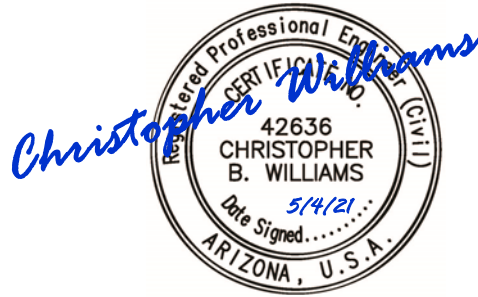


Approved
By Alan Heathcoat 10/26/2021 1:01:10 PM

May 4, 2021

Chuck Chisholm
K. Hovnanian Phoenix Division, Inc.
20830 N. Tatum Boulevard, Suite 250
Phoenix, AZ 85050

Phone: (480) 824-4175
Email: cchisholm@khov.com



Subject: Traffic Impact Statement – Alto
Southeast Corner of 75th Avenue and Orangewood Avenue – Glendale, AZ

Dear Mr. Chisholm,

Y2K Engineering, LLC (Y2K) has been retained to prepare a Traffic Impact Statement (TIS) for the proposed single family residential development, located on the southeast corner of 75th Avenue and Orangewood Avenue in Glendale, Arizona. The development will consist of 88 single-family homes with one access point on 75th Avenue and an emergency-only access on Orangewood Avenue.

The proposed development is anticipated to generate less than 100 trips in the weekday AM and PM peak hours. Based on the expected trips generated, a Traffic Impact Statement has been prepared for the site. A vicinity map is shown in **Figure 1** and an aerial of the site is shown in **Figure 2**.

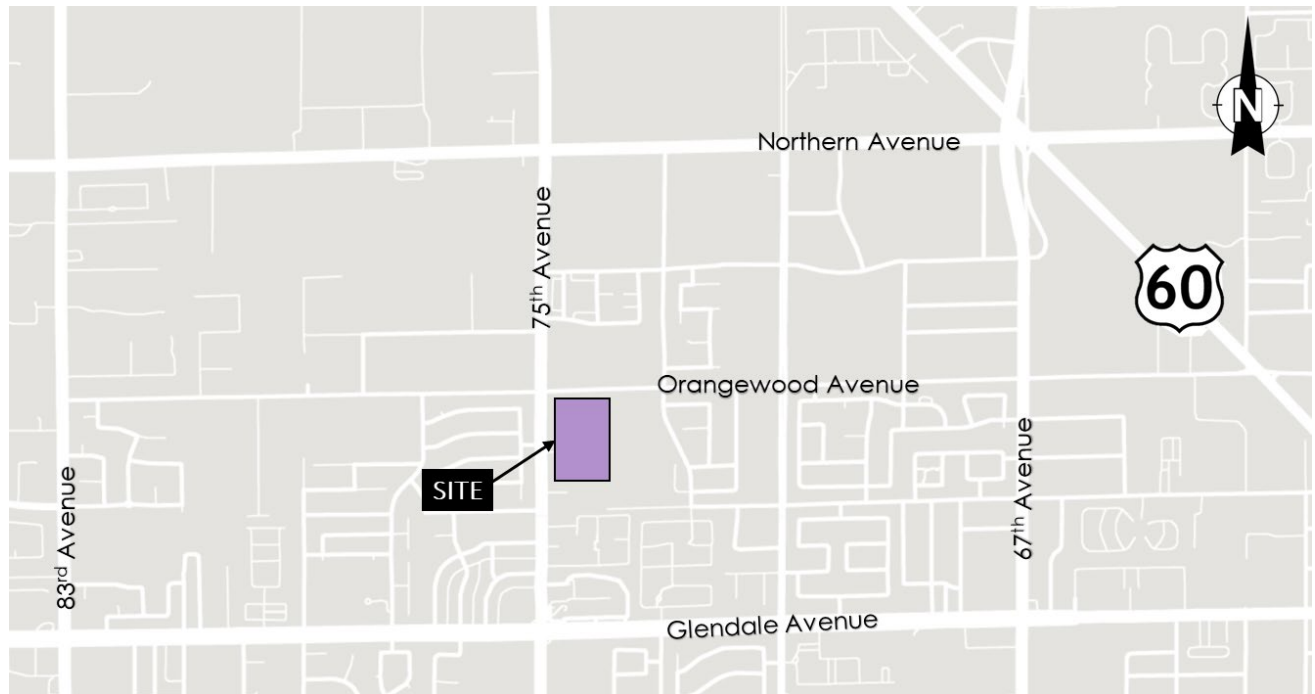


Figure 1: Project Vicinity Map



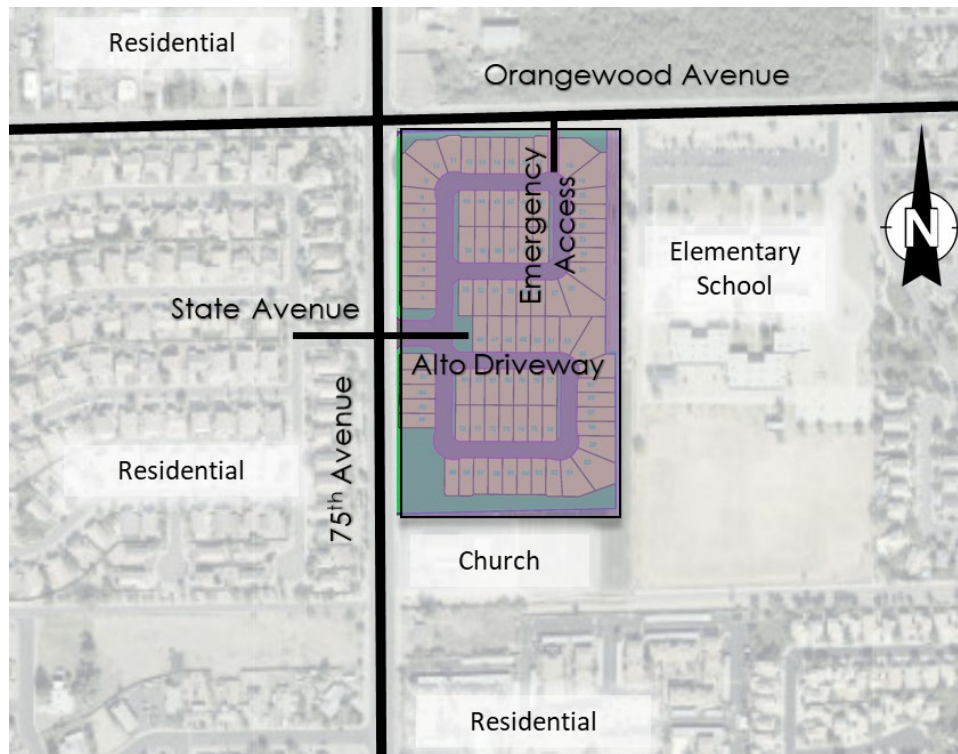


Figure 2: Proposed Site and Access

EXISTING ROADWAY NETWORK

75th Avenue is a north-south roadway with an arterial classification. 75th Avenue provides a five-lane cross section, with two through lanes in each direction separated by a two-way left turn lane. The roadway serves various residential, agricultural, commercial, and industrial developments in the vicinity of the project, and connects to Grand Avenue (US 60) approximately 1.5 miles north of the site. Curb, gutter, sidewalk, bike lanes, and roadway lighting exist on both sides of the roadway, while the west side of the street also has overhead utilities. The posted speed limit on 75th Avenue is 40 miles per hour (mph) near the project site.

Orangewood Avenue is an east-west collector road that serves existing residential and educational developments in the project vicinity. Orangewood Avenue has a three-lane cross section (one lane in each direction separated by a two-way left turn lane) and a posted speed limit of 25 mph. East of 75th Avenue, Orangewood Avenue provides access to the Desert Spirit Elementary School and eventually three-quarter access to Grand Avenue nearly 1.5 miles east of the site. While curb and cutter improvements have been constructed on Orangewood Avenue near the 75th Avenue intersection, both the north and south sides of the street have dirt shoulders along the project frontage. Overhead power lines parallel Orangewood Avenue on the north side of the street adjacent to the project frontage.

The intersection of **Orangewood Avenue and 75th Avenue** is a four-legged, signalized intersection with permitted left turn signal phasing for each approach. Northbound and southbound traffic is provided with a left turn lane, one through lane, and a shared through/right turn lane. The eastbound approach is offered a left turn lane, one through lane, and a designated right turn lane. Westbound traffic makes use of a left turn lane and a share through/right turn lane at the intersection.

An aerial of the surrounding roadway network and existing traffic control is shown in **Figure 3**.

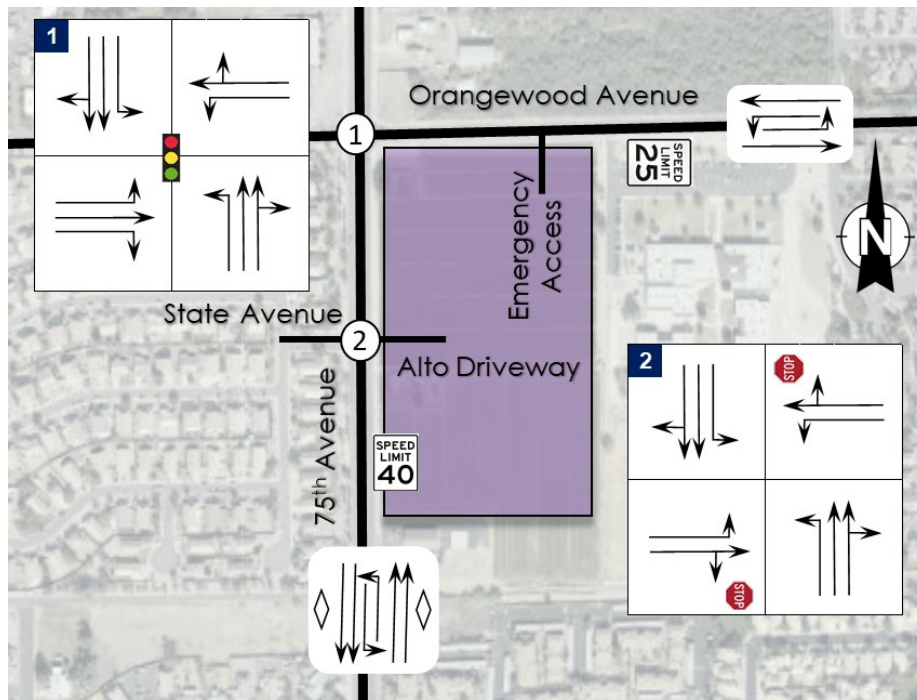


Figure 3: Existing Roadway Network

PROPOSED DEVELOPMENT

SITE LOCATION, LAND USE, AND ACCESS

The proposed site will be located on currently undeveloped agricultural farmland. The proposed development will construct 88 single family homes on a nearly 15-acre parcel. The site is surrounded by an elementary school to the east, residential developments to the west, a church to the south, and an undeveloped lot to the north.

The planned Alto Glendale site will be accessed by one proposed driveway on 75th Avenue which aligns with State Avenue that serves the Orangewood Estates development on the west side of 75th Avenue. The new Alto Driveway will form the fourth leg to the unsignalized intersection and will provide full access to/from 75th Avenue. The driveway will be wide enough for exiting vehicles to utilize designated separate westbound left and right turn lanes.

The new intersection configuration for the intersection of 75th Avenue/State Avenue will provide eastbound and westbound traffic with a left turn lane and a shared through/right turn lane. Northbound and southbound traffic on 75th Avenue may utilize the two-way left turn lane, one through lane, and one shared through/right turn lane. The minor streets will be STOP-controlled while traffic on 75th Avenue remains free-flow.

The Alto Glendale development will provide an emergency-only access point on Orangewood Avenue. This full-access driveway is anticipated to only serve emergency vehicles (as a supplement to Alto Driveway) and will not handle general trips to/from the home sites. The site plan is provided in **Attachment A**.

TRIP GENERATION

Trip generation for new developments is typically estimated using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition. This resource contains data collected by various transportation professionals for a wide range of different land uses. ITE land use code 210: Single Family Detached Housing was utilized for the proposed development. The fitted curve equation was used to calculate projected trip data, as the quantity of data points and the quality of the data relative to the regression curve warranted its use. The estimated trips associated with the residential development are summarized in **Table 1**.

Table 1: Trip Generation

DESCRIPTION OF LAND USE					VEHICLE GENERATED TRIPS						
					Daily Total	AM Peak Hour		PM Peak Hour			
ID	Land Use	ITE LUC	Size	D.U.	Enter	Exit	Total	Enter	Exit	Total	
1	Single-Family Detached Housing	210	88	D.U.	924	17	50	67	57	33	90
Total					924	17	50	67	57	33	90

As summarized in **Table 1**, the single-family housing development is anticipated to generate a total of 924 daily trips, with 67 trips in the AM peak hour and 90 trips in the PM peak hour.

TRIP DISTRIBUTION AND ASSIGNMENT

Trip distribution assignment percentages used in this analysis were distributed and assigned to the surrounding street system based on projected traffic patterns, access, connections to the nearby freeway network, and input from the City of Glendale’s Transportation Department. The distribution percentages are depicted in **Figure 4**.

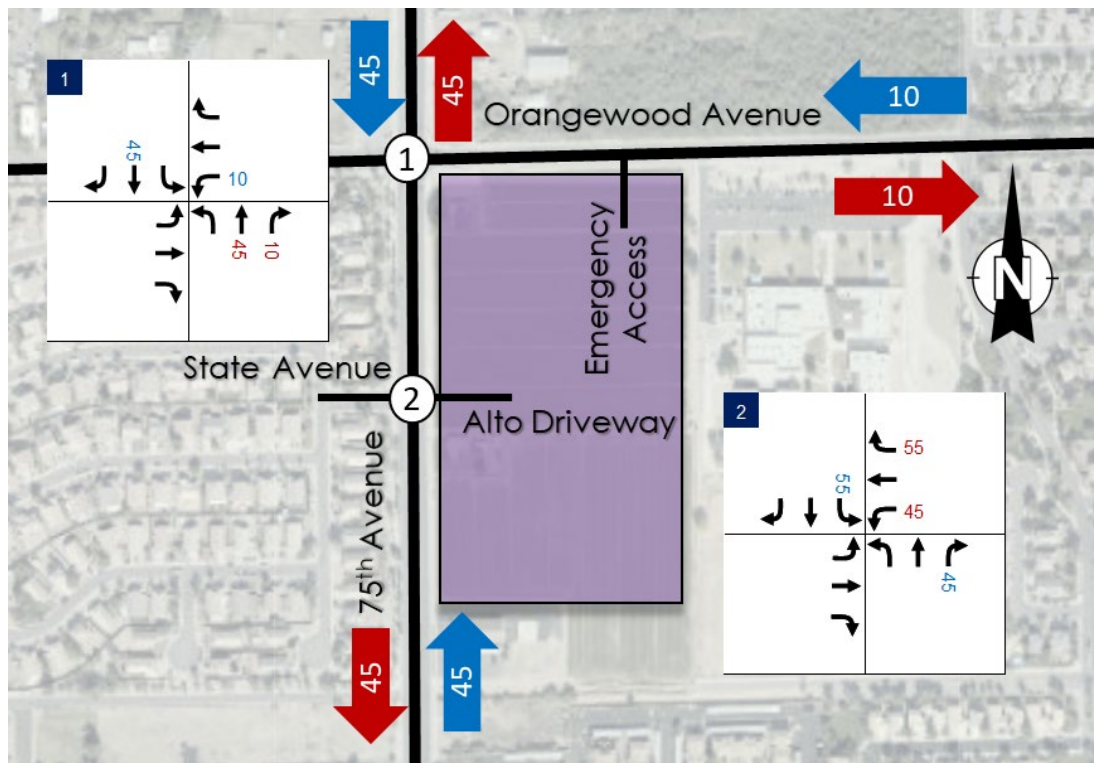


Figure 4: Trip Distribution

Peak hour turning volumes at the intersection of Orangewood Avenue and 75th Avenue and the intersection of 75th Avenue and State Avenue were estimated based on the trip generation and trip distribution percentages shown above. Given the trip distribution and anticipated vehicle generated trips, the hourly turning movement volumes at the study intersections are not expected to exceed the volumes shown in Figure 5.

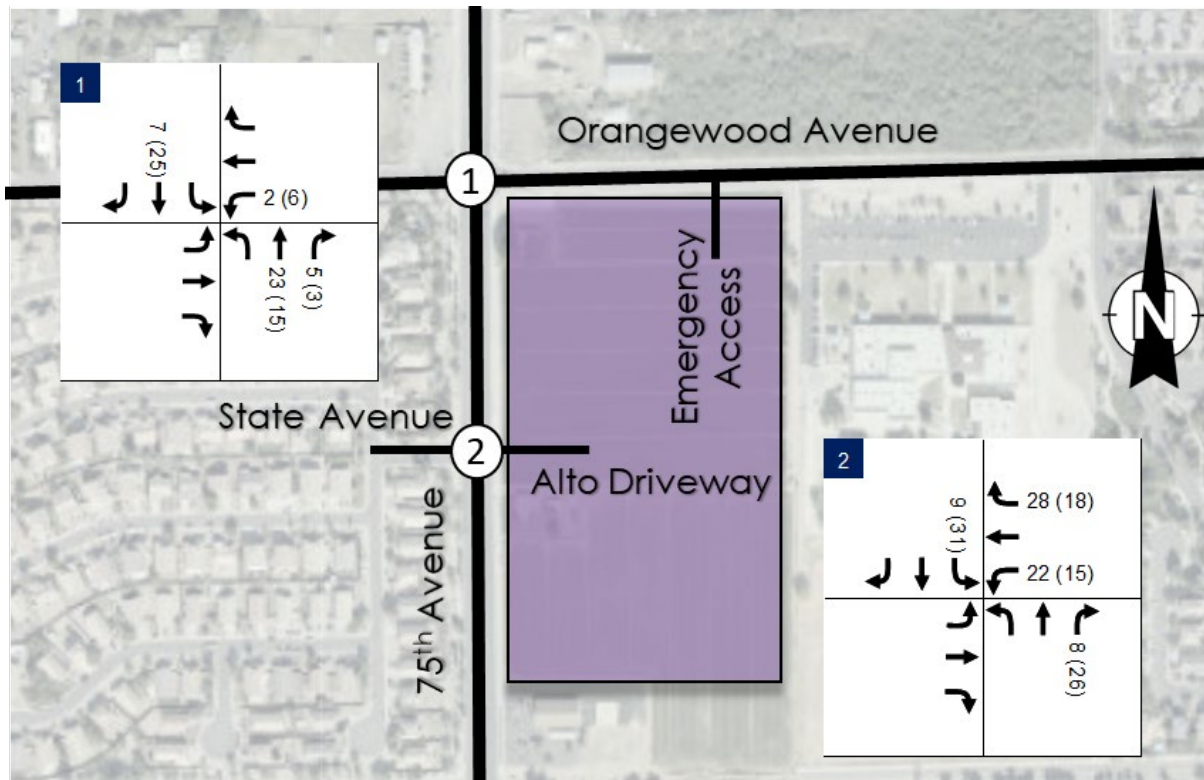


Figure 5: Estimated Site Traffic for Peak Hour Volumes

DRIVEWAY ACCESS REVIEW

DRIVEWAY SPACING ANALYSIS

The proposed site will be accessed via Alto Driveway. The proposed access point will align with State Avenue. The Alto Driveway will be located approximately 590 feet south of Orangewood Avenue and 520 feet north of an existing driveway serving a church located south of the site.

The City of Glendale provides specific guidelines for the placement and spacing of driveways in the *Engineering and Design Standards* (2015). Applicable standards state that “driveways should line up with driveways directly across the street to avoid left turn conflicts”. The proposed access point will align with an existing driveway and is not anticipated to facilitate offset left turn movements. Thus, Alto Driveway conforms to Glendale’s driveway spacing requirements.

The access spacing between Alto Driveway and the nearby Church Driveway and Orangewood Avenue is depicted in Figure 6.



Figure 6: Existing Driveway Access Spacing

ON-SITE CIRCULATION

Alto Driveway extends east from 75th Avenue to form an internal roadway network within the Alto Residential Development. The roadway will be wide enough to accommodate bi-directional traffic and will loop around the site to offer access to all home sites. No cul-de-sacs or sharp angles are proposed on the site, which helps to accommodate large vehicles such as a trailer, a fire truck, or a moving truck.

DECELERATION AND TURN LANES

The City of Glendale does not provide specific guidelines on left or right turn lane warrants. Due to this, Maricopa County Department of Transportation (MCDOT) guidelines were utilized to determine the need for left and right turn lanes at the project driveway. MCDOT provides specifications in the *Roadway Design Manual* (updated February 2020).

A left turn lane warrant was not conducted, as 75th Avenue currently provides a two-way left turn lane in the vicinity of the project. A right turn lane warrant was conducted for Alto Driveway using the following MCDOT standards:

“A driveway right turn deceleration lane is required when either of the following is met:

- The outside lane has an expected volume of 250 vph or greater and the right turn volume is greater than 55 vph.
- Any three of the below criteria are met:
 - a. At least 5,000 vehicle per day are using or are expected to be using the adjacent street.
 - b. The roadway’s posted speed limit is greater than 35 mph.
 - c. At least 1,000 vehicles per day are using or are expected to use the driveway.
 - d. At least 30 vehicles are expected to make right-turns into the driveway within a one-hour period.”



The right turn volume is anticipated to be 8 vehicles in the AM peak hour and 26 vehicles in the PM peak hour, and thus, the first warrant is not met. For the second warrant in which three of the four criteria must be met, the driveway does not meet criteria *c* or *d*, as the total daily number of trips anticipated by the site is 924 vehicles and only 26 vehicles are expected to turn right in the PM peak hour. Thus, the second warrant is not met, and a northbound right turn lane is not warranted at Alto Driveway.

PRINCIPAL FINDINGS AND RECOMMENDATIONS

- The traffic generated from the site is anticipated to be minimal and have a negligible impact to 75th Avenue, Orangewood Avenue, and the nearby roadway system. The single family detached housing development with 88 homes is proposed on a ± 15-acre site. The site is expected to generate 924 daily trips, with 67 AM and 90 PM peak hour trips.
- The site is proposed to be accessed by one driveway, Alto Driveway, that will extend west from 75th Avenue and will align with State Avenue. Alto Driveway conforms to City of Glendale driveway spacing guidelines.
- A site emergency access point on Orangewood Avenue will provide access for emergency vehicles only if there was ever a crash at 75th Avenue and the Alto Driveway.
- A northbound right turn lane is not warranted at Alto Driveway per MCDOT standards.

We appreciate the opportunity to prepare this study. Should you have any questions, please feel free to contact me by email at cwilliams@y2keng.com or by phone at (602)-380-8686.

Sincerely,

Y2K Engineering, LLC.

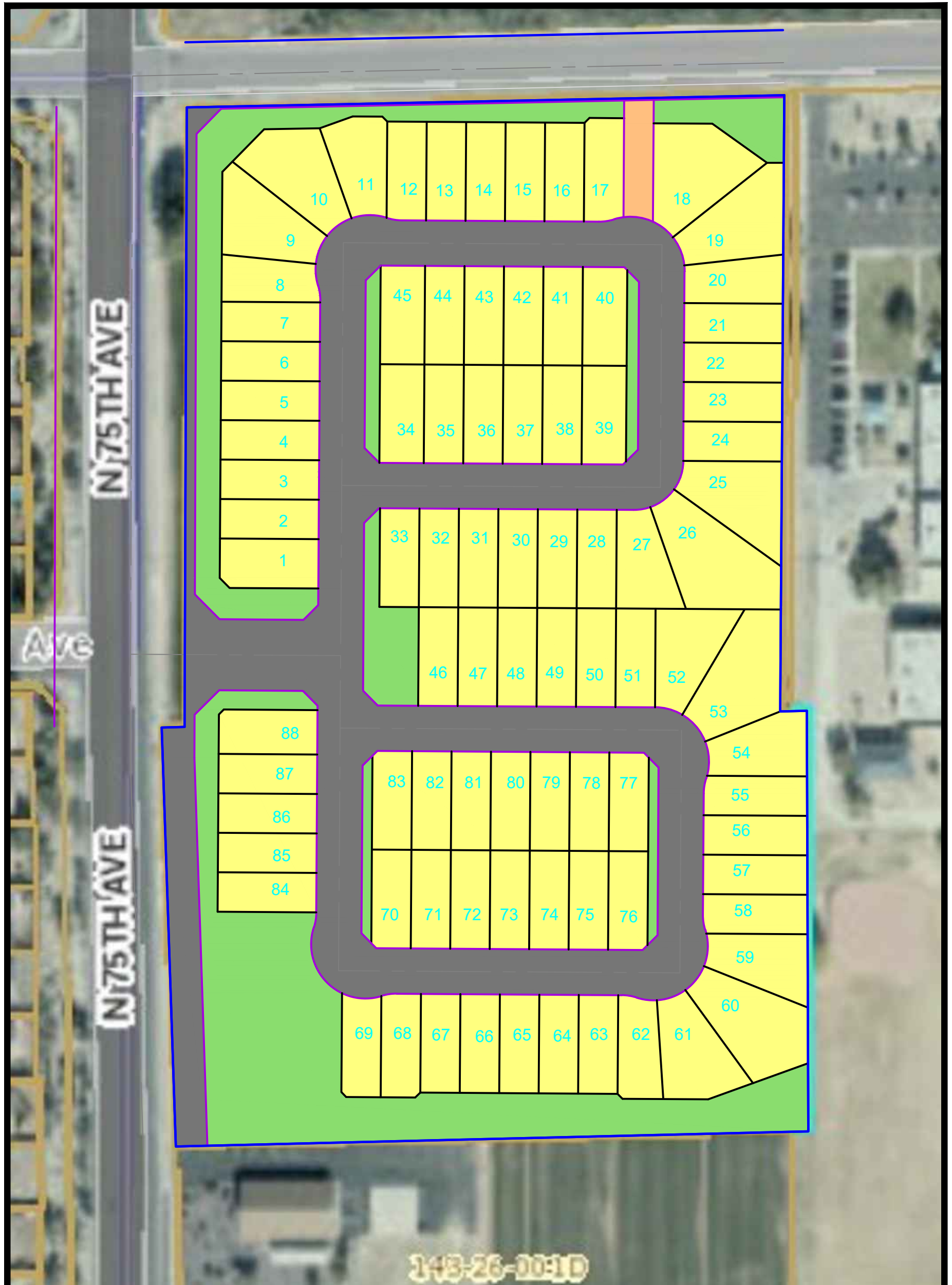
A handwritten signature in blue ink that reads 'Chris Williams'.

Christopher Williams, PE, PTOE
Senior Traffic Engineer

Attachment



ATTACHMENT A:
SITE PLAN



143-26-0010

75th & Orangewood

Total Units: 88
 Lot Size: 40' x 100'

Product: Cadence (30's)

Gross Area:	15.02 ac (approx)
Gross Density:	5.86 du/ac
Net Area:	14.5 ac (approx)
Net Density:	6.07 du/ac
Date:	2/2/2021

Lavelle, Christina

From: Heathcoat, Alan
Sent: Tuesday, October 26, 2021 1:15 PM
To: Lavelle, Christina
Subject: RE: Alto- ZON21-12

Christina,

I have reviewed the TIS and executive summary for the Alto development and have provided my approval.



Alan Heathcoat, P.E.
Transportation Engineer
Transportation Department

ah Heathcoat@glendaleaz.com
P 623.930.2041 | C 623.640.1032
6210 W. Myrtle Ave, Ste 112
Glendale, AZ 85301

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