AGENDA ITEM #: _____
DATE: August 29, 2016
COAC #: 16-5832ws

CITY OF GOODYEAR
CITY COUNCIL ACTION FORM

SUBJECT: Traffic Signal Standards	**STAFF PRESENTER:** Rebecca Zook, Director of Engineering and Luke Albert, City Traffic Engineer **COMPANY CONTACT:**

RECOMMENDATION:

Provide Mayor and Council with an update on the city's existing traffic signal pole standard, and discuss a recommendation for a revised standard to be used in the city.

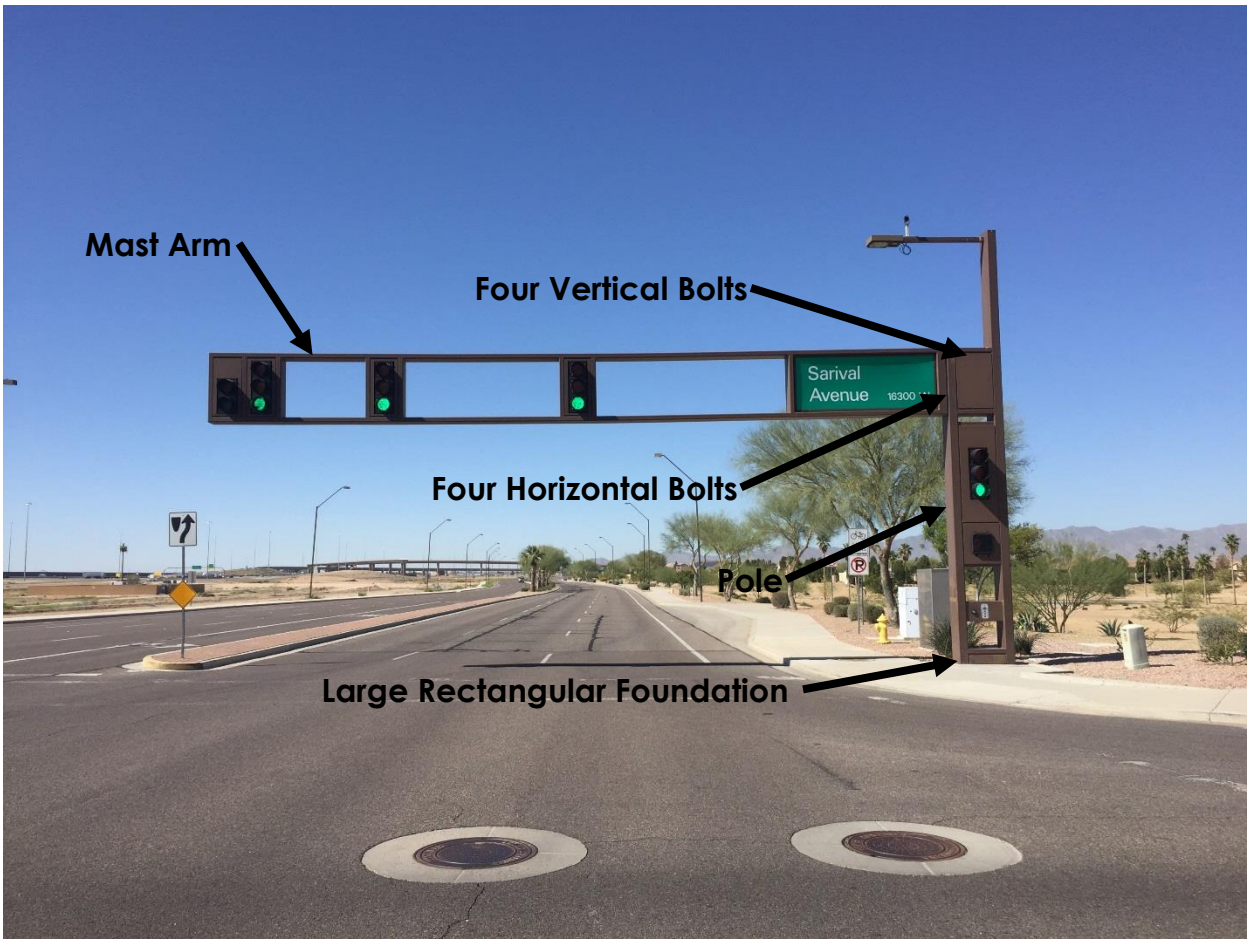
PURPOSE:

The purpose of this presentation is to discuss the city's existing traffic signal pole standard, and to provide a recommendation to revise the existing standard. (Rebecca Zook, Director of Engineering and Luke Albert, City Traffic Engineer)

BACKGROUND AND COMMUNITY BENEFIT:

Goodyear Current Practice (Modular Traffic Signal)

To date, the city's standard for traffic signal poles has been a type called Modular Traffic Signal (poles). This traffic signal pole was first utilized in the region by the city of Tempe; an example is shown in the photo below:



Goodyear's Modular Traffic Signal poles are painted brown, have a uniform rectangular appearance, and provide very large illuminated street name signs. The signal faces (the green-yellow-red bulbs) are visible but most of the signal head (compartment holding the green-yellow-red bulbs) is hidden by brown panels to provide a finished look. Modular Traffic Signal poles are very sturdy structures that almost always remain operational when struck by vehicles.

Modular Traffic Signal poles present frequent challenges during construction:

- A very large footprint is necessary for the cap of the concrete foundation. A rectangular concrete cap that is 6 feet 4 inches by 4 feet. The larger size often causes adjacent utility conflicts. Often either dry or wet utilities need to be moved to accommodate the foundation, increasing the overall cost by $10,000, $20,000, or even up to $50,000.
- Due to the size and weight of Modular Traffic Signal poles, the process of connecting the pole and mast arm (the portion of the pole that hangs over the travel lanes) is very complex. This may result in additional time that a road is closed during construction, and by extension, cost for the services of the contractor and city staff. The complexity is compounded by the fact that the mast arm and pole connection is fabricated off-site and conflicts are not known until construction is attempted in the field.
- Due to the weight of the structures, the longest available signal pole mast arms are only 50 feet in length. On fully developed arterial street sections such as McDowell Road and

PebbleCreek Parkway this results in the left turn signal head not being located over the left turn lane. While a left turn head is not required to be located directly over the left turn lane per Federal standards, locating the left turn head over the left turn lane provides the best visibility for motorists.

Note: An ADOT mast arm can be fabricated 15 feet longer than a Modular Traffic Signal, providing for the red arrow to be over the left turn lanes.

Maintenance of Modular Traffic Signal structures is similar to the maintenance of other types of signal structures, with regular preventative maintenance and pole painting required approximately every ten years. Construction of a traffic signal at a typical four-legged intersection, utilizing Modular Signal Pole structures, generally costs between $450,000 and $525,000.

ADOT Style Signal Poles in Goodyear and the Valley

In addition, to the current Modular Traffic Signal, the city also operates and maintains traffic signals that utilize Arizona Department of Transportation (ADOT) standards. These signals were installed with the I-10 and Loop 303 construction projects. An example of one of these ADOT style structures is shown in the photo below:

Note: The ADOT style traffic signal structure has been enhanced with powder coated brown to match Goodyear's existing traffic signal structures.

These ADOT style traffic signals also have easily visible (2 ½ foot by 8 foot) illuminated street name signs with our Goodyear logo. There are also options to enhance the look of the ADOT style traffic signal poles by adding decorative lighting fixtures to the street light on top of the pole and powder coating the poles in different colors for different areas of the city; similar to what Scottsdale does for their 9 districts. The photos below show an example in the MacDonald area of Historic Downtown Mesa where an ADOT style traffic signal pole was installed with a decorative lighting fixture on the street light to provide an enhanced look. These lighting fixture enhancements are similar to fixtures Goodyear currently uses on street lights inside the Ballpark Village area:

Note: In this photo, the ADOT style traffic signal structure has a decorative lighting fixture added to the street light and has been powder coated green to add to the aesthetics of this district.

Below is a photo rendering of what a Goodyear signal could look like utilizing an ADOT style traffic signal pole with the existing lighting fixture enhancements found in the Ballpark Village area:

Note: This is a graphic representation of a possible lighting fixture; an actual lighting fixture will depend on the size and location of intersection and brightness requirements for the intersection.

ADOT style traffic signal poles are much simpler and less costly to construct than Modular Traffic Signal poles. The largest ADOT style signal pole foundation is 3 feet in diameter, which makes it much easier to locate than a Modular Traffic Signal pole, as they take up a quarter to half of the footprint required for the Goodyear standard.

It is much easier for contractors to bolt ADOT poles and mast arms together, so the driving public's delay is decreased and less contractor and city staff time is needed during construction. The typical time it takes to bolt an ADOT style mast arm to the ADOT style signal pole is 15 minutes, compared to approximately one hour it takes when bolting a Modular Signal Pole mast arm to the pole; for a four-legged intersection that would total 1 hour for an ADOT style pole compared to 4 hours for our current Modular Traffic Signal Pole. Additionally, and due to the complexity of the connection, there have been occurrences where the bolts do not line up and a fabrication modification is needed. This may add one or two days to the schedule. In the last five years this has occurred five times.

ADOT signal pole mast arms are available at up to 65 feet in length, so there are no challenges with mast arms being too short to reach the left turn lanes.

Maintenance on ADOT style signal poles is similar to Modular Traffic Signal poles. Construction of a traffic signal at a typical four-legged intersection, utilizing an ADOT style signal pole, costs approximately $300,000 – less than two-thirds the cost of our current Modular Traffic Signal poles. In addition, steel is a commodity that fluctuates in price, which can significantly impact the cost of a modular traffic signal. A modular 50' traffic signal pole and mast arm weighs over 11,000 pounds, while an ADOT style traffic 50' traffic signal pole and mast arm weighs less than 3,000 pounds. The 65' ADOT style pole and mast arm is the longest signal pole available, and weighs approximately 3,300 pounds. By utilizing ADOT style poles, approximately 70% of the steel in the traffic signal structures can be eliminated at an intersection.

Current Inventory of Traffic Signals

There are traffic signals at 88 intersections in the city of Goodyear. Traffic signals at 77 of these intersections are constructed with Modular Traffic Signal poles. Of the 11 intersections that are not constructed with Modular Traffic Signal poles, the following seven traffic signals along Loop 303 and I-10 west of Loop 303 were constructed by ADOT using ADOT style poles that are powder coated brown:

- Loop 303 and Camelback Road
- Loop 303 and Indian School Road
- Cotton Lane and McDowell Road
- Cotton Lane and I-10 Eastbound Frontage Road
- I-10 and Sarival Avenue
- I-10 and Citrus Road
- I-10 and Perryville Road

In addition, the following four traffic signals were constructed with older ADOT style poles or poles with standards from different agencies with ownership ultimately being transferred to the city of Goodyear:

- I-10 and Litchfield Road
- MC-85 and Litchfield Road
- MC-85 and Estrella Parkway
- Litchfield Road and the pedestrian crosswalk south of Yuma Road

In the northern portion of the city, the traffic signal network from the Loop 303 to Dysart Road between Indian School Road and I-10 is mostly built out; some infill traffic signals remain (such as Earl Drive and Bullard Avenue). This is similar to the central area of our city between Cotton Lane/Loop 303 and the Dysart Road between I-10 and the Gila River; some infill signals remain (such as around our Airport and the Ballpark Village area).

In addition, there are currently no traffic signals north of Indian School Road along the Camelback Road corridor or west beyond the Cotton Lane/Loop 303 alignment that are constructed with Modular Traffic Signal poles.

The Loop 303 freeway and the traffic signals that have been constructed or are planned along this corridor, will be ADOT style pole standards that are powder coated brown.

Recommendation:

North and Central Goodyear
Engineering staff recommends we continue to utilize our Modular Traffic Signal poles for infill signals that are between Indian School Road and the Gila River, east of the Cotton Lane/Loop 303 to Dysart Road. We do not recommend utilizing an alternate traffic signal standard in this area due to the limited number of traffic signals that are planned in this area and the potential for an alternate traffic signal standard to look out of place.

Camelback Corridor and West of Loop 303
Only one signal exists along the Camelback Road corridor and it is built to ADOT standards. Since the Loop 303 currently utilizes an ADOT style signal pole and acts as a natural transition point, Engineering staff recommends that areas west of the Loop 303 utilize ADOT style traffic signals that are powder coated brown and explore options for decorative lighting fixtures to provide an enhanced look where ADOT style traffic signals are installed.

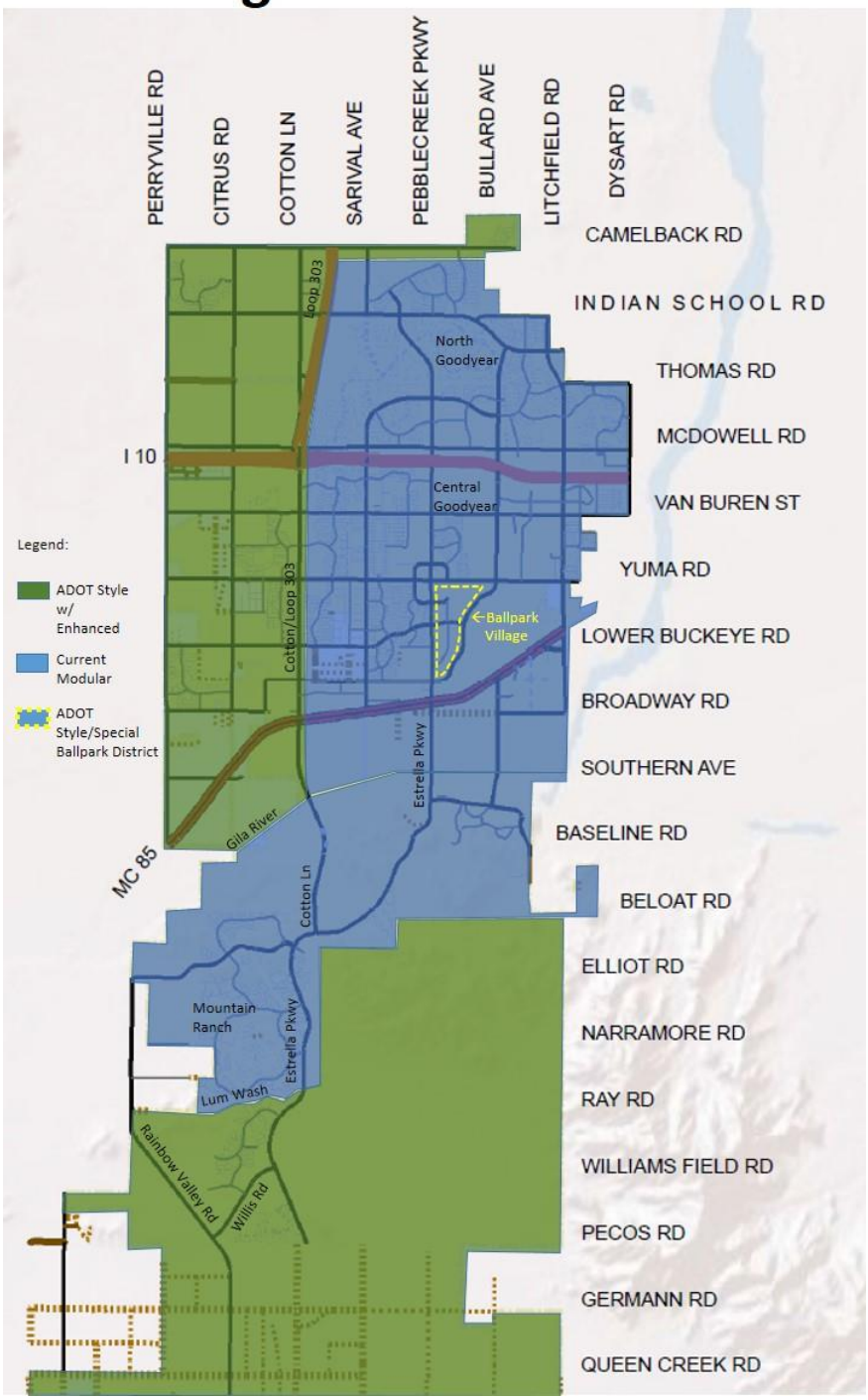
Utilizing a less expensive alternate traffic signal standard that is currently in use by the city provides the benefit of a significant cost savings without requiring an additional type of traffic signal to stock and maintain parts and equipment.

Estrella
There are four traffic signals in Estrella Mountain Ranch that are constructed using Modular Signal Style poles, so incorporating an alternate traffic signal standard is not recommended in the Mountain Ranch village of the Estrella development.

South of Mountain Ranch, in the Montecito and CantaMia villages of Estrella, no traffic signals exist. The Lum Wash and entrance into these newer villages provides for a natural transition to utilizing an ADOT style pole as well as for future developments south of this area. Engineering staff recommends that in areas south of Mountain Ranch the city utilize ADOT traffic signals that are powder coated brown and explore options for decorative lighting fixtures to provide an enhanced look where ADOT style traffic signals are installed.

Place Making and Identity Opportunity (Ballpark Village District)
Many cities such as Tempe (Mill Avenue District), Buckeye (Verrado Districts), Phoenix (Copper Square), Mesa (MacDonald and 2nd Street Historic District) and Scottsdale (Nine separate districts) use different colors, styles, art, and street furniture to create a destination and identity for their city. The Ballpark Village area of Goodyear would make for an optimal district for utilizing different colors, decorative light fixtures, and street furniture to accomplish this. Engineering staff recommends an evaluation using an ADOT style signal, with enhancements, inside of Ballpark Village (this does not include along Estrella Parkway, Bullard Avenue, or Yuma Road) to enhance place making and to add a sense of arrival in our future urban center/vibrant hub of the city.

Recommended
Traffic Signal Standards



PREVIOUS ACTIONS AND DISCUSSION:

The possibility of an alternate traffic signal standard was briefly discussed at a City Council Worksession on December 14, 2015. This worksession is presented as a follow up and continuation of that discussion.

FISCAL ANALYSIS:

There is no current financial impact, however, the utilization of an alternate traffic signal standard would result in a savings of approximately $150,000 to $225,000 per intersection in the future.

ATTACHMENTS:

Map of current traffic signals and Fiber Optic Interconnect