Section 6-4

TRAFFIC SIGNALS

The City of Buckeye, Arizona

Engineering Design Standards

Section 6-4

Adopted August 2020
# TABLE OF CONTENTS

**6-4.000 GENERAL INFORMATION:** ............................................2

- 6-4.001 TRAFFIC SIGNAL INFRASTRUCTURE REQUIREMENTS: ...2
- 6-4.002 DEFINITIONS AND ABBREVIATIONS: .....................2
- 6-4.003 DESIGN POLICY: ..................................................2
- 6-4.004 DILIGENCE.....................................................4
- 6-4.005 IMPLEMENTATION: ..................................................4
- 6-4.006 NATIONAL, REGIONAL AND LOCAL STANDARDS: ....5
- 6-4.007 CITY OF BUCKEYE TRAFFIC SIGNAL POLICIES: ........6
- 6-4.008 PRE-DESIGN CONFERENCE: ....................................7

**6-4.100 TRAFFIC SIGNAL NEEDS STUDIES** .........................7

- 6-4.101 TRAFFIC SIGNAL WARRANT ANALYSIS: .................7
- 6-4.102 TRAFFIC SIGNAL OPERATIONAL ANALYSIS ............7
- 6-4.103 TRAFFIC SIGNAL SPACING AND COORDINATION ......8
- 6-4.104 APPROVAL ....................................................8

**6-4.200 TRAFFIC SIGNAL DESIGN REQUIREMENTS** ............9

- 6-4.201 POLE TYPE AND LOCATION ..................................9
- 6-4.202 SIGNAL STRUCTURES AND FOUNDATIONS: ............10
- 6-4.203 SIGNAL INDICATIONS AND MOUNTING ...............10
- 6-4.204 PEDESTRIAN PUSH BUTTON DEVICES: .................11
- 6-4.205 CONTROLLER: ...............................................12
- 6-4.206 CONTROLLER CABINET: ......................................12
- 6-4.207 CONDUCTORS: ................................................13
- 6-4.208 CONDUITS: ..................................................13
- 6-4.209 PULL BOXES: .................................................14
- 6-4.210 INTERSECTION LIGHTING: ..................................14
- 6-4.211 ILLUMINATED STREET NAME SIGNS (IISNS) .......15
- 6-4.212 CLOSED CIRCUIT TELEVISION (CCTV) .................15

**6-4.201 PHASE DEVICES:** ..............................................16

- 6-4.202 BUSHES: ......................................................16
- 6-4.203 TACTILE PAVEMENT INDICATORS: ......................16
- 6-4.204 PAVEMENT MARKING: ..........................................17
- 6-4.205 PAVEMENT CUT-OUTS: .........................................17
- 6-4.206 CURB CUT-OUTS: ..............................................18
- 6-4.207 signals: ......................................................18
- 6-4.208 TECHNICAL SPECIFICATIONS: ..........................19
- 6-4.209 TRAFFIC SIGNALS: .........................................19
- 6-4.210 ADVANTAGE SIGNALS: .....................................20
- 6-4.211 REMOVAL AND SALVAGE: ..................................20
- 6-4.212 AS-BUILT DRAWINGS: .......................................22

**6-4.300 PLAN PREPARATION:** ...........................................19

- 6-4.301 GENERAL REQUIREMENTS: ................................19
- 6-4.302 DESIGN PLAN REQUIREMENTS: .........................20
- 6-4.303 GENERAL TRAFFIC SIGNAL NOTES: .....................21
- 6-4.304 SUBMITTAL REQUIREMENTS: .............................21
- 6-4.305 CITY OF BUCKEYE PERMIT: ...............................21

**6-4.400 MATERIALS:** ..................................................21

- 6-4.401 GENERAL REQUIREMENTS: .......................22
- 6-4.402 GENERAL PLAN REQUIREMENTS: .........................22

**APPENDIX**

- **APPENDIX 1** - CITY OF BUCKEYE TRAFFIC SIGNAL MAP ............................I
- **APPENDIX 2** - TRAFFIC SIGNAL STANDARD DETAILS .........................II
- **APPENDIX 3** - CITY APPROVED PRODUCT LIST ..........................III
- **APPENDIX 4** - TRAFFIC SIGNAL GENERAL NOTES ......................V
Section 6-4 – Traffic Signals

This section provides policy and standards establishing design criteria for constructing traffic signals on public rights-of-way. These traffic signals are owned and operated by the City of Buckeye (City).

The City Engineer may approve modifications to the requirements of these design standards if in the professional judgement of the City Engineer changes are required for public health and safety concerns.

The City Engineer may also approve modifications to the design standards where industry standards change or other situations exist that in the professional judgement of the City Engineer require modification to provide quality designs. Any request for a modification to these design standards must be submitted in writing and include a justification for the change requested. A copy of the City approved plans shall include a description of any approved modifications. Any final design must comply with the intent of these design standards.

The City Engineer is required, pursuant to Chapter 23, Article 23-2, of the City Code, to develop standards and detail regarding public improvements to be constructed within the City.
6-4 Traffic Signals

6-4.000 General Information:

6-4.001 Traffic Signal Infrastructure Requirements:
This section is to aid the Engineer with any traffic signal design to meet the City of Buckeye minimum standards.
Developers/Landowners are required, pursuant to the City Code, including the City Development Code, to design and install traffic signals as required by their approved Traffic Impact Analysis or approved stipulations.
Developers/Landowners shall install, at their expense, all traffic signals or traffic signal modifications necessary to serve their developments.
All dark sky requirements adopted by the State of Arizona shall be complied with whether or not they are listed specifically in this document.

6-4.002 Definitions and Abbreviations:
A. AASHTO – The American Association of State Highway and Transportation Officials
B. ADA – Americans with Disabilities Act
C. ADOT – Arizona Department of Transportation
D. APL – Approved Products List
E. APS – Arizona Public Service
F. APWA – American Public Works Association
G. A.R.S. – Arizona Revised Statutes
H. ASTM – American Society for Testing and Materials
I. AWG – American Wire Gauge
J. CCTV – Closed Circuit Television Camera
K. Combination Pole – Refers to a utility owned pole where the City shares the pole by mounting City signal equipment.
L. City – City of Buckeye
M. City Engineer – City of Buckeye Engineer or Designee
N. CMP – Community Master Plan
O. COB – City of Buckeye
P. Developer – Shall also be interpreted to mean Landowner; including development companies authorized to act on behalf of the Developer/Landowner.
Q. Engineer – An engineer registered in the State of Arizona to do engineering within the purview of their practice area.
R. EVP – Emergency Vehicle Pre-Emption
S. FHWA – Federal Highway Administration
T. GIS – Geographic Information System
U. GPS – Geographic Positioning System
V. HDD – High Density Polyethylene
W. IESNA – Illuminating Engineering Society of North America
X. IISNS – Internally Illuminated Street Name Sign
Y. IMSA – International Municipal Signal Association
Z. Inspector – Shall be interpreted to mean certified personnel capable to oversee and direct construction activities per project plans and specifications.
AA. Interim Traffic Signal Design – Shall be interpreted to mean the traffic signal design being conducted based on an intersection geometry that is less than the full buildout of the ultimate intersection geometric conditions (configuration, elevation, and operation).
BB. ITS – Intelligent Transportation System
CC. Landowner – Shall also be interpreted to mean Developer; including development companies authorized to act on behalf of the Developer/Landowner.
DD. LED – Light Emitting Diode
EE. LOS – Level of Service
FF. LRFD – Load Resistance Design Factor
GG. Lumen – A unit of luminous flux equal to the light emitted in a steradian by uniform point source of one candle intensity.
HH. MAG – Maricopa Association of Governments
II. MCDOT – Maricopa County Department of Transportation
JJ. Median – A flush or raised landscaped area down the middle of a roadway that adds aesthetics and prevents left-turns at unauthorized locations.
LL. NCHRP – National Cooperative Highway Research Program
MM. NEC – National Electric Code
NN. NEMA – National Electrical Manufacturers Association
OO. NESC – National Electrical Safety Code
PP. Plan(s) – Design drawings that are 100 percent complete and sealed by a registered professional engineer.
QQ. PROWAG – Public Rights-of-Way Accessibility Guidelines
RR. PS&E – Plan, Specifications and Estimate
SS. P.T.O.E – Professional Traffic Operations Engineer
TT. PUE – Public Utility Easement
UU. PVC – Polyvinyl Chloride
VV. ROW – Rights-of-Way
WW. SMFO – Single Mode Fiber Optic Cable
XX. SRP – Salt River Project
6-4.003 Design Policy:

A. Developers/Landowners must adhere to the City’s requirements for traffic signals within the City of Buckeye limits.

B. All construction documents shall be prepared by a registered Professional Civil Engineer licensed and practicing in the State of Arizona pursuant to the provisions of A.R.S. §32-101; §§32-121-131; §§32-141-152. Each sheet of the plans shall include the appropriate professional State of Arizona seal, signature, date and date of expiration below seal. The City of Buckeye does not require original seals and or signatures (wet seal) on improvement documents during the review cycle.

C. The traffic signal design shall be reviewed and approved by the City.

D. Developers shall install, at their expense, all traffic signals improvements including any modifications to existing signals necessary to serve their developments as well as any necessary improvements to provide a fully function traffic signal.

6-4.004 Diligence:

A. Developers/Landowners shall verify the need and requirements for a traffic signal as well as roadway and paving improvements that are required to provide service to a site. Available resources in which to find this information:

1. Obtain Traffic Impact Study to confirm the need for roadway, paving, and operational improvements.

2. Obtain Traffic Signal Warrant to document the need for a traffic signal.

3. Obtain existing utility maps and as-built drawings.

4. Design Engineer is required to contact blue stake during design to define all utilities within 200 feet of each leg of the intersection. The design engineer shall clear all foundation locations during design and prior to approval of plans.


6. Contact the City Engineer to confirm the need for any required conditions.

6-4.005 Implementation:

A. The implementation and enforcement of the design standard set forth in this section shall be effective the date of City Council’s adoption of the resolution approving the standards and requirements of this section and shall apply to the following:

1. All new plans and reports submitted to the City following the effective date of City Council's adoption of the resolution approving the standards and requirements of this section.

2. All plans seeking a new City Engineer’s signature or a re-approval from the City Engineer.

3. All expired plans shall be brought into conformance with the design standards of this section.
4. All plans produced under an approved CMP shall follow or be brought into conformance with the design standards of this section.

5. All current approved plans that have not been permitted shall comply with the requirements of this section. Prior to the issuance of the construction permit, the design Engineer shall submit a written letter to the City Engineer acknowledging the construction and materials that shall be performed and supplied pursuant to the requirements of this section.

6. All expired or abandoned plans as defined below:
   a. The City will not hold or store plans. Any plan set that has not been picked up from the City within 90 days of the City’s first notification to the applicant that the plans are ready to be picked up will be deemed abandoned. The Developer/Landowner will be notified that the expired plan set will no longer be considered by the City. If a plan is abandoned, the Developer/Landowner will be required to resubmit the abandoned plan and pay the City all associated fees.
   b. If a construction permit for the plans has not been issued within 1 year from the date of approval noted on the cover, the plans will be required to be resubmitted for review and re-approval.
      i. In order to resubmit plans, the design Engineer shall bring the plans into conformance of the City’s current standards and requirements.
      ii. All revised plans will be subject to the City’s current fee schedule.
      iii. This resubmittal is required to go through a comprehensive review of all plan sheets.
   c. If plans have not been resubmitted to the City for review or permitting within 2 years from the date of the last City action, the plans shall be considered expired. Once a plan is expired, the plans shall be resubmitted for first review and all associated fees shall be paid to the City.
      i. In order to resubmit plans, the design Engineer shall bring the plans into conformance of the City’s current standard and requirements.
      ii. All expired plans being resubmitted will be subject to the City’s current fee schedule.
      iii. This new submittal is required to go through a comprehensive review of all plan sheets.

6-4.006 National, Regional and Local Standards:
A. The following is a list of national, regional and local resources (the latest editions unless otherwise stated) are referenced and used for the design of streets within the City of Buckeye.

1. Resources, Standards and References:
   a. Arizona Supplement to the Manual on Uniform Traffic Control Devices - ADOT
   b. Manual on Uniform Traffic Control Devices (MUTCD) - USDOT, adopted by the State of Arizona
   c. Standard Specifications for Road and Bridge Construction – ADOT
   e. State of Arizona Signing and Marking Standard Drawings – ADOT
   f. Manual of Approved Signs (MOAS) for Use on State Highway System – ADOT
h. Uniform Standard Specifications for Public Works Construction – MAG
i. Uniform Standard Details for Public Works Construction – MAG
j. Traffic Barricade Manual – City of Phoenix
k. Pavement Marking Manual - MCDOT
l. Informational Guide for Roadway Lighting – AASHTO
m. Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals - AASHTO
n. A Policy on Geometric Design for Highways and Streets – AASHTO
o. Roadside Design Guidelines for clear zones – AASHTO
p. Highway Capacity Manual, Transportation Research Board
q. American Society for Testing and Materials – ASTM
r. Wire and Cable Specifications - IMSA
s. Traffic Control Systems, Standards Publication - NEMA
t. Americans with Disabilities Act (ADA) – United State Code
v. Signal Timing Manual - FHWA
w. Design Guideline Recommendations for the Arizona Parkway – MCDOT
x. Traffic Control Design Guidelines – ADOT

2. Additional references
c. NCHRP Accessible Pedestrian Signals: Synthesis and Guide to Best Practice, TRB


6-4.007 City of Buckeye Traffic Signal Policies:

A. The following policies have been adopted by the City Council.

1. A Traffic Signal Need Study per Section 6-4.100 shall be completed prior to design of new traffic signals.

2. Install warranted traffic signals to maintain ½ mile signal spacing on expressways, parkways and major arterials and minor arterials with 1 mile spacing desirable.
3. Install warranted traffic signals to maintain ¼ mile spacing on collector streets, with ½ mile spacing desirable.

4. Install left-turn arrows based on the City requirements listed as follows:
   a. Protected/permissive phasing will be required for all approaches with exclusive left turn lane, unless otherwise approved by the City Engineer.
   b. Protected only left turn phasing shall be required with dual left turn lanes.

5. All new intersections should be wired for ultimate eight phase signal condition, unless otherwise approved by the City Engineer.

6. Require a comprehensive traffic signal plan set when a new traffic signal is to be constructed, or when an existing signal or any part of an existing signal is to be modified in any way.

7. Require any traffic signal construction, private or public, to be constructed by a minimum of one certified IMSA Level II Signal Technician and one IMSA Level I Signal Technician. During construction, final direction shall be given by the City Engineer.

8. All equipment and materials shall be per the City requirements and submitted to the City Engineer for review and approval by the City, 30 working days prior to signal construction, for information call (623) 349-6825. City’s Approved Product List is provided in Appendix 3.

9. All traffic signal equipment including but not limited to signal poles, foundations, conduit runs, pull boxes, controller, cabinets, and electrical service, must be located within public ROW or easement.

10. All traffic signal and lighting design and equipment, in addition to meeting the requirements of this specification, shall conform to the documents listed in Section 6-4.006 in this document.

**6-4.008 Pre-Design Conference:**

A. Prior to beginning traffic signal design, a pre-design conference is required between the City and the traffic signal design Engineer.

**6-4.100 Traffic Signal Needs Studies**

**6-4.101 Traffic Signal Warrant Analysis:**

A. All proposed traffic signals shall be justified by a complete comprehensive traffic signal needs study and warrant analysis in accordance with MUTCD Section 4C. The traffic signal warrant needs study shall be prepared in conformance with the requirements of Section 6-1.412 of the Traffic Impact Analysis Section.

**6-4.102 Traffic Signal Operational Analysis**

A. For warranted traffic signals, a Traffic Signal Operational Analysis shall evaluate intersection operations and provide recommendations, including lane configuration and phasing, that will achieve a minimum level of service (LOS) of D or better.

B. The Traffic Signal Operational Analysis shall be conducted during the peak periods and using the volumes described in Section 6-1.408 of the Traffic Impact Analysis Section.

C. LOS analysis shall be performed utilizing the methodology in the latest edition of the Highway Capacity Manual.
D. The City recognizes there are a variety of phasing options. Supporting analysis and recommendation as part of the Traffic Signal Operational Analysis is required for review and approval by the City Engineer.

E. Left turn exclusive phasing shall be evaluated and justified using the MCDOT Left Turn Signal Phasing Study procedure manual (P8205).
   a. When left turn exclusive phasing is warranted, protected/permissive left turn phasing is preferred for traffic operations.
   b. Protected only left turn phasing should be implemented when there are sight distance restrictions and when there is a need for dual left turn lanes.
   c. Split phasing should be considered when there are conflicting vehicular paths or where approaches are offset, such that left turn movements have conflicting paths.

F. Right turn signal phasing (overlap) may be considered where an exclusive right turn lane is provided with left turn arrow on adjacent street.
   a. If this phasing is utilized, then No U-Turn signing shall be provided.

6-4.103 Traffic Signal Spacing and Coordination

A. Traffic signal spacing shall be evaluated as part of the Traffic Signal Operational Analysis. Typical signal spacing shall be no closer than ½ mile between signals. Closer spacing may be proposed with supported analysis but is subject to review and written approval by the City Engineer.

B. Where spacing is less than ½ mile to an existing (or future) signalized intersection a Signal Coordination Analysis shall be prepared as part of the Traffic Signal Operational Analysis showing how the proposed traffic signal may interact with adjacent signals in coordination.

C. Signal coordination analysis shall consist of:
   a. Analyzing both AM and PM weekday peak periods, based on existing cycle lengths.
   b. Make recommendations of proposed cycle length changes necessary to operate the new signal in coordination with adjacent signals.
   c. Analysis period may include weekend data, as directed by the City Engineer. Weekend Signal Coordination Analysis shall be coordinated with the City prior to collection of traffic data to establish time frames for analysis.
   d. Signal Coordination analysis shall be performed utilizing the latest edition of SYNCHRO software. SYNCHRO analysis results shall be reported to conform to the Highway Capacity Manual methodology.

6-4.104 Approval

A. As specified in the MUTCD, satisfaction of a signal warrant alone does not necessarily justify the installation of a new traffic signal. Review and approval by the City Engineer shall be required.
6-4.200 Traffic Signal Design Requirements

6-4.201 Pole Type and Location

A. The City approved traffic signal locations map can be on the City website at [http://www.buckeyeaz.gov/business/engineering/maps](http://www.buckeyeaz.gov/business/engineering/maps).

B. Pole location from travel way shall satisfy AASHTO minimum requirements.

C. The City utilizes two types of traffic signal structures based on roadway functional classification and geographic location within the City. See Appendix 1 for Traffic Signal Type Requirements map.

1. Trombone style traffic signal poles and arms shall be utilized be installed along parkways, gateway arterials, and major arterial as reflected in the Traffic Signal Type Requirements map roadways that provide connectivity to regional freeway system.

2. ADOT style traffic signal poles shall be installed on all side streets that intersect a Trombone corridor unless the intersecting street is another Trombone corridor. In this case, Trombone poles and mast arms shall be installed on all legs of the intersection.

3. If a traffic signal is warranted at an intersection not illustrated by a line in the Traffic Signal Type Requirements map (Appendix 1), an ADOT style traffic signal shall be installed.

4. All traffic signal poles and mast arms shall be painted the same color at an intersection. The City standard is white unless another color has been approved.

5. All traffic signal mast arms shall have a LED illuminated street name sign (ISNS) that is installed in the middle of the mast arm. The ISNS shall be white lettering on blue background with the City logo. See Section 6-4.211 for ISNS requirements.

6. The City Engineer is authorized to approve design variances due to the field constraints or an interim signal installation.

D. The City typically requires one pole for each corner. Where site conditions dictate, two poles may be used. One pole shall be a Type A pole (or Type G pole based on lighting needs), while the other pole shall be dependent on roadway classification and signal mast arm length.

E. For traffic signal layout at a major/major arterial intersection see City Detail 64210-1.

F. The traffic signal pole design and layout shall provide the most cost-effective condition and shall satisfy requirements set forth in this document.

G. A sufficient pedestrian landing meeting MUTCD and PROWAG requirements must be provided. The desirable pole with pedestrian push button location is within 5 feet from crosswalk line and 10 feet from face of curb. See City Detail 64211 for typical pedestrian push button and pole placement utilizing the City’s standard directional ramp.

H. For interim conditions, the traffic signal pole shall be located in their ultimate locations to minimize relocations and modifications upon future improvements. The Engineer shall verify minimum clearance above pavement for the interim and ultimate conditions. Provide top of pole elevations that will work for the ultimate geometric conditions.
6-4.202 Signal Structures and Foundations:

A. The City of Buckeye requires all structural design of signals to be compliant with the latest adopted structural standards by ADOT. Currently, the 2013 AASHTO standard specifications for structural design supports for highway signs, luminaires, and traffic signals, 6th edition w/ 2015 interims. Should ADOT adopt a more stringent structural standard in the future, the City requires the Engineer to follow and design to the ADOT adopted standard.

B. Trombone style traffic signal poles, mast arms, and foundations need to adhere to City Details 64220 to 64225.

C. ADOT traffic signal pole, mast arms, and foundations shall adhere to ADOT’s Signal and Lighting Standard Drawings and Standard Specifications for Road and Bridge Construction, Section 731.

D. Traffic signal pole hand hole is modified as shown in City Detail 64224.

E. Pedestrian push button post shall adhere to the ADOT Signals and Lighting Standard Drawings and Standard Specifications for Road and Bridge Construction, except as modified in City Detail 64225.

F. The use of combination poles will be on a case by case basis and approved by City Engineer.

G. Foundation details shown may be used with the following conditions:
   1. At least one test boring has been performed within 100 feet of the final pole location.
   2. Unfactored base reactions do not exceed the reactions shown on City Detail 64220 by more than 5%.
   3. Pole heights and mast arm lengths do not exceed those shown on City Detail 64221.

6-4.203 Signal Indications and Mounting:

A. All design elements must comply with the MUTCD standards unless directed otherwise by the City.

B. All traffic signal indicates shall be compatible with signal structure.

C. For interim conditions, the number and placement of traffic signal heads shall accommodate the ultimate lane geometry to minimize relocations and modifications upon future improvements. Deviations shall be approved by the City Engineer and will only be evaluated on a case-by-case basis.

D. Typically, a minimum of three (3) traffic signal heads is required for control of a through movement (2 overhead mount and 1 side-mount on the right) and shall satisfy the MUTCD based on the number of through lanes. This does not include the Q-2 or Q heads for left turn movements.

E. Typically, a minimum of two (2) traffic signal heads is required to control a left-turn movement. One signal head shall be overhead-mounted on the outboard of the signal mast arm and the other signal head shall be side-mounted or pole-mounted on the far-side left corner facing the corresponding through movement. Position of the left turn-turn signal head shall conform to the MUTCD.

F. All traffic signal indications, mounting assemblies, and mounting heights shall comply with ADOT Signal and Lighting Standard Details, unless otherwise specified in this document.

G. All signal faces shall be twelve-inch for all through and left-turn indications. Acceptable signal faces include Type F, Type G, Type R, Type Q, and Type Q-2. Eight-inch signal faces shall not be used.
H. Pedestrian signal indications should be installed at ALL intersections, unless directed otherwise by the City Engineer.

I. All pedestrian indications shall be countdown.

J. Traffic signal heads, back plates, tunnel visors, and mounting brackets shall be black.

K. All mounting assemblies for traffic signals mounted on signal mast arm and poles should conform to ADOT Signal and Lighting Standard T.S 9 series drawings. Acceptable mounts for uprights and mast arms include:

<table>
<thead>
<tr>
<th>Mount Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Shall not be used</td>
</tr>
<tr>
<td>II</td>
<td>Traffic Signal Mast Arm Signal Head</td>
</tr>
<tr>
<td>III</td>
<td>Shall not be used</td>
</tr>
<tr>
<td>IV</td>
<td>Vehicular head on top of Type A Pole</td>
</tr>
<tr>
<td>V</td>
<td>For pedestrian head side mounted on pole</td>
</tr>
<tr>
<td>VI</td>
<td>Dual vehicular heads on top of Type A Pole</td>
</tr>
<tr>
<td>VII</td>
<td>Dual pedestrian head side mounted on pole</td>
</tr>
<tr>
<td>VIII</td>
<td>Shall not be used</td>
</tr>
<tr>
<td>IX</td>
<td>Shall not be used</td>
</tr>
<tr>
<td>X</td>
<td>Vehicular head side mounted on Type A Pole</td>
</tr>
<tr>
<td>XI</td>
<td>Vehicular head side mounted on pole</td>
</tr>
</tbody>
</table>

L. All hardware shall be mounted on pole “backside at 45 degrees” or per City requirements.

M. Prior to drilling or mounting traffic signal heads on signal pole, approval of the mounting height and orientation shall be approved by the City traffic signal inspector to avoid visibility conflicts with signal mast arm.

N. Side-mount traffic signal indications should be mounted on the backside of the pole, at a 45-degree angle and at a height of 115 inches to the bottom drill hole as shown in ADOT T.SL. 4-26.

O. Traffic signal indications shall be approved by the City Engineer. Any questions regarding placement of traffic signal indications shall be directed to the City Engineering Department at (623)-349-6282.

P. ADOT Style Requirements:

1. Four (4) section Type G heads shall be on ADOT style pole uprights and on the signal mast arm. The aiming of the signal head shall not conflict with the signal mast arm or signal mast arm connection.

Q. Trombone Style Requirements:

1. Signal heads shall be mounted on the Trombone signal mast arm per the City Detail 64222 and 64223. See the City Approved Products List.

2. Five (5) section Type Q-2 signal heads shall be used in the trombone style signal mast arms.

6-4.204 Pedestrian Push Button Devices:

A. Pedestrian push buttons should be installed at ALL intersections, unless directed otherwise by the City Engineer.

B. Pedestrian push buttons should be installed for ALL directions, unless directed otherwise by the City Engineer.
C. Pedestrian push buttons shall meet MUTCD and ADA requirements, including but not limited to:
   1. The Engineer shall provide a 4-ft x 4-ft concrete landing slab immediately adjacent to the pole and directly under the pedestrian signal button per ADA requirements.
   2. The concrete landing slab shall have a maximum 2% slope in any direction in accordance with ADA requirements.
   3. The mounting height of pedestrian push buttons shall be at 42 inches above finished landing to center of button in accordance with ADA requirements.
   4. Pedestrian push buttons shall be audible and tactile per ADA requirements. See the City Approved Product List.
   5. Placement of pedestrian push button at major arterial/arterial intersection shall conform to City Detail 64210 and 64211.
   6. Pedestrian push buttons shall be provided in the median refuge area where two stage pedestrian crossings are required by the City.
   7. ADA accessibility guidance for placement of pedestrian push buttons shall conform to City Detail 64211.

6-4.205 Controller:
   A. A NEMA TS-2 Type 1 traffic signal controller shall be supplied and installed, unless otherwise directed by the City Engineer. See the City Approved Product List.
   B. Controller Testing requirements:
      1. The controller shall be delivered a minimum of three weeks (21-days) prior to installation for testing by the City.
      2. Delivery of controller shall be made to City Public Works Department at 23454 W. MC Highway 85, Buckeye, Arizona 85326
      3. Notify City Public Works at 623-349-6825 a minimum of 24-hours prior to delivery of controller.
   C. The signal controller shall be wired in the cabinet by a City Public Works signal inspector with IMSA Level 2 certified electrician.

6-4.206 Controller Cabinet:
   A. Traffic signal cabinet shall be a NEMA TS 2, plug and go design, size 7, with 16 channels, per City specification with GPS or equivalent. See the City Approved Product List.
   B. Testing requirements:
      1. The controller shall be delivered a minimum of three weeks (21-days) prior to installation for testing by the City.
      2. Delivery of controller shall be made to City Public Works Department at 23454 W. MC Highway 85, Buckeye, Arizona 85326
      3. Notify City Public Works at 623-349-6825 a minimum of 24-hours prior to delivery of controller.
   C. The City prefers the traffic signal cabinet to be installed on the northwest corner of the intersection. The cabinet shall be oriented, so the intersection is visible during maintenance. The Engineer shall
gain approval from the City to install the controller/cabinet on a corner other than the northwest corner.

D. The cabinet foundation dimensions shall be 30-inch x 48-inch, project 4 to 8 inches above the adjacent (ultimate) ground elevation and extend 32 inches below the adjacent (ultimate) ground elevation. Installation of 10 feet x 3/4-inch copper ground rod shall be installed in the cabinet using 1-inch PVC conduit. The ground rod shall be in conformance with the City’s Building Code. Resistivity tests will be required to confirm ground rod size, especially where overhead electric is present.

E. A concrete pad shall be installed in front of the cabinet with the dimensions of 48-inch x 48-inch x 4 inch.

F. Cabinet foundation per City Details 64260-1 and 64260-2.

6-4.207 Conductors:

A. All IMSA conductors shall be No. 14 AWG solid core copper, unless voltage calculations, based on a maximum allowable loss of 3% (3.6 VAC), indicate the need for a larger conductor size.

B. IMSA No. 19-1, copper, multi-conductor cable shall be used to provide electrical circuits to all traffic signal indications and pedestrian indications.

C. One IMSA 25 conductor cable shall be routed un-spliced from each signal pole terminal block to the controller cabinet. Thus, if eight traffic signal poles are proposed, eight cables, running un-spliced from each pole to the controller cabinet.

D. IMSA 4 and 7 conductors shall run continuous from the signal indication to terminal block. Do not splice conductors in the pull box.

E. IMSA 2 conductor cable shall run un-spliced from pedestrian push button devices to controller and cabinet.

F. See City Detail 64270 for Wiring Diagram.

G. Signal conductor grounding wire shall be No. 8 green stranded insulated in all main runs.

H. All lighting conductor shall be THHN/THWN or approved equal.

I. IMSA cables may be used to provide linkage to other electrical circuits such as railroad cabinets, beacons, internal to structures, etc.

J. EVP detector cable shall run un-spliced from the EVP device to the controller and cabinet. See the City Approved Product List for EVP cable.

K. Re-pull completely with new wire and remove old wire if any existing conduit run is disturbed. The use of wire pulling lubricant is required in all conduits. Install pull strap in every conduit run.

L. IMSA cables, CCTV cables, video detection cables, emergency vehicle pre-emption cables and interconnect cables shall run un-spliced from controller cabinet to device. Under no circumstances will splicing be allowed within any conduit.

M. Where cables loop through pull boxes, they shall be marked with tape to designate cable to the appropriate pole. Conductors and cables shall have a minimum of 72-inches of slack in all pull boxes.

N. All future conduits and mast arm tenons shall have a pull strap installed and be capped with a 2-inch cap to prevent contaminants from entering the mast arm.

O. All single conductors shall be THW stranded including ground, bond, and service.
P. A six (6) strand single mode fiber optic branch cable shall be provided between the control cabinet and Number 9 pull box for connection to the City wide ITS system.

6-4.208 Conduits:

A. Typical intersection street crossing conduits shall consist of three (3) 3-inch conduits to complete a box type design. One (1) conduit run will exclusively be used for electrical circuits (IMSA cables, lighting, common, bond, etc). One (1) conduit run will exclusively be used for low voltage and non-electrical circuits (video detection cable, EVP preemption cable, and CCTV cable). One (1) conduit as a spare which shall contain an insulated No. 8 wire stranded. See City Detail 64280.

B. Typical intersection conduit shall consist of one (1) 3-inch conduit from median pull box to corner pull box as shown in City Detail 64280.

C. Two (2) 2-inch conduits shall run from signal pole with mast arm to nearest Number 7 with extension pull box. One (1) 2-inch conduit shall run from Type A pole or pedestrian post to the nearest Number 7 with extension pull box. Three (3) 3-inch conduits shall run from Number 7 with extension to control cabinet.

D. One (1) 2-inch PVC shall run from the control cabinet to the Number 9 pull box. Conduit shall be installed per Section 6-6, Intelligent Transportation System.

E. See City Detail 64281 for trench details.

F. Rigid conduit below ground shall not be provided. Use galvanized rigid conduit for exposed, above-ground runs through the first sweep below grade. Rigid conduit shall be wrapped per building code.

G. Place red warning tape in all conduit trenches, 12 inches above conduits, witnessed by the City’s inspector.

H. All PVC shall be Schedule 40 PVC, except for service runs above ground.

I. Traffic signal conduit sweep radius shall be a minimum of 24-inch.

J. See Transportation Section 6-6 for Intelligent Transportation System conduit requirements and sweeps.

K. Spare conduits without adjacent cabling outside the same live trench shall include tracer wire.

6-4.209 Pull Boxes:

A. Pull box size shall conform to ADOT Signal and Lighting Standard Drawings and Standard Specifications for Road and Bridge Construction, Section 731.

B. Number 5 pull boxes shall be used in medians as shown in City Detail 64290.

C. Use Number 7 with extension pull boxes at all corners. See City Detail 64291.

D. The home run pull box shall be Number 7 with extension placed adjacent to the control cabinet with 18-inch drainage consisting of #57 rock per ADOT specifications.

E. Number 9 pull box shall be installed adjacent to the controller and cabinet per Section 6-6, Intelligent Transportation System, City Detail 64280 and 66211-1 and 66211-2.

F. Number 5 and 7 pull boxes shall be Fiberlyte.

G. Number 7 pull boxes shall include minimum 6-inch extension.

H. Pull boxes shall be installed as shown in City Detail 64292.
I. Pull boxes shall not be placed in traveled roadways. Conduit must be extended where necessary to relocate pull box to a non-traveled area. If the conduit cannot maintain a straight route, a new conduit run will be required.

J. Where possible, locate all pull boxes adjacent to sidewalks rather than in the sidewalk. Placement in the sidewalk shall be approved in a case by case basis by the City Engineer.

K. Mark all traffic signal pull boxes with “TRAFFIC SIGNAL” on the lid.

L. Mark all ITS pull boxes with “COB ITS” per Section 6-6, Intelligent Transportation System manual and details.

6-4.210 Intersection Lighting:

A. This manual is not intended to be a street lighting design manual. However, intersection lighting shall be included as part of the traffic signal design. See the City’s Lighting Section 7-2 for Public Streetlights and intersection lighting requirements.

B. Luminaires shall be provided on all signal poles unless directed otherwise by the City Engineer.

C. All lighting conductors shall be THHN/THWN or approved equal.

D. Luminaire wire connections will only be made in pull boxes and not brought into the signal controller cabinet. All street lights will be connected in the junction box with a 5 Amp in line fuse holder (non-locking type).

E. Luminaire shall be a shoebox LED fixture with 140 Watt, 3000K, 17,300 Lumen. See the City’s Lighting Section 7-2 for Public Streetlights and intersection lighting manual.

6-4.211 Illuminated Street Name Signs (IISNS)

A. IISNS shall be mounted on Trombone Style Mast arm per City Detail 642110.

B. IISNS shall be mounted on ADOT style poles using flag per City Detail 642111.

C. IISNS layout, format, color, and size shall be approved by the City Engineer prior to manufacture and installation.

D. All lighting conductors shall be THHN/THWN or approved equal.

E. See City Approved Product List for IISNS.

F. Font size/height shall be based on visible distance and shall satisfy MUTCD.

6-4.212 Closed Circuit Television (CCTV)

CCTV cameras shall be used considered for all signalized intersection and as direction by the City Engineer. Priority usage for CCTV cameras shall be to monitor real time traffic conditions remotely.

A. CCTV camera location at signalized intersection should provide the ability to view the intersection and all approaches.

B. The design Engineer shall be responsible for conducting a field verification of the traffic signal pole location which provides the best intersection and roadway approach views based on any notes, obstructions and camera mounting height.

C. The City Engineer will have final authority on the location of CCTV cameras at each intersection. At intersections where multiple cameras will be installed, the traffic management camera shall take location priority over all other camera uses, as approved by the City Engineer.
D. The CCTV camera cabling shall run un-spliced from the CCTV camera to the traffic signal controller cabinet.

E. The following equipment shall be supplied with each CCTV camera:
   1. CCTV cabling and mounting
   2. Power supply or Power-Over-Ethernet (POE)
   3. Ethernet Switch with fiber optic jumper cables and CAT 5E cables
   4. Surge protection

F. See City Detail 642120 for CCTV Field Equipment.

G. See City Approved Product List for CCTV.

6-4.213 Emergency Vehicle Pre-Emption:
A. All new and modified traffic signal shall be designed to provide emergency vehicle pre-emption (EVP).
B. EVP shall be used for all directions and at all locations, unless otherwise directed by the City Engineer.
C. EVP shall be through the use of optical devices.
   a. Single input/single output sensor will be utilized on narrow roadways to control a single approach.
   b. Dual input/single output sensors will be utilized on wide roadways with multiple lanes to control a single approach.
   c. Dual input/dual output sensors will be utilized to control two approaches independently. This EVP sensor shall be mounted in a location where sensors can receive signals from both approaches.
   d. Dual input/dual output sensors will be utilized on roadways were landscaped medians are existing or proposed.

D. EVP is a line of site system. The mounting location shall provide for an unobstructed view of the approach as far out as possible in order to detect approaching vehicles as far out as possible.
E. EVP is typically mounted on the traffic signal mast arm across from approaching signal. Additional sensors may be necessary if approaches are offset or vision is obstructed.
F. In cases where vertical and horizontal curvature impact visibility, EVP sensors may need to be mounted on additional poles located upstream from the traffic signal.
G. The desirable unobstructed EVP sensor visibility distance shall be 1,800 feet.
H. EVP shall consist of optical sensors, interface card, cabling, and mounting hardware. See City Approved Product List.
I. EVP cable shall run un-spliced from the device to controller and cabinet.
J. Tape and color-code all detector cables.

6-4.214 Detectors:
A. Presence detection shall be video detection. Video detection camera shall be provided for all approaches to the intersection.
B. Video detection system shall include video detection cameras, cabling, mounting hardware, and controller interface. See City Approved Products List.

C. Unless otherwise specified, cameras will be mounted on signal mast arms with a six-foot riser.

D. Advanced detection shall be utilized on all major roadways or as directed by the City Engineer. Use of advanced detection on all other roadways shall be evaluated based on national guidelines and approved by the City Engineer.

E. Advanced detection shall be radar detection. See City Approved Products List.

6-4.215 Phasing Standard:

A. The City Engineer will determine all intersection phasing and traffic operations.

B. The City uses the standard NEMA dual quad 8-phase with phase 2 being northbound through. Typical phasing schematics are shown provided in City Detail 642150 and 642151.

C. Left-turn phasing will operate as leading left, unless otherwise directed by the City Engineer.

D. Provide phasing diagram for interim and ultimate 8-phase operation, unless directed otherwise by the City Engineer.

6-4.216 Electrical Service:

A. Electrical Service

1. The Engineer shall contact the applicable service provider to determine source for traffic signal power and to coordinate applicable requirements.
2. Engineer shall identify and design the electric service on the traffic signal plans, including APS power source point of delivery (POD) and electrical service run from the service POD to the traffic signal electrical service cabinet.
3. APS plans for electrical service shall be included in the construction plans.
4. The Engineer shall obtain a service address from the City. The electrical service address shall be shown on the traffic signal plan.
5. The contractor must obtain a building permit from the City prior to installation.
6. The Engineer shall provide load calculation to secure electrical service.

B. Electrical Service Cabinet (Meter Pedestal):

1. An electrical service cabinet shall be provided for each traffic signal and provide service ONLY for the traffic signal and associated traffic signal intersection lighting.
2. A separate uninterruptable power supply (UPS) shall be provided for all locations. The electric service cabinet shall be a combination meter pedestal with uninterruptable power supply (UPS) for all locations. See the City Approved Product List.
3. The electric service cabinet shall include lightning arrest (ground rod), photocell receptacle rated for 20 amps or more, sub-breakers and test/auto switch. Photo cell shall be oriented in the North direction.
4. The electrical service cabinet shall be buss/breaker connections on the UPS.
5. When the power source is an overhead power drop, use a 2-inch galvanized conduit above ground and through the first underground sweep. Power run design shall be per utility company requirements. Overhead power drop shall be approved by the City prior to use and
installation. Underground ungalvanized conduit installations shall be wrapped per manufacturers requirements.

6. There shall be a minimum of 20 foot spacing between the electrical service cabinet and utility service provider point of service location.

7. The electrical service cabinet shall be located no closer than 20 feet from the traffic signal control cabinet (edge-to-edge) and on the same corner.

8. Mount a permanently affixed metal address tag on the front side of the electrical service cabinet with 1-inch lettering that faces the road.

6-4.217 Signage:

A. All signage shall be provided with the traffic signal installation and shall be in accordance with the MUTCD.

B. Existing stop control signage shall be maintained until signal is fully operational.

C. Traffic Control Change Ahead warning signs shall be installed when traffic control type or operations has changed at an intersection. Warnings shall be installed by the contractor for a minimum of 60 days following the traffic control change. When warning stage is complete, the contractor shall remove temporary signs and deliver to the City Public Works Department at 23454 W. MC Highway 85, Buckeye, AZ 85326.

6-4.218 Pavement Marking:

A. All necessary striping shall be provided with the traffic signal installation and shall be in accordance with the MUTCD and City Section 6-5 Signing and Marking manual.

B. The traffic signal layout and position of signal indications are subject to the intersection pavement marking layout. The design Engineer shall provide a signal layout that will operate for both interim and ultimate striping conditions.

C. Pavement marking design at each signalized intersection shall consist of a new stop bar and new crosswalk on each approach, unless otherwise approved by the City Engineer.

D. Pavement marking for stop bar and crosswalks shall not be installed until immediately prior to signal activation.

E. Pavement marking may extend beyond the intersection traffic signal layout to illustrate and design for the roadway widening, lane geometry, and the associated tapers and transitions to match existing. The limits of pavement marking will be subject to the widening and transition lengths necessary to match existing conditions.

F. The intersection shall be striped to accommodate the proposed lane configuration and roadway geometry approved by the City Engineer.

G. Longitudinal lane lines shall align through the intersection. Shifting of lane alignment through the intersection will only be allowed on a case-by-case basis and shall be approved by the City Engineer.

H. A separate pavement marking plan shall be provided at the end of the traffic signal plan set to clearly illustrate all existing and proposed striping improvements, including longitudinal lane lines, left/right turn lane and symbols, bike lanes and symbols, transition and tapers, stop bars,
crosswalks, obliteration, and all associated dimensions. Striping plans shall be provided in accordance with City Section 6-5 Signing and Marking manual.

I. Pavement marking type, color, and size shall be provided in accordance with City Section 6-5 Signing and Marking manual.

J. Only permanent pavement marking layouts shall be identified on the traffic signal plans. The interim traffic signal plan sheet shall illustrate the interim pavement marking layout. The ultimate traffic signal plan shall illustrate the ultimate pavement marking layout.

6-4.219 Removal and Salvage:

A. Keep all existing traffic signal equipment and streetlights in operation until new installations are operational.

B. Removal of foundations shall be least 36-inches below finished grade and shall be specified on the traffic signal plans.

C. All existing traffic signal equipment shall be salvaged to City Public Works Department at 23454 W. MC Highway 85, Buckeye, AZ 85326. Notify public works a minimum of 48 hours in advance of delivery at 623-349-6825.

D. Construction debris shall be removed and disposed of by the Contractor utilizing a City of Buckeye licensed hauler.

E. Keep all traffic signal approaches that have vehicle detection in operation during construction. Construction staging to avoid existing detectors or the installation of temporary detectors will be required to maintain detection during construction.

F. In most cases, the City Engineer will require temporary detection to be installed in intersections that are being reconstructed, if normal detection cannot be restored in a timely manner. All changes to detection, EVP or other, shall be over seen and approved by the City Traffic Signal Inspector.

6-4.300 Plan Preparation:

6-4.301 General Requirements:

A. All plans shall comply with “Design Standards - Section 1-2 Plan Submittal Requirements” General Construction Notes and Standard Sheets for Infrastructure Plan Submittals

B. Traffic signal plan symbols and legend shall comply with ADOT Standard Drawing T.S. 0-2. Traffic signal legend shall be included in the plans set.

C. Traffic Signal Plan set shall comply with the City Details 643010 through 643013. Traffic Signal Plan set shall consist at a minimum of the following sheets:

1. Cover Sheet – This is to be provided for traffic signal improvement projects. If traffic signal is included as part of a larger project plan set, the traffic signal plan set shall stand alone as its own plan set. Cover sheet shall comply with City Detail 12200 provided in Section 1-2, Plan Submittal Requirements.

2. Interim Traffic Signal Layout – This layout and design will include the interim traffic signal layout necessary to accommodate the interim intersection configuration and operation. Interim traffic signal phasing operation diagram shall be shown on this sheet. See City Detail 643010.

3. Ultimate Traffic Signal Layout – Engineer shall design for an ultimate intersection layout. This traffic signal layout and design will define the ultimate needs. Ultimate traffic signal phasing operation diagram shall be illustrated on this sheet. See City Detail 643011.
4. **Pole Schedule** – This sheet shall identify the interim and ultimate signal equipment and locations. See City Detail 643012.

5. **Conductor Schedule and Internally Illuminated Street Name Sign** – This sheet shall identify the traffic signal conduit and conductors to be installed. The conductor schedule shall indicate conduit run number, conduit size, wire type/size, and phase. IISNS detail shall also be provided on this sheet. See City Detail 643013.

**6-4.302 Design Plan Requirements:**

A. All plans shall be neat and legible.

B. All Traffic Signal layout plans shall be drawn to scale.
   1. Horizontal scale shall not be smaller than 1 inch = 20 feet on plan views.

C. Locate and identify ALL existing and/or proposed improvements, above and below ground, within 200 feet of the intersection. INCLUDE ALL UTILITIES.

D. Locate and identify ALL existing and/or proposed pavement marking and signing, include turn-arrows for exclusive turn lanes.

E. Locate existing vegetation (trees, etc.), which could be in conflict with any proposed equipment locations or impact required signal visibility distances.

F. Provide a profile layout when vertical roadway alignment may impact traffic signal visibility requirements. (1 inch = 40 inches-scale for profile is acceptable.)

G. Provide bearings for each leg of the intersection when deflection is greater than 2 degrees. Provide roadway curve data, if applicable.

H. Locate all traffic signal equipment (pole and foundations, controller cabinet, electric service cabinet, pull boxes, etc.) by station and offset dimension.

I. Identify ALL existing ROW and easements within 200 feet of the intersection.

J. Provide details of any items not covered by these standards.

K. All electrical shall meet City adopted building and electrical codes.

**6-4.303 General Traffic Signal Notes:**

A. The General Traffic Signal Notes provided in Appendix 4 shall be located on the Traffic Signal Design Plans. Also see “Design Standards - Section 1-2 Plan Submittal Requirements,” for additional notes that may also be required. The Traffic Signal General Notes shall be edited appropriately for the project.
6-4.304 Submittal Requirements:

A. Plan Review Submittals:
   1. Street lights, traffic signals, signing and marking, and other construction shall be shown on their respective plan sets.

B. In addition to PDF copies, a CD with the following items is required to accompany the plans submitted for signature to the City:
   1. Base map for the area of the plans seeking approval including all property lines, ROW, PUE’s, easements etc.
   2. All traffic signal features, sign locations and monuments, etc.
   3. All the information shall be shown on a single map, not cut sheets like the plans and located on reasonable layers in CAD.
   4. Utility clearance letters from each utility identified on blue stake ticket indicating no facilities, no conflict, and/or conflicts have been mitigated.
   5. Utility subsurface documentation verifying all pole foundation locations are clear from conflicts.

6-4.305 City of Buckeye Permit:

A. The Developer/Landowner shall secure permits from the City for constructing all traffic signals on the approved traffic signal plans.

B. If a revised plan set is submitted, approved, and signed then the Developer/Landowner is responsible for securing a revised permit from the City.

6-4.400 Materials:

A. Submittals:
   1. All materials used on the project or incorporated into the construction are subject to approval or rejection by the City Engineer.
   2. City approved technical material/manufacturer data is required for all materials and appurtenances used on the project before work commences.
   3. All delivered materials shall match the approved technical data or provide an approved equal.
   4. The contractor shall submit four copies of the submittals to the City Engineer.
   5. All work installed prior to approval of submittals is subject to rejection by the City.
   6. A copy of the approved product submittals shall be on the jobsite at all times.
   7. Each of the submittals shall clearly show the manufacturer and have comprehensive technical data for the proposed product.
   8. All material submittals shall be submitted at or before the Pre-Construction meeting for review and approval by the City Engineer.

B. Materials:
   1. See City Approved Product List provided in Appendix 3.
   2. The material list represents a list of approved products and equipment by the City. An equivalent product can be submitted and subject to approval by the City Engineer.
3. All vehicular indications shall be wide-angle LED type lamps and meet ITE specifications for LED traffic signal indications. See the City Approved Product List.

4. All pedestrian indications shall be LED countdown modules and have bottom hinges. See the City Approved Product List.

5. Traffic signal heads shall be Polycarbonate. See the City Approved Product List.

6-4.500 As-Built Drawings:

6-4.501 General Requirements:

A. All plans shall comply with “Design Standards - Section 1-2 Plan Submittal Requirements.”

B. Final record drawings (only Final Records are required):

1. Final record drawings required for submittal.
2. Station and offsets for all poles, cabinets and pull boxes.
3. Record drawings shall be accepted and approved before bond will be released.

[END OF SECTION]
Appendix 1 - City of Buckeye Traffic Signal Map
Appendix 2 – Traffic Signal Standard Details

64210-1 Traffic Signal Pole Layout for Major Arterial / Major Arterial Intersection
64211 Guidance for Pole Placement for ADA Accessibility to Pedestrian Push Buttons
64220 Trombone Style Traffic Signal Pole Foundation
64221 Trombone Style Signal Pole Details
64222 Trombone Style Signal Mast Arm (1 of 2)
64223 Trombone Style Signal Mast Arm (2 of 2)
64224 Handhole Detail
64225 Pedestrian Post
64260-1 Control Cabinet and Foundation
64260-2 Control Cabinet and Foundation
64270 Wiring Diagram
64280 Pull Box and Conduit Layout
64281 Traffic Signal Conduit Trench Details
64290 Number 5 Fibertlite Pull Box
64291 Number 7 Fibertlite Pull Box
64292 Traffic Signal Pull Box Installation
642110 Internally Illuminated Street Name Sign Trombone Mast Arm Mount
642111 Internally Illuminated Street Name Sign Flag Mount
642120 CCTV Field Equipment
642150 Phasing Diagram without Left Turn Phasing
642151 Phasing Diagram with Left Turn Phase
643010 Interim Traffic Signal Layout
6443011 Ultimate Traffic Signal Layout
643012 Pole Schedule Plan Sheet
643013 Conductor Schedule and Internally Illuminated Street Name Sign Plan Sheet
NOTES:
1. POLE LOCATION SUBJECT TO FIELD CONDITIONS.
2. PLACEMENT OF FOUNDATION SHALL SATISFY AASHTO REQUIREMENTS.
3. PLACEMENT OF PEDESTRIAN PUSH BUTTON POST AND TYPE 'A' POLE SHALL BE 2' TO 4' FROM TOP OF RAMP.
4. FOR RAMPS, ROADWAY, SIDEWALK, AND MEDIANS SEE COB SECTION 6-3 STREET PLANS AND DESIGN FOR REQUIREMENTS.
5. FOR SIGNING AND MARKING SEE COB SECTION 6-5 FOR DESIGN REQUIREMENTS.
6. COB PREFERENCE IS TO PROVIDE TWO STAGE, AS SHOWN ON NWC, NEC, AND SWC. FOR MAJOR/MAJOR ARTERIALS, DETAIL ILLUSTRATES MINIMUM POLE PLACEMENT WHEN TWO STAGE CANNOT BE ACCOMMODATED.

* DIMENSION IS FROM LIP OF GUTTER TO CENTER OF STRIPE.
NOTES

1. * DESIRABLE LOCATION IS WITHIN 5 FT OFFSET FROM CROSSWALK LINE AND 10 FT OFFSET FROM FACE-OF-CURB.

2. ** MAXIMUM OFFSET IS WITHIN 10 FT OFFSET FROM CROSSWALK LINE AND 20 FT OFFSET FROM FACE-OF-CURB WITH CITY ENGINEER APPROVED DESIGN EXCEPTION.

3. SIDEWALK EXTENSION APPLIES TO ALL POLE LOCATIONS TO MEET ADA FOR CLEAR LANDING AREA, SLOPE, HEIGHT, AND REACH REQUIREMENTS.
**City of Buckeye Standard Details**

**TROMBONE STYLE TRAFFIC SIGNAL POLE FOUNDATION**

**SIGNAL POLE FOUNDATION**

**SECTION A-A**

**NOTE:**

1. THE CITY OF BUCKEYE REQUIRES ALL STRUCTURAL DESIGN OF SIGNALS TO BE COMPLIANT WITH THE 2013 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, 6TH EDITION W/ 2015 INTERMS.

2. FOUNDATION DESIGN DOES NOT APPLY TO TRAFFIC SIGNALS LOCATED NEAR THE TOP OF ESEARPENTS OR RIDGES OR IN THE UPPER HALF OF HILLS WITH ABRUPT GRADE CHANGES EXCEEDING 15 VERTICAL FEET.

3. FOUNDATION SIZES & REINFORCEMENT SHALL BE CONSTRUCTED USING THE "25" AND "110pcf" VALUES OUTLINED IN TABLES ABBEVE UNLESS A GEOENGINEERING EXPLORATION & RECOMMENDATION ALLOWS FOR HIGHER SOIL CAPACITIES.

4. THE FOUNDATION DESIGN IS ADEQUATE TO SUPPORT SIGNAL POLES MANUFACTURED BY VALMONT INDUSTRIES, OR AN APPROVED EQUAL. PROVIDED THE MAXIMUM LOADS SHOWN IN THESE DETAILS IS NOT EXCEEDED. IF THE LOADS ARE EXCEEDED, THE CONTRACTOR SHALL HAVE THE FOUNDATION ANALYZED BY A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF ARIZONA.

5. CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRSSIVE STRENGTH f'_c = 3,500 PSI.

<table>
<thead>
<tr>
<th>UN-FACTORED BASE REACTIONS</th>
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<tr>
<td><strong>BUCKEYE POLE SIZE</strong></td>
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<tr>
<td>--------------------------</td>
</tr>
<tr>
<td><strong>35' MAST ARM AND SHORTER</strong></td>
</tr>
<tr>
<td><strong>40'-45' MAST ARM</strong></td>
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<tr>
<td><strong>50'-55' MAST ARM</strong></td>
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</tbody>
</table>

NOTE: BASE REACTIONS PROVIDED BY MANUFACTURER
BUCKEYE TYPE A TROMBONE

Scale: N.T.S.

NOTES:

1. VERIFY ALL DIMENSIONS AND CONDITIONS PRIOR TO STARTING WORK. NOTIFY ENGINEER OF ANY DISCREPANCIES OR INCONSISTENCIES, (I.E. BOLT CIRCLE WITH POLE MANUFACTURER).

2. VERIFY IN FIELD ALL EXISTING CONDITIONS SHOWN ON DRAWINGS.

3. ANY ENGINEERING DESIGN PROVIDED BY OTHERS AND SUBMITTED FOR REVIEW SHALL BEAR THE STAMP (AND SIGNATURE) OF AN ENGINEER REGISTERED IN ARIZONA.

4. THE POLE MANUFACTURER SHALL BE RESPONSIBLE FOR SPECIFYING ALL ANCHOR BOLT INFORMATION (I.E. DIAMETER, EMBEDMENT LENGTH, BOLT CIRCLE, MATERIAL, ETC.) ENSURING THE ANCHOR BOLTS ARE CAPABLE OF TRANSFERRING ALL APPLICABLE LOADS INTO THE FOUNDATION WITHOUT EXCEEDING THE MAXIMUM LOAD REQUIREMENTS SPECIFIED ON THIS DETAIL.

BUCKEYE TYPE B TROMBONE

Scale: N.T.S.

1.50"X3.25" ALUMINUM IDENTIFICATION TAG SECURED TO POLE SHAFT WITH (2) 0.19" RIVETS

POLE AND ARM ID TAG

Scale: N.T.S.

BUCKEYE TYPE A

55" MAST ARM

1.000000

POLE TYPE (EX A)

POLE OR ARM PART NUMBER

MAST ARM LENGTH (EX: 55")
The City of Buckeye requires all structural design of signals to be compliant with the 2013 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 6th edition w/ 2015 interims.

Wind Velocity:
90 MPH Isotach

**MATERIAL DATA**

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<th>COMPONENT</th>
<th>ASTM DESIGNATION</th>
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<tr>
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<td>BASE PLATE &amp; SIGNAL ARM ATTACHMENT</td>
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<tr>
<td>SIGNAL ARM CONNECTING BOLTS</td>
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</table>

**FINISH COAT:** TGIC or Urethane Polyester Powder

**COLOUR:** To be approved by City based on Location

**VALMONT SPEC:** F-2640

**LOADING CHART**

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<thead>
<tr>
<th>DEVICE</th>
<th>DESCRIPTION</th>
<th>PROJ. AREA (ft²)</th>
<th>WEIGHT (lbs)</th>
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<tbody>
<tr>
<td>A</td>
<td>12&quot;-5 SEC. SIGNAL W/ BACKPLATE</td>
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<tr>
<td>B</td>
<td>24&quot; X 24&quot; SIGN</td>
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<tr>
<td>C</td>
<td>39½&quot; X 96½&quot; SIGN</td>
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<td>D</td>
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<td>E</td>
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</tbody>
</table>
(1) 3-TERMINAL 132 SERIES THERMOPLASTIC POWER BLOCK AND (2) 1-TERMINAL THERMOPLASTIC POWER BLOCK.

10-TERMINAL COPPER GROUNDING BUS (ACCEPTS AWG #6 TO AWG #8 CONDUCTORS). TERMINALS ON 0.375" CENTERS BONDED TO POLE ELECTRICALLY.

HANDHOLE RIM FORMED FROM 0.50" THICK MATERIAL - 50 KSI MIN. YIELD

0.500"

0.229" THICK HANDHOLE COVER. BACKED WITH 0.06" THICK GASKET.

SECTION A-A

WIRING ACCESS HOLE CUT IN TUBE WALL BEHIND RIM AS SHOWN. (EDGES WILL BE BEVELED)
PEDESTRIAN POST GENERAL NOTES:

1. ALL DIMENSIONS ARE IN ENGLISH UNITS.

2. ALL PEDESTRIAN POSTS MAY BE OF THE STRAIGHT, WALL THICKNESS SHALL NOT EXCEED 0.125". POLE O.D. SHALL BE 4.00".

3. INSTALL A SINGLE 2" PVC CONDUIT IN FOUNDATION AT 36" DEPTH.

4. ANCHOR BOLTS SHALL BE 1"x12", EACH ANCHOR BOLT SHALL HAVE FOUR HEX NUTS AND TWO FLAT WASHERS.

5. ANCHOR BOLTS SHALL PROJECT 3 1/8" ABOVE THE FINISHED SIDEWALK.

6. A STAINLESS STEEL TAG SHALL BE PERMANENTLY ATTACHED TO THE POLE 4" ABOVE THE POLE BASE STATING THE MANUFACTURER’S NAME, C.O.B. POLE TYPE AND DATE MANUFACTURED.

7. THE LEVELING NUTS SHALL BE INSTALLED ON TOP OF CONCRETE POLE BASE. SPACE BETWEEN THE CONCRETE POLE BASE AND POLE BASE AROUND LEVELING NUTS SHALL BE CONSTRUCTED OF 1/2" COTTON ROPE AND BE ORIENTED ON THE OPPOSITE SIDE OF THE POLE FROM THE STREET. SEE ADOT SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, SECTION 731−3.01.

8. A 25’ COIL OF #4 AWG BARE COPPER CONDUCTOR OR A 14" SQUARE COPPER GROUND PLATE SHALL BE INSTALLED BEFORE THE CONCRETE IS Poured AND CONNECTED UNDER ONE OF THE NUTS OF THE CONNECTED BOLTS. THE GROUND OR COIL SHALL BE COVERED WITH 6" OF FILL.

9. UNSTABLE SOIL MAY REQUIRE DEEPER FOUNDATION. SEE ADOT SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, SECTION 731−3.01.
NOTES:

2. CONDUIT PROJECTION ABOVE FOUNDATION SHALL BE 2 1/2" MIN. AND 4" MAX AND SHALL HAVE SMOOTH BELL BENDS ATTACHED. CONDUITS SHALL BE CLIPPED.

3. RAISED CONCRETE PAD 48"X4"X48", SHALL BE PLACED IN FRONT OF CABINET. PAD SHALL BE SET 2" BELOW THE FOUNDATION ELEVATION. SLOPE PAD AWAY FROM CABINET FOR DRAINAGE (2% MIN). SEE ADOT STD. DWG. T.S. 2-1.

4. 1" SLEEVE (FOR GROUND ROD) SHALL BE INSERTED WHEN FOUNDATION IS POURED. INSTALL A 3/4" DIAMETER X 10' LONG BONDED COPPER GROUND ROD IN 1" SLEEVE POSITIONED AS SHOWN IN PLAN VIEW AND PLACED 10" BACK FROM CABINET DOOR. GROUNDING SHALL MEET CITY OF BUCKEYE BUILDING CODE REQUIREMENTS.

5. PRIOR TO POURING CONCRETE FOUNDATION, FINAL APPROVAL OF CONDUIT PLACEMENT FROM TRAFFIC SIGNAL INSPECTOR OR DESIGNEE SHALL BE OBTAINED.

6. ANCHOR BOLTS SHALL BE 3/4"X12"X5" COMPLETED WITH NUTS AND WASHERS. ANCHOR BOLT PROTECTOR ABOVE FOUNDATION SHALL BE 1 1/2" MIN AND 2 1/2" MAX.

7. USE AN APPROVED SILICONE SEALER RTV TYPE, GREY IN COLOR OR CLEAR, BETWEEN CABINET AND FOUNDATION.

8. CLASS S CONDUIT MINIMUM 3,000 PSI TO BE AIR-ENTRAINED AT 3,000 FT IN ELEVATION AND ABOVE.
25 CONDUCTOR SIGNAL CABLE
(IMS A 19-1 CONDUCTORS)

#14AWG, FOR STANDARD INTERSECTION CONFIGURATIONS ONLY

NOTES

1. THIS TABLE ONLY APPLIES FOR A STANDARD INTERSECTION CONFIGURATION. TWO POLES PER CORNER CONFIGURATIONS AND NEAR SIDE INDICATIONS MAY REQUIRE ADDITIONAL WIRING NOT SHOWN IN THIS TABLE.

2. 25-CONDUCTOR SIGNAL CABLE IS INSTALLED UNSPLICED FROM THE CONTROLLER TO EACH POLE AND IS TERMINATED IN THE TERMINAL BLOCK LOCATED ON THE POLE.

3. ALL TERMINATION POINTS OTHER THAN TERMINAL BLOCKS REQUIRE A SPADE TERMINATION.

4. IMS A 19-1, #14AWG, 2-CONDUCTOR SHALL RUN UNSPLICED FROM PEDESTRIAN PUSH BUTTON TO CONTROLLER AND CABINET.

WIRING TO FIELD

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City of Buckeye
Standard Details

WIRING DIAGRAM

Revised: 08/2020
Detail: 64270
GENERAL NOTES

1. INSTALL GREEN #8 THW STRANDED COPPER WIRE FULL LENGTH INSIDE OF CONDUIT WITH THREE FEET (3') EXTENDING ABOVE CONDUIT.

2. ALL BARE BONDS SHALL BE SPICED TOGETHER FOR FUTURE LOCATING PURPOSES.

3. GRAY PVC SCHEDULE 40 ELECTRICAL CONDUIT SHALL BE USED FOR OPEN TRENCH AND DIRECTIONAL DRILL APPLICATIONS.

4. DEPTH OF PVC INSTALLATION SHALL BE 36” MINIMUM (TYPICAL) BELOW LIP OF GUTTER AND RUN IN A HORIZONTAL PLANE FROM PULL BOX TO PULL BOX.

5. IF A NUMBER 9 PULL BOX EXISTS NEAR BY A NUMBER 7 PULL BOX FOR A FUTURE SIGNAL, CONNECT THE TWO PULL BOXES WITH A 2” CONDUIT.

6. CONDUIT RUN FROM METER PEDESTAL TO ELECTRICAL COMPANY POINT OF DELIVERY FOR SERVICE SHALL BE INSTALLED TO ELECTRICAL COMPANY SIZE AND SPECIFICATIONS.

SEE COB ITS DETAIL 66101

NO. 7 WITH EXTENSION CENTER 1/2 DELTA

SEE NOTE 6

NOT TO SCALE

SIDEWALK

MIN 20'
GENERAL NOTES:

1. ALL TRENCH BACKFILL ACROSS HARDENED SURFACES SHALL BE 100% 1/2 SACK SLURRY PER MAG SPEC 728.

2. ALL LONGITUDINAL TRENCH CUTS WITHIN 2' OF EXISTING PAVEMENT SHALL BE BACKFILL 100% WITH ABC AND COMPACTED TO 95%. LAST TWO FEET SHALL BE COMPACTED TO 100%.

3. ALL TRENCHING IN UNPAVED STREETS CAN USE NATIVE BACKFILL. THIS ALSO INCLUDES STREETS THAT WILL BE COMPLETELY RECONSTRUCTED.

4. TRENCH COMPACTION SHALL MEET BACKFILL TYPE 1, PER MAG STD. SPEC TABLE 601.

5. PIPE ZONE MATERIAL SHALL BE 1/2 SACK CLSM PER MAG STD SPEC 728.

6. EXCAVATED TRENCH WIDTH SHALL NOT BE LESS THAN 18 INCHES.

7. TRENCHES IN EXISTING ROADS SHALL BE PER MAG STD. DTL 200 "T-TOP".

8. 2500 LB PULL TAPE SHALL REMAIN IN CONDUIT AFTER INSTALLATION.

9. 4 MIL NON DETECTABLE PLASTIC WARNING TAPE SHALL BE PLACED 12" TO 16" BELOW FINISHED SUBGRADE.

10. USE MASONRY BLOCK 2"X4"X8" PER MAG SECTION 775. GRADE MW PER ASTM C62. SPACING SHALL BE EVERY 5 FEET TO AVOID PIPE SAG. PROVIDE CONDUIT TRENCH SPACERS AT ALL MASONRY BLOCK LOCATIONS AROUND ALL CONDUITS.

11. TRENCH DEPTH MAY VARY BASED ON CONFLICTS WITH UTILITIES.
**SPECIFICATIONS OF ACCEPTABLE FIBRELYTE PRODUCTS**

<table>
<thead>
<tr>
<th>CHRISTY ORDERING CODE</th>
<th>ITEM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL30BOX12</td>
<td>BOX</td>
<td>30FL BOX (13&quot;X24&quot; I.D. X 12&quot; HIGH)</td>
</tr>
<tr>
<td>FL30T</td>
<td>LID</td>
<td>30FLT FIBRELYTE LID, BOLT DOWN</td>
</tr>
<tr>
<td>FL30X8</td>
<td>EXTENSION</td>
<td>30FL 8&quot; HIGH EXTENSION</td>
</tr>
</tbody>
</table>

**NOTES:**

1. SEE CITY OF BUCKEYE SPECIFICATIONS FOR PULL BOX MATERIAL REQUIREMENTS.
2. SEE COB DETAIL 64292 FOR TYPICAL PULL BOX INSTALLATION DETAILS.
3. COVER LETTERING SHALL BE 1" LETTERS. LETTERING SHALL READ "TRAFFIC SIGNALS" FOR TRAFFIC SIGNAL BOXES.
4. ALL HARDWARE REQUIRED TO SECURE THE LID SHALL BE SUPPLIED BY THE CONTRACTOR.

**SPECIFICATIONS**

FIBRELYTE FL30 BOX 13"X24" (NO. 5)
NOT TO SCALE

SPECIFICATIONS

FIBRELYTE FL36 BOX 17"X30" (NO. 7)

"T" LIDS

STRAIGHT TYPE PENTAHEAD BOLT FOR "T" BOX

NOTES:
1. SEE CITY OF BUCKEYE SPECIFICATIONS FOR PULL BOX MATERIAL REQUIREMENTS.
2. SEE COB DETAIL 64292 FOR TYPICAL PULL BOX INSTALLATION DETAILS.
3. COVER LETTERING SHALL BE 1" LETTERS. LETTERING SHALL READ "TRAFFIC SIGNALS" FOR TRAFFIC SIGNAL BOXES OR "COB ITS" FOR ITS/INERTIE/FIBEROPTIC PULL BOXES.
4. ALL HARDWARE REQUIRED TO SECURE THE LID SHALL BE SUPPLIED BY THE CONTRACTOR.

SPECIFICATIONS

FIBRELYTE FL36 BOX 17"X30" (NO. 7)

<table>
<thead>
<tr>
<th>CHRIstY</th>
<th>ORDERING</th>
<th>ITEM</th>
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<tr>
<td>FL36BOX12</td>
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<td>36FL BOX</td>
<td>(17&quot;X30&quot; I.D. X 12&quot; HIGH)</td>
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<tr>
<td>FL36T</td>
<td>LID</td>
<td>HIGH 36FLT FIBRELYTE LID, BOLT DOWN</td>
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<tr>
<td>FL36X8</td>
<td>EXTENSION</td>
<td>36FL 8&quot; HIGH EXTENSION</td>
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</tbody>
</table>

City of Buckeye
Standard Details

Buckeye, AZ

NO. 7 FIBERLYTE PULL BOX

Revised: 08/2020
Detail: 64291
NOTES:
1. BACKFILL WITH DESIGNATED SIZE NO. 57 AGGREGATE TO 24" BELOW FINISHED GRADE. BACKFILL 24" WITH SELECT EXCAVATED MATERIAL AND THROUGHLY COMPACT.
2. THIS BOX IS DESIGNED FOR NON–TRAFFIC AREAS.
3. CONDUITS PER PLANS.
4. CONDUIT C/L SHALL BE ALIGNED TO TOP EDGE OF PULL BOX TO FACILITATE CABLE PULLING.
5. NUMBERS IN CIRCLES REFER TO ITEMS IN MATERIALS LIST.
6. "TRAFFIC SIGNALS" SHALL BE THE TITLE INSCRIBED IN THE TRAFFIC SIGNAL PULL BOX LID. PULL BOX LID SHALL BE APPROVED BY CITY OF BUCKEYE.
7. USE FELT PAPER TO BLOCK OPENING BETWEEN CONDUIT AND AROUND BASE TO PREVENT BACKFIRE MATERIAL FROM ENTERING BOX.

<table>
<thead>
<tr>
<th>MATERIAL LIST</th>
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<tbody>
<tr>
<td>ITEM</td>
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INTERNALLY ILLUMINATED STREET NAME SIGN
TROMBONE MAST ARM MOUNT

CITY OF BUCKEYE – CROSSFIRE I.E.D.
ILLUMINATED STREET SIGN – 39.5”x96.75”x4”

FACES: .177” THICK CLEAR POLYCARBONATE WITH 1ST SURFACE DECORATION AS FOLLOWS

VINYL: EC #1175 BLUE (REVERSE OUT WHITE GRAPHICS), GRAFFITI RESISTANT FILM #1160 APPLIED TO ENTIRE FACE; LOGO: EXTERIOR GRADE DIGITAL PRINT

FONTS: CLEARVIEWONE CD–45 (STANDARD SPACING)

ILLUMINATION: I.E.D.’S – CROSSFIRE TOP & BOTTOM WITH I.E.D. POWER SUPPLY 1 AMP/ B124/SUN TECH #B124 FISHER PIERCE #B124 OR TORK #3002

CABINET: 39.5”x96.75”x4” PERIMETER ALUMINUM TUBE FRAME WITH 1.5” HINGED FACE FRAMES – PAINTED PER CITY OF BUCKEYE COLOR CODE

RETIENERS: HINGED FACE WITH PROP POD. PAINTED TO MATCH CABINET.

INSTALLATION: STEEL TUBE AND BRACKETS – ALUMINUM TO MATCH PLATE ATTACHED TO TOP OF CABINET.
CITY OF BUCKEYE – FLAG MOUNT CROSSFIRE L.E.D. ILLUMINATED STREET SIGN – 39.5"x96.75"x4"

FACES: .177" THICK CLEAR POLYCARBONATE WITH 1ST SURFACE DECORATION AS FOLLOWS

BACKGROUND: EC #1175 BLUE (REVERSE OUT WHITE GRAPHICS), GRAFFITI RESISTANT FILM #1160 APPLIED TO ENTIRE FACE; LOGO: EXTERIOR GRADE DIGITAL PRINT

FONTS: CLEARVIEWONE CD-45 (STANDARD SPACING)

ILLUMINATION: L.E.D.'S – CROSSFIRE TOP & BOTTOM WITH L.E.D. POWER SUPPLY 1 AMP/
B124/SUN TECH #B124 FISHER PIERCE #B124 OR TORK #3002

CABINET: 39.5"x96.75"x4" PERIMETER ALUMINUM TUBE FRAME WITH 1.5" HINGED FACE FRAMES – PAINTED PER CITY OF BUCKEYE COLOR CODE

INSTALLATION: MOUNT TO EXISTING CITY OF BUCKEYE SIGNAL POLES USING FLUORESCENT COMPRESSION BRACKETS
CCTV FIELD EQUIPMENT

LUMINAIRE MAST ARM, (VARIES BY LOCATION)

CCTV MOUNT

DOME CCTV
PAN/TILT/ZOOM
CAMERA

1" DIAMETER FIELD-DRILLED
HOLE, INSTALL BUSHING
ACCORDING TO NEC
REQUIREMENTS

TRAFFIC SIGNAL POLE

CCTV CABLE PROVIDED
BY CAMERA SUPPLIER, CONTRACTOR
TO COORDINATE REQUIRED LENGTH
PRIOR TO DELIVERY OF CABLE.
COMPOSITE CABLE SHALL RUN
UNSPliced FROM THE CCTV TO THE
TRAFFIC SIGNAL CABINET.

POLE MOUNT
ADAPTER

THE ROTATION OF THE CCTV MOUNT
SHALL BE ALIGNED TO POINT AT THE
TRAFFIC SIGNAL POLE ON THE
DIAGONALLY OPPOSITE CORNER.

DOME CCTV
PAN/TILT/ZOOM
CAMERA

1" DIAMETER FIELD-DRILLED
HOLE, INSTALL BUSHING
ACCORDING TO NEC
REQUIREMENTS

POLE MOUNT
ADAPTER

TROMBONE TRAFFIC
SIGNAL MAST ARM

TROMBONE TRAFFIC
SIGNAL POLE

CCTV CABLE PROVIDED BY CAMERA SUPPLIER,
CONTRACTOR TO COORDINATE REQUIRED
LENGTH PRIOR TO DELIVERY OF CABLE. CABLE
SHALL RUN UNSPliced FROM THE CCTV TO
THE TRAFFIC SIGNAL CABINET.

INSTALLATION NOTES:

1. THE CABLING SHALL BE CONTAINED INSIDE OF THE POLE. A HOLE SHALL BE DRILLED IN THE POLE FOR
CABLING TO EXIT THE POLE AND FEED THROUGH THE MOUNTING ASSEMBLY. THE HOLE SHALL BE SEALED
TO PREVENT ANY WATER FROM ENTERING THE POLE. CABLING WITHIN THE POLE SHALL HAVE A MEANS
OF CABLE SUPPORT AT THE TOP TO PREVENT THE CABLE TENSION FROM PULLING ON THE EQUIPMENT.

2. CCTV CAMERA SHALL BE MOUNTED WITHIN ONE DEGREE OF LEVEL ON BOTH HORIZONTAL AXIS.

TYPICAL ADOT
TRAFFIC SIGNAL
POLE

TYPICAL TROMBONE
TRAFFIC SIGNAL POLE
INTERIM TRAFFIC SIGNAL PLAN LAYOUT

PULL BOX SCHEDULE

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<th>NO.</th>
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PHASING MOVEMENTS (WITHOUT LEFT TURN PHASING):

Ø 1  Ø 3  Ø 4  Ø 2

PHASING MOVEMENTS (WITH LEFT TURN PHASING):

Ø 1  Ø 2  Ø 3  Ø 4

NOTES

INTERIM TRAFFIC SIGNAL PLAN SHEET

City of Buckeye
Standard Details

Revised: 08/2020
Detail: 643010
### Pole Schedule

**NOTES:**
1. ALL STATIONS AND OFFSETS ARE BASED ON ROAD CONSTRUCTION ROAD CENTERLINE.
2. TRAFFIC SIGNAL SHOP DRAWINGS AND DESIGN CALCULATIONS ARE REQUIRED.
3. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL STAKE POLE FOUNDATIONS AND ELEVATIONS FOR APPROVAL BY THE CITY.

<table>
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<tr>
<th>CABINET</th>
<th>TYPE</th>
<th>CONTROLLER</th>
<th>AUX. CONTROL</th>
<th>ASSEMBLY NOTES</th>
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**STA XX+XX, XX.X' LT/RT**

**STA XX+XX, XX.X' LT/RT**

**STA XX+XX, XX.X' LT/RT**

**STA XX+XX, XX.X' LT/RT**

**STA XX+XX, XX.X' LT/RT**

**STA XX+XX, XX.X' LT/RT**

City of Buckeye
Standard Details

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<th>Revised: 08/2020</th>
<th>Detail: 643012</th>
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CONDUCTOR SCHEDULE

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INTERNALLY ILLUMINATED SIGNAGE

STREET NAME

SIGNING DETAILS

SEE DETAIL 64270
Appendix 3 - City Approved Product List
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<th>EQUIPMENT</th>
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<td><strong>TRAFFIC SIGNAL</strong></td>
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<tr>
<td>Traffic Signal Controller Cabinet</td>
<td>Size R Cabinet, Nema Size 7</td>
<td>Econolite</td>
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<tr>
<td>Traffic Signal Controller</td>
<td>Cobalt ATC Traffic Controller</td>
<td>Econolite</td>
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<td>Meter Pedestal</td>
<td>MEUG-35-M100-ADOT</td>
<td>Myers</td>
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<td>MMU</td>
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<td>Battery Back-Up Unit</td>
<td>200 Amp</td>
<td>Alpha</td>
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<td>Video Detection System</td>
<td>AutoScope Vision Camera System</td>
<td>Econolite</td>
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<td>Grid Smart fish eye detection with</td>
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<td></td>
<td>performance measures</td>
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<tr>
<td>Video Detection System Mounting</td>
<td>1-piece extended tilt and Pan,</td>
<td>Pelco</td>
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<td>Aluminum Stellar cable mount</td>
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<tr>
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<td>Grid Smart Mounting Bracket</td>
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<tr>
<td>Emergency Vehicle Pre-emption</td>
<td>Model 721 and 722</td>
<td>Opticom</td>
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<td>Emergency Vehicle Pre-emption Mounting</td>
<td>Model 764 Phase Selector</td>
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<td>Emergency Vehicle Pre-emption Cable</td>
<td>Astro Mini-Brac</td>
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<tr>
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<td>Schedule 40 PVC</td>
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<tr>
<td>No 5, 7, and 7E Pull Boxes</td>
<td>FiberLyte</td>
<td>Various</td>
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<tr>
<td>Traffic signal vehicular heads with</td>
<td>Type F, Type G, Type R, Type Q-2, and</td>
<td>GE GTX for LED Arrow</td>
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<tr>
<td>12-inch LED indications</td>
<td>Type Q</td>
<td>Signals GE VLA LED</td>
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<tr>
<td>Pedestrian Countdown Signal Heads</td>
<td>16 x 18 inch</td>
<td>GE LED Countdown</td>
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<tr>
<td>Pedestrian Pushbuttons</td>
<td>ADA Pushbutton</td>
<td>Polara Bulldog</td>
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<td>Upright and Mast Arm Signal Head Mountings</td>
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<td>A-Pole Signal Head Mountings</td>
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<td>Pedestrian Signal Head Mounting</td>
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<td>Street Light LED Fixtures</td>
<td>GE Evolve II Shoebox LED ERL2018_330ADKBZLRG</td>
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<td>Internally Illuminated Street Name Sign (IISNS)</td>
<td>Fluoresco</td>
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<tr>
<td>Signal Poles</td>
<td>ADOT Standard and Trombone</td>
<td>Valmont</td>
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<td>Signal Mast Arms</td>
<td>ADOT Standard and Trombone</td>
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<td>Vault with 180 degree torsion assist lid</td>
<td>Jensen</td>
</tr>
<tr>
<td>Electrical Conduit</td>
<td>Schedule 40 PVC</td>
<td>Various</td>
</tr>
<tr>
<td>Backbone Single Mode Fiber Optic Cable</td>
<td>Dry loose tube 144 fiber</td>
<td>Corning</td>
</tr>
<tr>
<td>Branch Single Mode Fiber Optic Cable (To TS cabinet)</td>
<td>Dry loose tube 6 fiber with SC Connectors</td>
<td>Gator Patch</td>
</tr>
<tr>
<td>Fiber Optic Splice Closure</td>
<td>450D with minimum of 2 splice trays</td>
<td>Tyco</td>
</tr>
<tr>
<td>Ethernet Switch</td>
<td>RS900G</td>
<td>Ruggedcom</td>
</tr>
<tr>
<td>Closed-Circuit Television (CCTV) Field Equipment</td>
<td>Q6055-E</td>
<td>AXIS</td>
</tr>
</tbody>
</table>
Appendix 4 – Traffic Signal General Notes

1. Traffic control plans shall conform to the City of Phoenix Traffic Barricade Manual and MUTCD Section 6. Traffic control plans shall be reviewed and approved by City Public Works Inspector.
2. Utility locations shown are based upon the best available information. The Contractor shall contact Blue Stake at 602-263-1100 before construction and verify actual utility locations.
3. Traffic signal poles, mast arms and service cabinets shall be painted with 2 coats of white enamel paint meeting manufacture recommendations.
4. All corner pull boxes shall be Number 7 with extension with 18-inch drainage, consisting of #57 rock, per ADOT spec. The median pull box shall be Number 5.
5. A ground rod shall be installed within the customer side of the electrical service panel and in the control cabinet foundation and satisfy City’s Building Code requirements.
6. Pavement replacement shall conform to City Section 6-3 Street Planning and Design Criteria manual. Sidewalk replacement shall conform to MAG Standard Detail 230, 231, 232, 233, and 234, as appropriate.
7. Internally Illuminated Street Name Signs shall be provided and mounted on traffic signal mast arms for Trombones style poles and flag mounted on ADOT style poles in accordance with the City of Buckeye Traffic Signal Details.
8. Applicable signal and pedestrian indications shall be wide angle LED type lamps per the City Approved Product List.
9. A fully functional Emergency Vehicle Pre-Emption (EVP) including device, cabling, phase selector, and mounting brackets shall be provided and installed. The EVP shall be field-adjusted to optimize reception. EVP per the City Approved Product List.
10. All existing traffic control and street lights shall remain in operation until new installations are energized and operational. Any traffic detectors disturbed during construction shall be replaced with temporary detectors until the final detection system is in place and operational.
11. Any removed City equipment shall be salvaged and returned to the City Public Works Department at 23454 W. MC Highway 85 Buckeye, AZ. All salvaged equipment shall be dismantled.
12. Questions concerning traffic signal design should be directed to the Signal Designer, Address, Phone Number here.
13. The electrical service address is: Address.
14. At START of construction the contractor shall contact the City Public Works Department at 623 349-6825 to ensure the availability of the City Traffic Signal Technician and coordinate power authorization, cabinet set-up, inspection requirements and the preconstruction meeting. City Traffic Signal Technician shall be called 48-hours prior to all inspection points, as called for.
15. At START of construction the contractor shall contact the electric power provider to confirm power location and to schedule inspection.
16. All wires shall be color coded with tape as shown in City Standard Detail 64270.
17. All signal foundations shall be flat, not dished or blocked/out. Foundations shall be no lower than back of sidewalk or future back of sidewalk.
18. All traffic signal poles, new, borrowed or existing, shall be brought to “like new” condition, including unused holes welded, pole painted, wire upgraded to IMSA cable.
19. Traffic Control Change Ahead warning signs shall be installed when traffic control type or operations has changed at an intersection. Warnings shall be installed by the contractor for a minimum of 60 days following the traffic control change. When warning stage is complete, the contractor shall remove temporary signs and deliver to the City Public Works Department at 23454 W. MC Highway 85, Buckeye, AZ 85326.