

901 E. Katella Shade and Shadow Analysis

Shading and shadowing can be a potential impact when a building(s) blocks sunlight from neighboring properties, including roof-top solar. While the City does not have an ordinance or formally adopted policy, the City's past practice has been that new shading from a project should not continuously cover either rooftop solar panels or residential windows for a two-hour period between 7:30 am and 9:30 am. The City uses the winter solstice for the analysis because the sun angle is lowest on that day, resulting in the most restrictive condition of the year. The spring and fall equinox and summer solstice may also be analyzed, but are not required, for this Project because the sun angle is much higher during those times of year, resulting in less shading.

The Applicant's Landscape Architect, Land Concern, conducted a shade/shadow analysis, which is included as **Attachment A**. The analysis was performed by modeling both the existing conditions and the proposed residential project. The modeling is georeferenced to the GPS coordinates of the project site, which allows the model to accurately calculate the azimuth of the sun, which is the location of the sun in degrees from north, and the sun angle elevation during the winter solstice.

Attachment A (sheets L7-L8) provides a shade analysis during the winter solstice from 7:00 to 9:30 am in both the existing condition and the proposed condition. This analysis was done from overhead. In the 9:30 am condition, a yellow line marks the limits of shading. In all but two locations, 932 and 942 E. Carleton Avenue, Project shading is absent from the residential structures along E. Carleton Avenue by 9:30 a.m.

Further analysis of both 932 and 942 E. Carleton Avenue was performed to determine the change between existing and proposed conditions. Additional analysis and modeling were necessary because of the existing vegetation both on the Project site as well as on each individual property. The analysis, included in **Attachment A (sheet L35)**, is shown at an angle, which allows for the relationship between the existing landscape and the residential structures to be clearly seen. The analysis shows that the proposed Project would not create new shading impacts beyond what occurs during the existing condition on the winter solstice due to existing vegetation on the Project site and on each private property.

The Project proposes a zone change from a commercial zone (C-P) to a residential zone (R-3) with the application of the Small Lot Subdivision Ordinance development standards. Therefore, a component of the shade/shadow analysis includes consideration of whether the change in zoning, and therefore a change in development standards, would have a substantial effect on shading/shadowing.

The two development standards that most affect the adjoining residential properties on E. Carleton Avenue are the setback from the northern Project property boundary and the height limit. The existing C-P zone requires a setback of 0-feet along the northern Project property boundary and a height limit of 32 feet. Therefore, a commercial developer could build a 32-foot-tall office building or other commercial structure 0 feet from the northern Project property

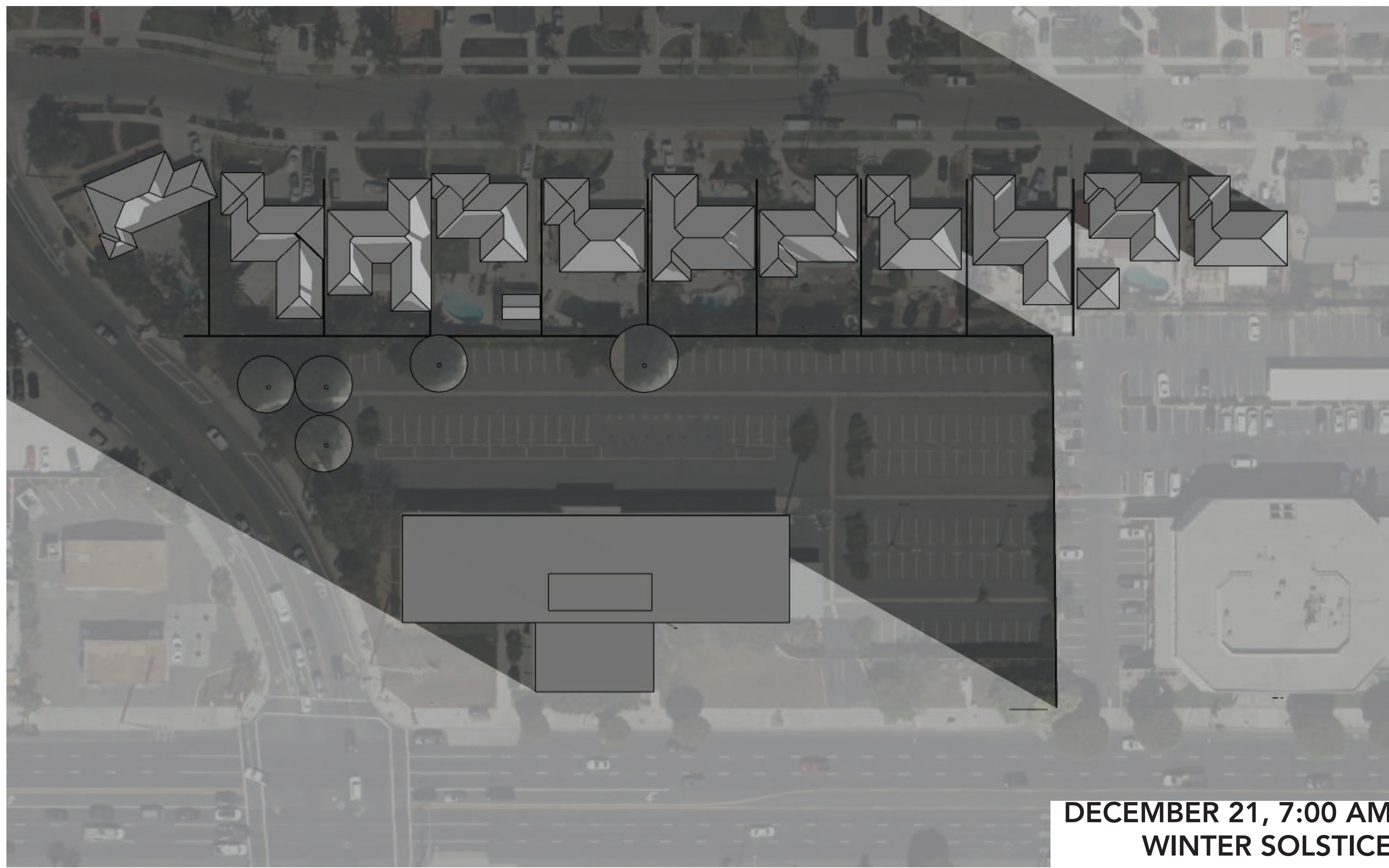
boundary without the need for discretionary City approval (called "by right") because the commercial use and structure would be consistent with existing zoning standards.

The proposed Project requests a zone change to R-3 with the application of the Small Lot development standards. The Small Lot development standards require a 5-foot setback along the northern Project property boundary and a 35-foot height limit. Therefore, the zone change would increase the setback standard from the northern property boundary and allow for an increase in height by 3 feet.

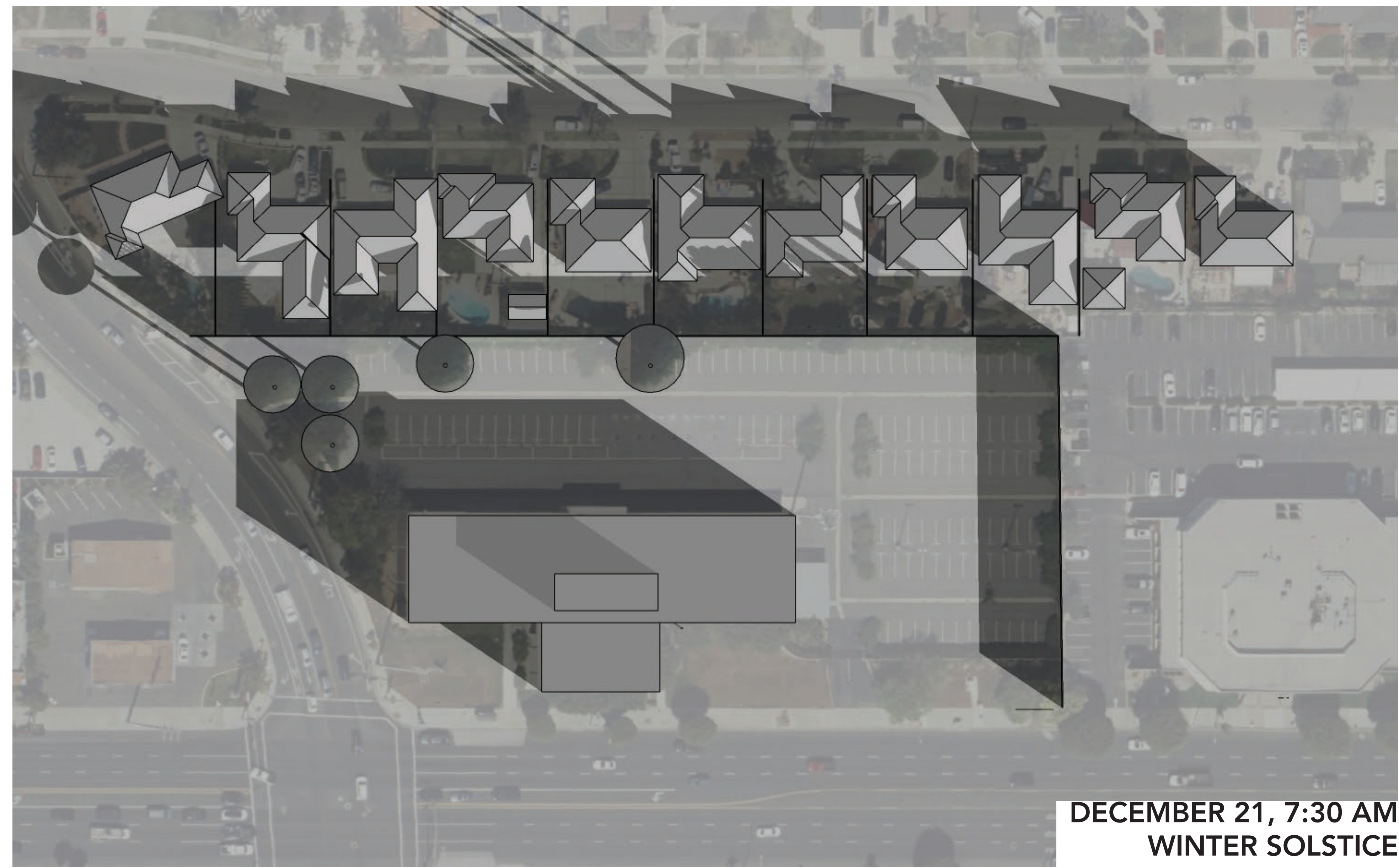
However, for the proposed Project, the Applicant has restricted the building height for the first row of residential units to two-stories and increased the setback of the second story for these units. The proposed two-story structures measure approximately 20 feet to the eave and 24.5 feet overall height, and the second story of those residential units would be setback an additional 2 - 5 feet, for a total second story setback between 12 and 15 feet from the northern property boundary. Therefore, the Project would result in the height of the structures being approximately seven (7) feet lower than permitted in the C-P zone and setback 10 feet and more than permitted in the C-P zone. That two-story height restriction and additional second story setback for the northern-most row of residences would be governed by the Design Review approval and conditions of approval.

Therefore, the shading impacts from the proposed Project are less than what could occur "by right" under existing zoning. The existing zoning permits a 32-foot-tall commercial structure located where the Project proposes structures less than 25 feet tall. The additional seven (7) feet in building height permitted under the existing zoning would increase the shading of the residential properties along E. Carleton compared to the proposed Project.

Attachment A



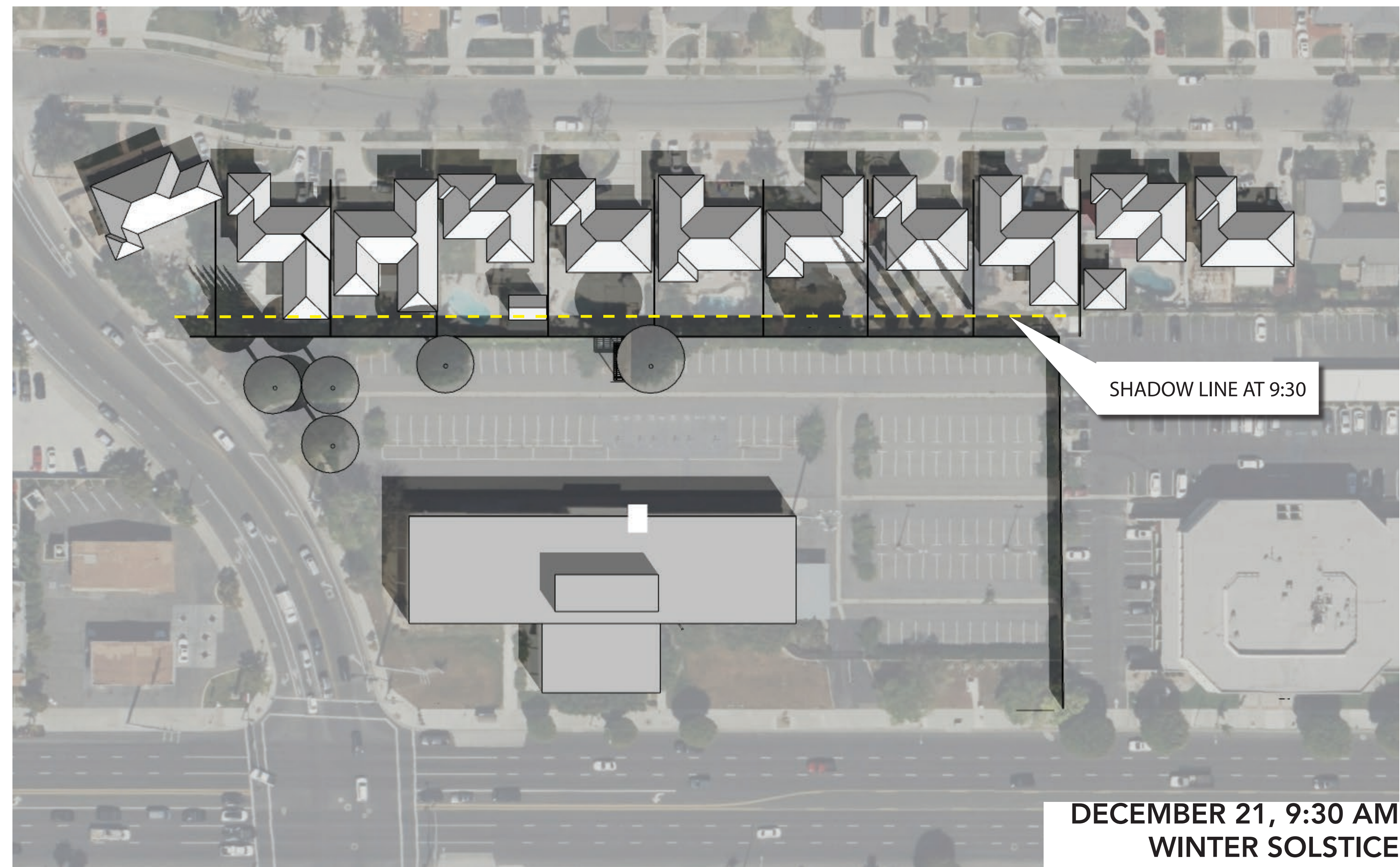
DECEMBER 21, 7:00 AM
WINTER SOLSTICE



DECEMBER 21, 7:30 AM
WINTER SOLSTICE



DECEMBER 21, 8:30 AM
WINTER SOLSTICE



DECEMBER 21, 9:30 AM
WINTER SOLSTICE

SHADOW LINE AT 9:30

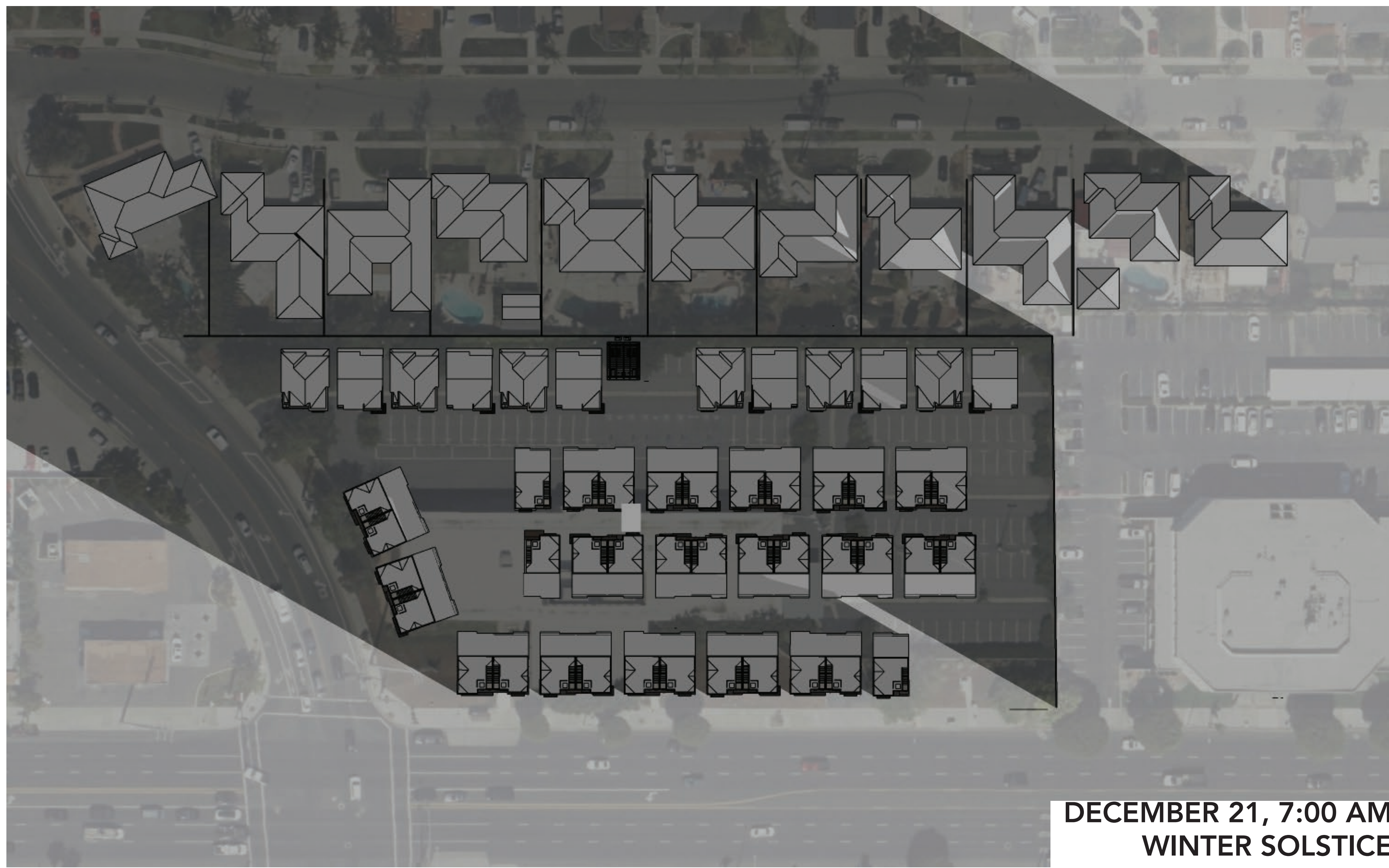
INTRACORP 

Sun/Shade Existing

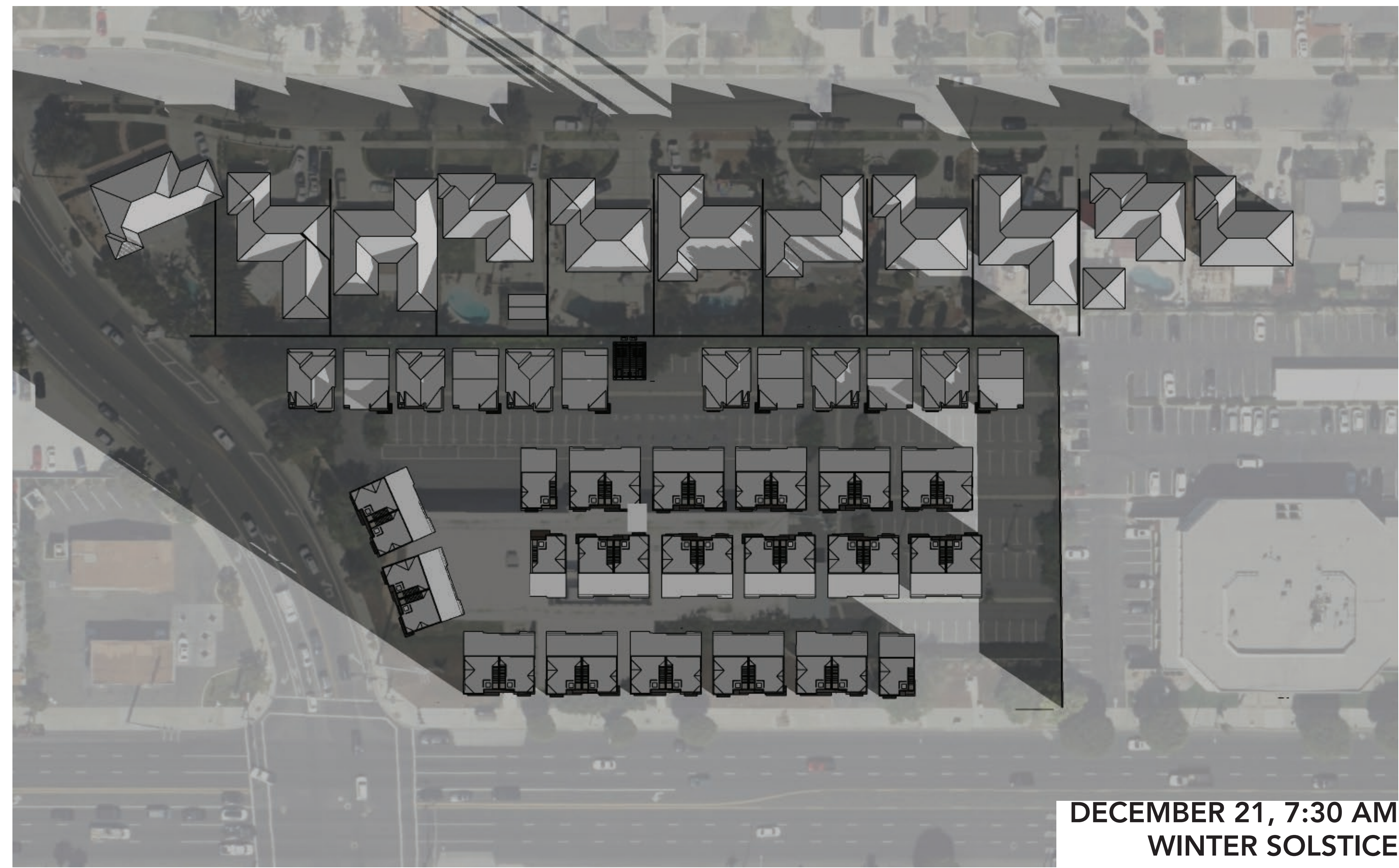
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901 E. Katella Ave
ORANGE, CA





DECEMBER 21, 7:00 AM
WINTER SOLSTICE



DECEMBER 21, 7:30 AM
WINTER SOLSTICE



DECEMBER 21, 8:30 AM
WINTER SOLSTICE



DECEMBER 21, 9:30 AM
WINTER SOLSTICE

SHADOW LINE AT 9:30

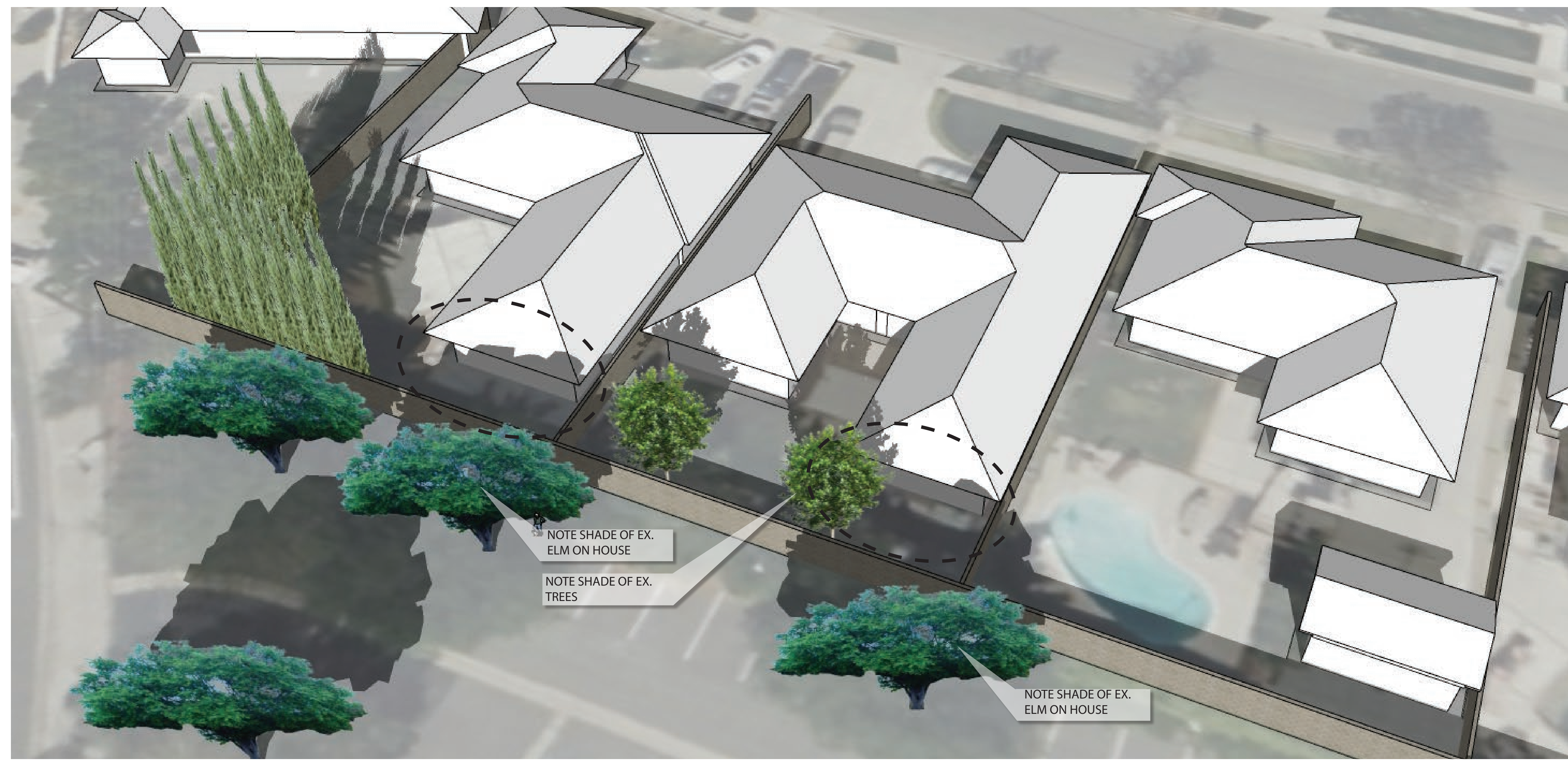
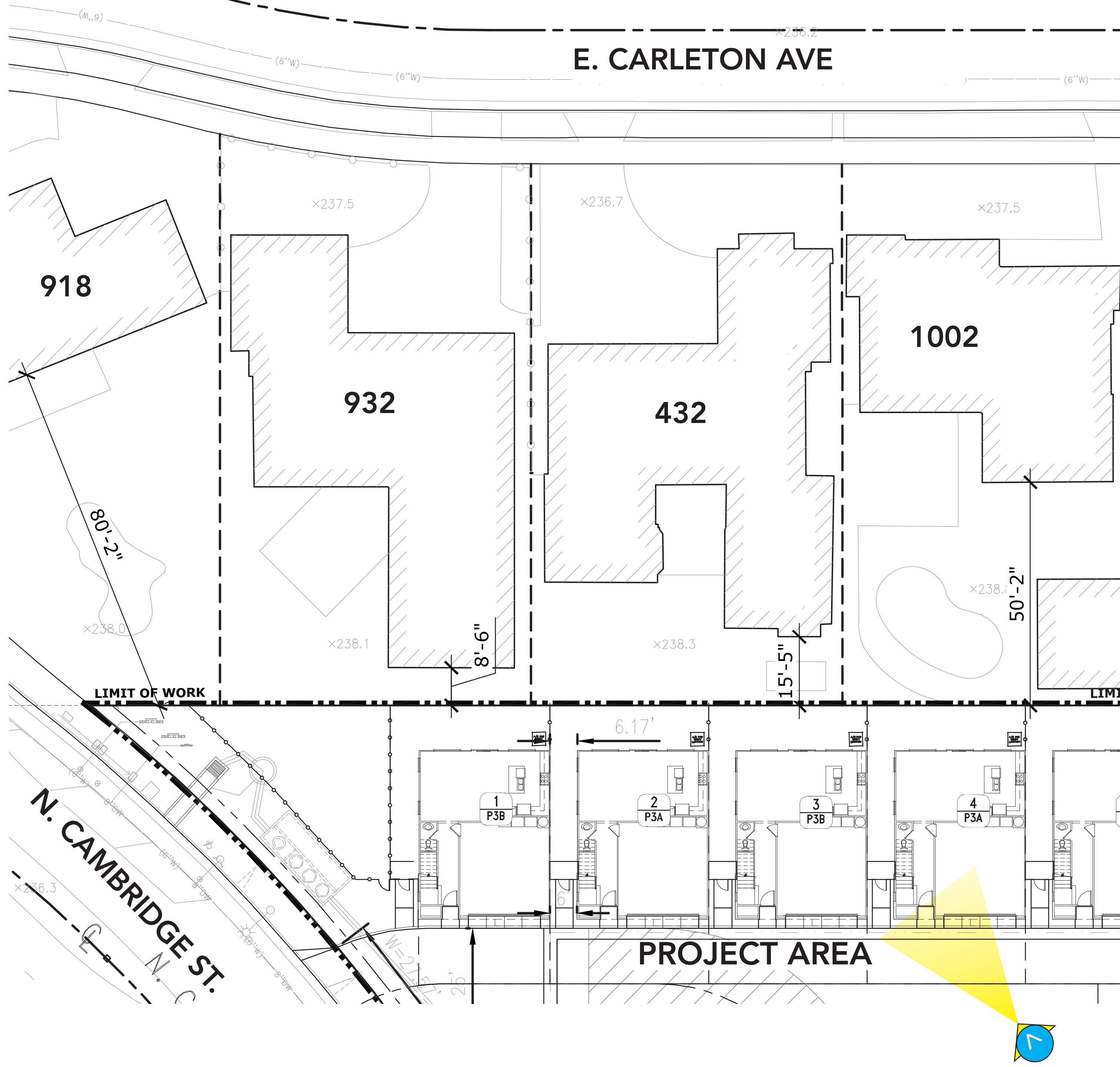
Sun/Shade Proposed

INTRACORP 

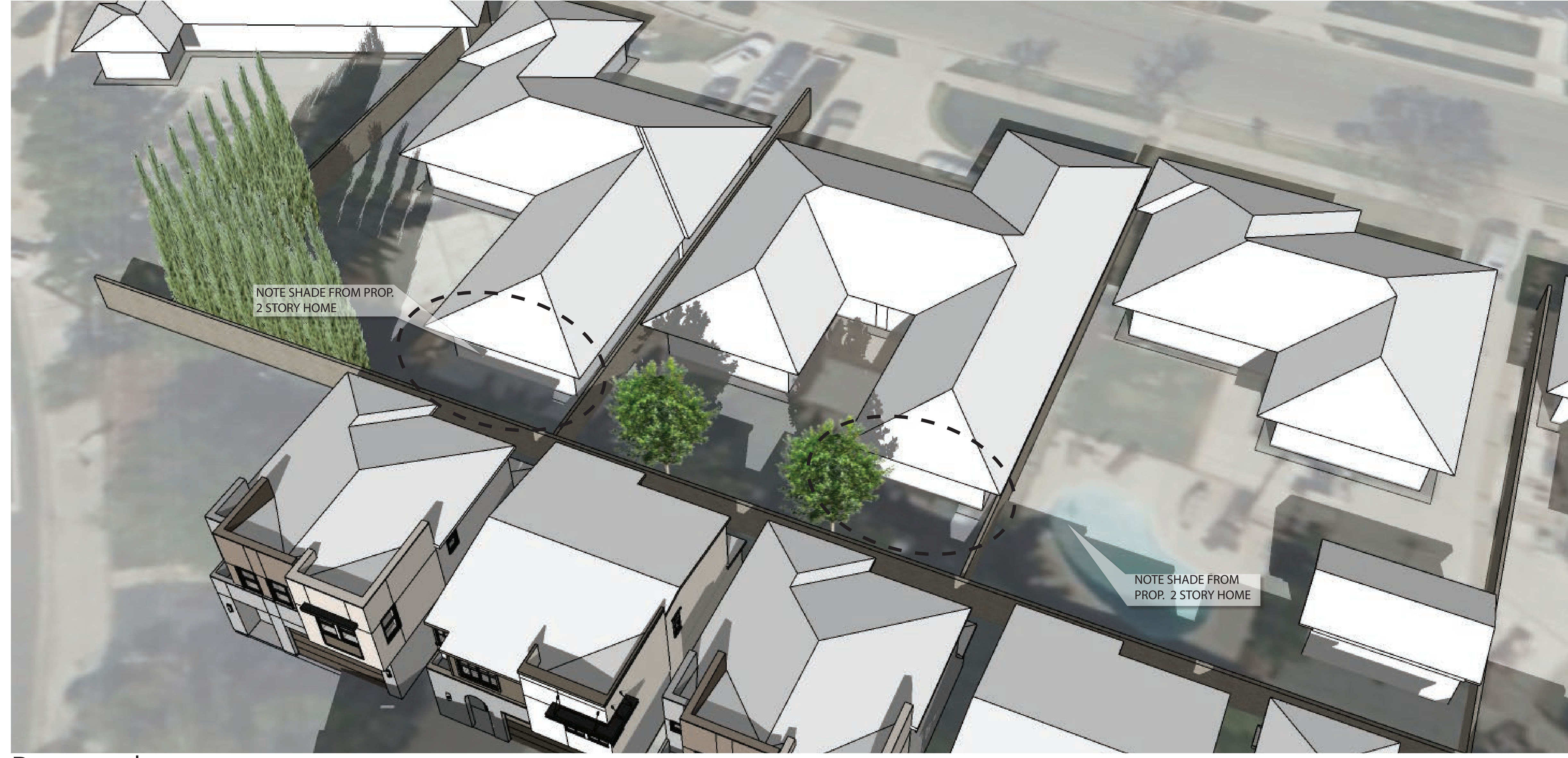
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Existing



Proposed

Existing Shade vs Proposed Shade: 12/21 @ 9:30 AM

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