Kimley-Horn has investigated the proposed development site located at the southeast corner of 9th Street and Mill Avenue in Tempe, Arizona. The proposed development is a phased 5 level parking structure with space allocated for future occupied space tenants. Phase 1 of the parking structure is 830 stalls. Phase 2 is an expansion to the east of the initial phase and brings the total stall count to 1,400. Additionally, Kimley-Horn has prepared a preliminary analysis of the existing infrastructure available to service the 5+/- acre site. The results of this investigation and analysis are included herein and have been divided into the following sections: Site Location and Background, Floodplain/Storm Water, Grading and Earthwork, Wet and Dry Utilities, and Right-of-Way/Streets.

The information contained in this memorandum is based on City of Tempe GIS utility maps, a site visit conducted on July 31, 2019, aerial images, available design reports and as-built plans, and the Maricopa County Assessor’s website. The assertions made in this memorandum, particularly those pertaining to future infrastructure requirements, are based on the information gathered and are subject to verification, reviews, and approvals by multiple agencies. Any future infrastructure requirements noted are to be regarded as anticipated requirements based on preliminary information.

Site Location and Background

The site is located near the southeast corner of 9th Street and Mill Avenue in Tempe, Arizona. The development site is approx. 5 acres located in the southwest portion of APN 132-44-001A and is zoned CC – Commercial Core per the Assessor’s page. The overall parcel is approx. 34 acres and is owned by Arizona State University (ASU).

The development area is bounded on the east by Myrtle Ave (private) followed by a collection of ASU campus buildings, on the south by 10th St. (private) followed by additional ASU facilities, on the west by Mill Ave (public) followed by neighborhood commercial developments, and on the north by 9th St. (private) followed by the proposed Omni & Mirabella mixed use developments currently under construction. The development area is currently developed commercially with existing buildings and parking areas.

See Appendix A for the Parking Structure Conceptual Drawings.
Floodplain/Storm Water

Per Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Number 04013C2240L, dated October 16, 2013, this property is in flood zone “X” defined as “Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.”

See Appendix 1 for the FEMA FIRMMette map.

The proposed site consists of developed land that slopes generally from north to south. There was no topographic survey available at the time this memo was prepared; however, based on visual evidence it appears the current site drainage design utilizes sheet flow across the main parking areas and around the existing building into storm drain inlets located along the south and west sides of the site.

Offsite storm water does not appear to impact the development area. Runoff from the adjacent private streets is conveyed via curb/gutters around the site and captured in adjacent catch basins that discharge into the public storm drain system in Mill Ave.

Typically, in the City of Tempe all new developments shall make provisions onsite to retain the storm water runoff generated by the 100-year, 2-hour storm event. However, this site falls within a reduced retention requirement zone where the City only requires storage of the first 0.9-inches of rainfall depth (instead of the standard 2.1-inches associated with typical design event).

The volume required is determined by the following formula:

\[ V_r = C(R/12)A \]

Where  
\[ V_r = \text{Required storage volume in cubic feet} \]  
\[ R = \text{Precipitation amount in inches} = 0.9 \text{ inches} \]  
\[ A = \text{Area in square feet of total disturbed area} = \pm 250,000 \text{ sf} \]  
\[ C = \text{The post-development run-off coefficient} = 0.95 \]

In this scenario the total required retention volume for the proposed site is approximately 18,000 cf. Storage shall be incorporated into the structure footprint under the ground level via cast-in-place vaults, interlocking concrete culverts or interlocking concrete pipe or half pipes. No corrugated metal pipe (CMP) shall be used for stormwater detention. The site will require approximately two dual-chamber drywells to retain and dispose of the required storm water volume. Dual-chamber drywells are required when accepting direct pavement runoff.

Preliminary research indicates this site may be located in an area that is exempt from the above stated retention requirements. For planning purposes, it should be assumed that the reduced retention volume calculated above will be required for this development.

See Appendix 1 for the Retention Summary for the reduced retention scenario, if required.
Grading and Earthwork

As stated previously, the proposed site is in FEMA flood zone “X”. The City of Tempe does not specify a minimum finished floor elevation for buildings constructed in this flood zone. However, Section 6.3.2 of the Storm Water Policies and Standards Manual dictates that finished floor elevations for all buildings shall be set a minimum of 12” above the lowest adjacent top of curb elevation (or lowest drainage outfall).

A topographic survey is required to properly evaluate the grading and earthwork considerations. It is assumed that the proposed site can be balanced with possibly a slight export until more information on the existing site topography is available.

Wet and Dry Utilities

The existing City of Tempe water infrastructure consists of an 8-inch water main in Myrtle Ave and 10th St adjacent to the site. Mill Ave contains an 8-inch water main adjacent to the site and a 24-inch transmission main located on the west side of the street. 9th St does not currently have any existing water infrastructure. Fire hydrants exist in 5 locations around the site, fed from the adjacent 8-inch water lines. The existing development utilizes several small service laterals for the multitenant retail spaces. It is assumed that adequate pressure exists to service the proposed development. Further analysis is required to confirm.

Existing City of Tempe wastewater infrastructure is located in Myrtle Ave and Mill Ave. The existing development is serviced by the 6-inch sewer in Mill Avenue and it is assumed the proposed development will also be able to connect in Mill Ave. The existing sewer in Myrtle Ave appears to service the adjacent ASU facilities and may not be available to service the proposed development. Further analysis is required to confirm the capacity of the existing sewer lines. The adjacent high-density construction projects may compromise the capacity available in the adjacent public facilities.

The proposed development will be served by APS (power), Century Link Communications (telephone), Cox (cable), and Southwest Gas (natural gas). APS has existing aerial facilities along 10th St. and Myrtle Ave. that serve the project site and surrounding areas. Cox, CenturyLink, and Southwest Gas also all have existing infrastructure that serves the project site.

See Appendix 2 for the City of Tempe GIS utilities map and services maps for franchise utility providers.

Right-of-Way / Streets

The adjacent portion of Mill Avenue appears to be constructed to its ultimate condition. It is therefore not anticipated that any additional right-of-way will be dedicated to the City of Tempe at the time of development.

The other three surrounding private streets are two-way two-lane streets that are assumed to be of sufficient capacity to serve the proposed development. A traffic study will be required to verify capacity
of the adjacent streets. Further analysis will be necessary to determine if ingress/egress to the garage will be accommodated by the existing private streets.

**Conclusion**

The purpose of this memorandum has been to summarize the results of Kimley-Horn’s investigation and analysis of the existing and anticipated infrastructure improvements that will be required to develop the site as depicted in the conceptual site plan. The above listed recommendations are based on preliminary information and a review of available plans, reports, and survey data. The information presented herein is subject to change pending agency reviews and input.

Should you have any questions or concerns, please do not hesitate to contact us.

Sincerely,

Eric Whitehurst, P.E.
Appendix 1: FEMA FIRMette and Retention Summary
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/1/2019 at 10:37:44 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.
### Reduced Retention Summary - Tempe Campus Mill Ave Garage

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<th>Precipitation Depth [P]</th>
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Appendix 2: City of Tempe and Franchise Utility Maps