A
	Design for Pedestrians	✓	✓
	Design for Bicyclists	✓	✓
	Slow Traffic Speeds to Benefit Local Businesses	N/A	N/A
	Minimize ROW Acquisition to Limit Initial Costs	✓	✓
	Minimize Left-Turn Movements to Improve Safety	✗	✓
	Mangini Parkway at Primary Site Driveway (East)		
INT 02	Urban Environment Focus	N/A	N/A
	Design for Pedestrians	✓	✓
	Design for Bicyclists	✓	✓
	Slow Traffic Speeds to Benefit Local Businesses	N/A	N/A
	Minimize ROW Acquisition to Limit Initial Costs	✓	✓
	Minimize Left-Turn Movements to Improve Safety	✗	✓
	Mangini Parkway at Site Driveway (West)		
INT 03	Urban Environment Focus	N/A	N/A
	Design for Pedestrians	✓	✓
	Design for Bicyclists	✓	✓
	Slow Traffic Speeds to Benefit Local Businesses	N/A	N/A
	Minimize ROW Acquisition to Limit Initial Costs	✓	✓
	Minimize Left-Turn Movements to Improve Safety	✗	✓
	Oak Avenue Parkway at Primary Site Driveway		
INT 04	Urban Environment Focus	N/A	N/A
	Design for Pedestrians	✓	✓
	Design for Bicyclists	✓	✓
	Slow Traffic Speeds to Benefit Local Businesses	N/A	N/A
	Minimize ROW Acquisition to Limit Initial Costs	✓	✓
	Minimize Left-Turn Movements to Improve Safety	✗	✓
Feasible	✓		
Not Feasible	✗		

Kimley»Horn

Conclusions

Below is a summary of the findings as contained in the ICE:

- **Intersection 1: Oak Avenue Parkway and Mangini Parkway**
  The roundabout is the preferred alternative (see ICE for concept exhibit).

- **Intersection 2: Mangini Parkway and Primary Site Driveway (East)**
  The roundabout is the preferred alternative (see ICE for concept exhibit).

- **Intersection 3: Mangini Parkway and Site Driveway (West)**
  The roundabout is the preferred alternative (see ICE for concept exhibit).

- **Intersection 4: Oak Avenue Parkway and Primary Site Driveway**
  The roundabout is the preferred alternative (see ICE for concept exhibit).

As you have expressed, the impetus for this ICE was the City's desire to understand if the shift of the Folsom Ranch middle school site from its current Specific Plan location to the adjacent/combined site next to the high school site would create traffic access or circulation issues not previously contemplated as part of the Specific Plan traffic analyses. The ICE concludes that both the traffic signals and roundabouts operate acceptably during the weekday peak-hours. *As a result, the proposed land use shift is not anticipated to create additional transportation concerns beyond the Specific Plan*. Furthermore, the ICE concludes that roundabout traffic control at all four study intersections is recommended due to both quantitative and qualitative measures as documented thoroughly within the ICE. The reader is encouraged to review the ICE for appropriate supporting material.