Traffic Signal Legend

- FO — HDPE Fiber Optic Conduit with Locating Cable (Sized as Noted)
- PVC Conduit (Size as Noted)
- 1" HDPE Conduit
- 1.5" HDPE Conduit
- 2" HDPE Conduit
- 3" HDPE Conduit
- 4" HDPE Conduit

(Refer to Wiring Diagram for Clarification)

- (30') — Mast Arm Pole (Length)
- (30') — Combination Pole (Traffic Signal and Street Light)
- Pedestal Pole
- Pedestrian Pushbutton Pole
- Traffic Signal Head
- Traffic Signal Head w/Backplate
- Pedestrian Signal Indication
- EVP Detector
- Advance Radar Detector
- Presence Radar Detector
- Type 1 Service Box
- Type 2 Service Box
- FO — Type 1 Fiber Optic Service Box
- FO — Type 2 Fiber Optic Service Box
- J — Type 1 Junction Box
- J — Type 2 Junction Box
- ATC Traffic Signal Controller Cabinet (Single Wide)
- ATC Traffic Signal Controller Cabinet (Double Wide)
- OP — Advance Loop Detector, OPTCS Loop
- Presence Loop Detector
- Presence Detection Zone
- Radar Detector Reference Aim Point (Abstract Only)
- Video Detection Camera
- Closed Circuit TV (CCTV) Camera
- CG — CNG Generator Cabinet (Shaded Portion Shows Exhaust Side of Cabinet)
- GM — Gas Meter

- Electrical Service
- Evergy Service Pedestal
- Class E LED Post-Top Luminaire w/14' Pole
- 150W Post-Top Luminaire w/14' Pole
- Class D LED Cobra-Head w/30' Light Pole
- Class C LED Cobra-Head w/30' Light Pole
- Class B LED Cobra-Head w/30' Light Pole
- Class A LED Cobra-Head w/30' Light Pole
- Class D LED Cobra-Head w/40' Light Pole
- Class C LED Cobra-Head w/40' Light Pole
- Class B LED Cobra-Head w/40' Light Pole
- Class A LED Cobra-Head w/40' Light Pole
- Class D LED Cobra-Head w/Combination Pole
- Class C LED Cobra-Head w/Combination Pole
- Class B LED Cobra-Head w/Combination Pole
- Class A LED Cobra-Head w/Combination Pole

- 2 — Construction Note
- 2 — Pole Number
- 2 — Service Box Number
- 4A — Vehicular Signal Head No.
- 8P2 — Pedestrian Signal Head No.
- 42 — Loop Detector No. (Video or Radar Detection Zone No.)
- Flat Sheet Street Name Sign
- Flat Sheet Traffic Sign
- SNS — Illuminated Street Name Sign

Existing Equipment Removal Summary

Location	Description of Item	Quantity

Traffic Signal Turn-on Procedure

1. Turn-on should not be scheduled until power is actually available at the service pedestal and all other equipment and hardware is installed.
2. At least two working days prior to scheduled signal activation, all testing should be completed and successful, all defects and deficiencies correct, all indications operational and properly aimed, cables tagged, controller fully operational performing all timing functions required, all other items of work associated with the signal completed, and all signs and pavement markings properly installed unless otherwise approved by the engineer.
3. The City Inspector and Signal Technician will conduct a full inspection of the signal system within these same two days. Upon satisfactory conditions of the signal system, the turn-on schedule will be confirmed. Any deficiencies found during the final inspection shall result in the rescheduling of the activation.
4. If the traffic signal is a new installation where previously none existed, the contractor shall install "SIGNAL AHEAD" (W3-3) and "NEW" (W16-15p) warning signs with orange background and yellow type B flashing beacons advising the motorists of the signal activation. Signs may be installed prior to putting the signal into operation and covered until such time as the signal is placed into full operation. Signs are subsidiary to other items.
5. Actual activation shall consist of the following steps:
   * installation of all required equipment in the controller cabinet
   * testing of installed equipment
   * unbagging of all signal heads and signs if applicable
   * activation of the signal with the contractor's flagger stopping all traffic momentarily as the signal is turned on.
   * minor re-aiming of signal heads, if necessary
   * uncover the signal ahead sign and turn on flashing beacon
6. Activation of the traffic signal shall not be scheduled for weekends, Fridays or days right before public holidays. Activation shall take place in the morning hours only after 9:00 a.m.
7. The contractor shall remove the "Signal Ahead" (W3-3) and "NEW" (W16-15p) warning signs and flashing beacons after one week of operation.
8. Assumption of maintenance operations related to equipment or signal timings within the traffic signal cabinet will be the responsibility of the City of Overland Park and shall occur after successful turn-on to full operation. This applies to temporary traffic signal installations, traffic signal modifications and new traffic signal installations and applies to normal maintenance operations or emergency callouts to take corrective action to return the signal back to full operating condition. Final acceptance by the City is conditional until the contractor has corrected all defects and punch list items. If a traffic signal malfunction occurs between successful turn-on and final acceptance and the signal malfunction is due to faulty work by the contractor, the City of Overland Park Maintenance Division will take corrective action and has the discretion to bill the contractor for all related expense, including overhead.

Instructions for Disassembly and Return of Salvaged Traffic Signal Equipment

For Use on Federal Funded Projects

The following is a list of traffic signal equipment which shall be salvaged and stored on site for pickup by the City of Overland Park, unless otherwise instructed by the inspector. All salvaged equipment shall be carefully disassembled and stored. The condition at the time of City pickup shall be the same as prior to removal. The contractor shall notify the City of Overland Park Department of Public Works Inventory Control Specialist at (913) 327-6603 to arrange for the City pickup of the salvaged equipment. Provide 48-hours advance notice.

DELETE WHICHEVER NOTE DOES NOT APPLY TO THIS PROJECT

For Use on Non-Federally Funded Projects

The following is a list of traffic signal equipment which shall be salvaged and returned to the City of Overland Park, unless otherwise instructed by the inspector. The condition at the time of delivery shall be the same as prior to removal. Disassembly of equipment shall be done prior to to returning the equipment. All equipment, excluding signal poles and mast arms, shall be delivered to the Blue Valley Public Works Maintenance Facility (Traffic Services Maintenance Office and Shop) 6869 W. 153rd Street. Signal poles and mast arms shall be returned to offsite facility near 53rd Street and Renner Road (West of I-435). The contractor shall notify the City of Overland Park Department of Public Works Inventory Control Specialist at (913) 327-6603 to arrange for the delivery of the salvaged equipment. Provide 48-hours advance notice.

The City maintains the first right of refusal of any equipment listed. The project inspector will make an on-site assessment to determine if the equipment should be salvaged or disposed. Any equipment that will not be salvaged shall become the property of the contractor.

1. Emergency Vehicle Pre-emption (EVP) detector units, Video Detection Cameras, Radar Detectors, CCTV cameras, pedestrian pushbuttons and any other equipment must be removed from the mast arms or poles and returned.
2. All vehicular traffic signal heads and pedestrian signal heads shall be removed from the mast arms or poles and be salvaged. All LED indications must be removed from the vehicular signal and or pedestrian signal heads and boxed prior to salvaging. Lamps, visors and backplates should remain attached to the vehicular and pedestrian signal heads.
3. Mounting brackets and signal head mounting arms should be removed from the signal heads. Mounting bracket cables shall not be cut for removal, unless they are cracked or damaged.
4. All signal poles, pedestal poles, mast arms and luminaire arms shall be salvaged. Anchor bolt covers and pole caps must be boxed and or bagged and salvaged with the equipment. Mast arms and luminaire arms shall be removed from poles prior to delivery. The contractor shall be required to remove and discard all included cable except wiring harnesses for radar detection and RWIS sensors which shall be salvaged with the equipment.
5. Secondary service pedestal enclosures or battery backup enclosures shall be removed from the traffic signal controller cabinet and returned.
6. Traffic signal controller cabinet and all internal components shall be salvaged. Any traffic signal controller cabinet hardware that is not attached to the cabinet must be boxed and or bagged and returned with the equipment. Field wire connections on salvaged signal controller cabinets shall be unscrewed at the terminals instead of cut off.
7. All compressed natural gas generator assembly units shall be salvaged.
8. All junction box and service box covers and lids shall be salvaged if in good condition.
9. Disassembly of any streetlight equipment that is attached to the traffic signal equipment shall follow the guidelines as stated in the "instructions for disassembly and return of salvaged streetlighting equipment".
10. Disassembly of any traffic sign equipment attached to the traffic signal equipment shall follow the guidelines as stated in the "instructions for disassembly and return of salvaged traffic sign equipment".

General Notes

1. The contractor shall stake the locations for all poles, controllers, service boxes and junction boxes to be installed. The stations and offsets provided are to the center of the traffic signal equipment. Elevations shall be provided. If obstructions are encountered during installation, the contractor will re-stake those locations affected by the obstruction. The Traffic Signal Inspector shall inspect the staking prior to any excavation/construction.
2. The locations of existing underground utilities, if shown, are shown in an approximate location only and have not been independently verified. The contractor shall be responsible for contacting all utility companies for locations of all underground lines prior to excavation and be fully responsible for any and all damages, which might be occasioned by the contractor's failure to exactly locate and preserve any and all underground utilities.
3. The City of Overland Park is on the KS OneCall System. The contractor shall call 811 to obtain locates for streetlighting, traffic signal, and fiber optic conduits/cables. Irrigation systems are not considered an underground utility and identification is not required by the owner.
4. The contractor shall be responsible for removing and salvaging existing equipment as noted. See instructions for Disassembly and Salvage of Traffic Signal Equipment.
5. Rock and shale may be encountered and thus the bid items shall reflect the extra work necessary to accomplish the installation. No additional payments ("extras") will be made for excavation of rock or shale and unsuitable backfill materials. The following conditions shall prevail: All conduit trenches and pre-drilled holes within rock/shale shall be backfilled with suitable material and properly compacted in accordance with the specifications.
6. Conduits shall be installed under all streets, drives and sidewalks prior to paving within the limits of the street improvements. The conduit placement shall be coordinated with the paving operation, if applicable, and inspected by the City Traffic Signal Inspector. (See Trench Details)
7. The conduit shall be installed under any existing underdrain pipe crossings and underdrain blankets. Where pole foundations are to be installed through an existing underdrain blanket, the blanket shall be pre-cut to prevent damage of the blanket. In the event the blanket is damaged, the fabric shall be replaced.
8. HDPE conduit shall be installed continuously between all traffic signal appurtenances. Conduit splices between appurtenances shall not be allowed unless fusion couplings or other fusion methods are used.
9. All cable splices from loop detector cable to lead-in cable at junction boxes shall be watertight.
10. Damage to any existing traffic signal equipment due to the construction shall be the responsibility of the contractor, and the contractor shall report any operational problems to the Traffic Services Maintenance Department (913) 327-6600. The equipment shall be replaced or repaired (as directed by the City) with approved materials in conformance with the current standard details, specifications, practices and policies. The contractor shall be responsible for any stored existing materials (removed for construction) to be re-installed.
11. All existing traffic signal equipment is to be used in place (U.I.P.) unless otherwise noted in the plans.
12. All areas disturbed by construction shall be sodded as directed by the Engineer. The grass medians shall be seeded and brick pavers restored, unless otherwise noted or directed. Sidewalk damaged by construction or removed due to construction shall be replaced as directed, in accordance with the Overland Park Municipal Code requirements.
13. Forms (including rebar cages, etc.) conduit and anchor bolts shall be installed and in place for review by the Inspector a minimum of 24 hours in advance of the proposed concrete placement. No concrete placement shall begin after 3:00 p.m.
14. All loop detectors shall be wet cut with equipment approved by the Engineer. Loops shall be cut prior to the final surface lift, but after review of the pre-marked locations.
15. Luminaire arms shall be oriented in the same vertical plane as the mast arm unless otherwise indicated in the plans.
16. Turn-on of the traffic signal system, shall be in accordance with City turn-on procedures.
17. All construction of the traffic signal that will result in toking the existing traffic signal out of operation shall be performed on Sunday between 9:00 a.m. and 6:00 p.m. and completed that same day, unless otherwise directed by the Engineer. The City of Overland Park Police Department shall provide officer control of the intersection when the signal is out of operation. The contractor shall notify the police department and the City Traffic Services division at least 72 hours in advance. The Traffic Signal Inspector and the Traffic Signal Specialist shall be present during this time (unless otherwise directed by the Engineer).
18. The traffic signal contractor shall notify the City of Overland Park Department of Public Works, (913) 895-6027, of the exact construction schedule so that inspection of the traffic signal installation can be made of all phases, including conduit installations.
19. The contractor shall be responsible for any damage incurred to any existing underground sprinkler system during construction. All affected pipes or fittings shall be restored to their original condition and location and new materials used shall be similar to those of the existing system. All restoration work shall be acceptable to the Engineer and owner thereof.
20. The contractor shall be required to submit catalog cuts or shop drawings for all equipment to be installed on this project. All materials shall be from the City of Overland Park pre-approved materials list available at City Hall.
21. All signal cable shall be positively identified at the controller and each pole with phase numbers and colored electrical tape as follows:

Vehicle Phases	Pedestrian Phases
ϕ 1 – Purple and White	ϕ 6 – Purple and Orange
ϕ 6 – Purple	ϕ 2 – Blue and Orange
ϕ 5 – Blue and White	ϕ 8 – Yellow and Orange
ϕ 2 – Blue	ϕ 4 – Red and Orange
ϕ 3 – Yellow and White	
ϕ 8 – Yellow	
ϕ 7 – Red and White	
ϕ 4 – Red	

22. The contractor shall leave slack cable in poles, service boxes, junction boxes and control center according to the following:
    - provide 6' min. slack for all cable in service boxes
    - provide 10' min. slack for all cable in the controller cabinet
    - provide 3' slack for loop cable in the junction box
    - provide 3' slack for loop lead-in cable in the junction box
    - provide 1' min. slack on each side of the cable splice, and for CCTV, EVP and #10 AWG ground cables, at signal poles
23. The contractor shall positively identify the detector loop cables in the junction boxes, where they come in from the street, with wraps of white electrical tape corresponding to the loop number. The cables should be identified according to lane. The inside lane should be marked as number one and increasing outward. All loops shall be connected in series.
24. Within the traffic signal cabinet, the contractor shall use plastic tie-wrap identification tags with permanent marker to identify all of the vehicular and pedestrian heads that are served by each cable. The numbering of the signal heads shall conform to the plan sheets.
25. The contractor, or their supplier, shall, at the contractor's expense, submit a concrete mix design for approval by the Kansas City Metro Materials Board (KCMMB) prior to placement of any concrete. Additional information regarding KCMMB approved concrete mix designs is available on the following website: www.kcmmb.org
26. All non-functioning traffic signal heads shall be covered with approved opaque coverings specifically manufactured for traffic signal heads. The color of the coverings shall be as follows:
    - orange at locations of new traffic signals, where no previous signal existed.
    - black at locations of signal modifications such that the coverings do not detract from the functioning signal heads.
27. All existing traffic signals shall remain in operation and be used in place until the permanent traffic signal installation is complete and in operation. Refer to the traffic control plans for additional requirements. The contractor shall coordinate the disconnection of service with Evergy for the existing signal system.
28. All temporary traffic signals installed by the contractor shall be equipped with a 2070 or ASC3 Rackmount controller provided by the contractor for compatibility with the City's signal system.
29. Contractor shall use a polymer lubricating agent to facilitate conduit bores under paved streets. Failure to do so will result in a denial to retrieve bore head by excavation methods, in the case of loss, under any paved street.
30. The ends of all conduit in the controller cabinet shall be plugged with duct seal.
31. All existing concrete foundations, shown to be removed, shall be removed a minimum of 24" below final grade.
32. The contractor shall be required to install inventory stickers on the back of all signs installed on signal poles, or mast arms on the project, and record each respective bar code number on the plan sheet adjacent to the corresponding sign, for delivery to the project inspector. Inventory stickers will be provided by the City.
33. If the final combination signal/streetlight pole is less than ten (10) feet away from the nearest overhead power line, the contractor shall contact Evergy and request them to sleeve their line prior to pole installation, drilling of foundation, or any other associated work. All associated costs shall be the responsibility of the contractor.
34. The contractor shall be required to have all tree branches that obstruct CCTV cameras, radar detection sensors or traffic signal heads trimmed by a licensed arborist.
35. Any equipment the City pre-ordered prior to the contract shall be picked up at the applicable City Maintenance facility at the contractor's expense. All the items must be picked up at one time.
36. The Contractor shall deliver the controller, conflict monitor, Ethernet Switch, CCTV Camera, EVP Discriminator, and etc. to the Traffic Signal Inspector two weeks prior to signal turn-on so the equipment can be programmed.

CITY OF OVERLAND PARK
DEPARTMENT OF PUBLIC WORKS

NO.	DATE	REVISIONS	BY
1	09/01/2021		
2			
3			

2021 Standard Details — V.I.G

TRAFFIC SIGNAL
GENERAL NOTES (CIP)

SHEET NO. 01 | TOTAL SHEETS 53

March 9, 2023 - 10:04 AM
jjiller
P:\AutoCAD\Details\2021 Traffic Signal Details - MASTER.dwg

Traffic Signal Legend

- FO — HDPE Fiber Optic Conduit with Locating Cable (Sized as Noted)
- PVC Conduit (Size as Noted)
- 1" HDPE Conduit
- 1.5" HDPE Conduit
- 2" HDPE Conduit
- 3" HDPE Conduit
- 4" HDPE Conduit

(Refer to Wiring Diagram for Clarification)

- (30') — Mast Arm Pole (Length)
- (30') — Combination Pole (Traffic Signal and Street Light)
- Pedestal Pole
- Pedestrian Pushbutton Pole
- Traffic Signal Head
- Traffic Signal Head w/Backplate
- Pedestrian Signal Indication
- EVP Detector
- Advance Radar Detector
- Presence Radar Detector
- Type 1 Service Box
- Type 2 Service Box
- FO — Type 1 Fiber Optic Service Box
- FO — Type 2 Fiber Optic Service Box
- J — Type 1 Junction Box
- J — Type 2 Junction Box
- ATC Traffic Signal Controller Cabinet (Single Wide)
- ATC Traffic Signal Controller Cabinet (Double Wide)
- OP — Advance Loop Detector, OPTCS Loop
- Presence Loop Detector
- Presence Detection Zone
- Radar Detector Reference Aim Point (Abstract Only)
- Video Detection Camera
- Closed Circuit TV (CCTV) Camera
- CNG — CNG Generator Cabinet (Shaded Portion Shows Exhaust Side of Cabinet)
- GM — Gas Meter

- Electrical Service
- Evergy Service Pedestal
- Class E LED Post–Top Luminaire w/14' Pole
- 150W Post–Top Luminaire w/14' Pole
- Class D LED Cobra–Head w/30' Light Pole
- Class C LED Cobra–Head w/30' Light Pole
- Class B LED Cobra–Head w/30' Light Pole
- Class A LED Cobra–Head w/30' Light Pole
- Class D LED Cobra–Head w/40' Light Pole
- Class C LED Cobra–Head w/40' Light Pole
- Class B LED Cobra–Head w/40' Light Pole
- Class A LED Cobra–Head w/40' Light Pole
- Class D LED Cobra–Head w/Combination Pole
- Class C LED Cobra–Head w/Combination Pole
- Class B LED Cobra–Head w/Combination Pole
- Class A LED Cobra–Head w/Combination Pole

- 2 — Construction Note
- (2) — Pole Number
- 2 — Service Box Number
- 4A — Vehicular Signal Head No.
- 8P2 — Pedestrian Signal Head No.
- 42 — Loop Detector No. (Video or Radar Detection Zone No.)
- Flat Sheet Street Name Sign
- Flat Sheet Traffic Sign
- SNS — Illuminated Street Name Sign

Existing Equipment Removal Summary

Location	Description of Item	Quantity

Traffic Signal Turn–on Procedure

1. Turn–on should not be scheduled until power is actually available at the service pedestal and all other equipment and hardware is installed.
2. At least two working days prior to scheduled signal activation, all testing should be completed and successful, all defects and deficiencies correct, all indications operational and properly aimed, cables tagged, controller fully operational performing all timing functions required, all other items of work associated with the signal completed, and all signs and pavement markings properly installed unless otherwise approved by the engineer.
3. The City Inspector and Signal Technician will conduct a full inspection of the signal system within these same two days. Upon satisfactory conditions of the signal system, the turn–on schedule will be confirmed. Any deficiencies found during the final inspection shall result in the rescheduling of the activation.
4. If the traffic signal is a new installation where previously none existed, the contractor shall install "SIGNAL AHEAD" (W3–3) and "NEW" (W16–15p) warning signs with orange background and yellow type B flashing beacons advising the motorists of the signal activation. Signs may be installed prior to putting the signal into operation and covered until such time as the signal is placed into full operation. Signs are subsidiary to other items.
5. Actual activation shall consist of the following steps:
   * installation of all required equipment in the controller cabinet
   * testing of installed equipment
   * unbagging of all signal heads and signs if applicable
   * activation of the signal with the contractor's flagger stopping all traffic momentarily as the signal is turned on.
   * minor re–aiming of signal heads, if necessary
   * uncover the signal ahead sign and turn on flashing beacon
6. Activation of the traffic signal shall not be scheduled for weekends, Fridays or days right before public holidays. Activation shall take place in the morning hours only after 9:00 a.m.
7. The contractor shall remove the "Signal Ahead" (W3–3) and "NEW" (W16–15p) warning signs and flashing beacons after one week of operation.
8. Assumption of maintenance operations related to equipment or signal timings within the traffic signal cabinet will be the responsibility of the City of Overland Park and shall occur after successful turn–on to full operation. This applies to temporary traffic signal installations, traffic signal modifications and new traffic signal installations and applies to normal maintenance operations or emergency callouts to take corrective action to return the signal back to full operating condition. Final acceptance by the City is conditional until the contractor has corrected all defects and punch list items. If a traffic signal malfunction occurs between successful turn–on and final acceptance and the signal malfunction is due to faulty work by the contractor, the City of Overland Park Maintenance Division will take corrective action and has the discretion to bill the contractor for all related expense, including overhead.

Instructions for Disassembly and Return of Salvaged Traffic Signal Equipment

The following is a list of traffic signal equipment which shall be salvaged and returned to the City of Overland Park, unless otherwise instructed by the inspector. The City maintains the first right of refusal of any of the equipment listed. The project inspector will make an on–site assessment to determine if the equipment should be salvaged or disposed. Any equipment that will not be salvaged shall become of the property of the contractor.

1. Emergency Vehicle Pre–emption (EVP) detector units, Video Detection Cameras, Radar Detectors, CCTV cameras, pedestrian pushbuttons and any other equipment must be removed from the mast arms or poles and returned.
2. All vehicular traffic signal heads and pedestrian signal heads shall be removed from the mast arms or poles and be returned. All LED indications must be removed from the vehicular signal and or pedestrian signal heads and boxed prior to returning. Lamps, visors and backplates should remain attached to the vehicular and pedestrian signal heads.
3. Mounting brackets and signal head mounting arms should be removed from the signal heads. Mounting bracket cables shall not be cut for removal, unless they are cracked or damaged.
4. All signal poles, pedestal poles, mast arms and luminaire arms shall be returned. Anchor bolt covers and pole caps must be boxed and or bagged and returned with the equipment. Mast arms and luminaire arms shall be removed from poles prior to delivery. The contractor shall be required to remove and discard all included cable except wiring harnesses for radar detection and RWIS sensors which shall be returned with the equipment.
5. Secondary service pedestal enclosures or battery backup enclosures shall be removed from the traffic signal controller cabinet and returned.
6. Traffic signal controller cabinet and all internal components shall be returned. Any traffic signal controller cabinet hardware that is not attached to the cabinet must be boxed and or bagged and returned with the equipment. Field wire connections on returned signal controller cabinets shall be unscrewed at the terminals instead of cut off.
7. All compressed natural gas generator assembly units shall be returned.
8. All junction boxes and service boxes and lids shall be salvaged if in good condition.
9. Disassembly of any streetlight equipment that is attached to the traffic signal equipment shall follow the guidelines as stated in the "instructions for disassembly and return of salvaged streetlighting equipment".
10. Disassembly of any traffic sign equipment attached to the traffic signal equipment shall follow the guidelines as stated in the "instructions for disassembly and return of salvaged traffic sign equipment".

All traffic signal equipment, excluding signal poles and mast arms, to be returned shall be returned in the same condition as it was prior to removal. Disassembly of equipment shall be done prior to returning the equipment to the Blue Valley Public Works Maintenance Facility (Traffic Services Maintenance Office and Shop) 6869 W. 153rd Street. Signal poles and mast arms shall be returned to the offsite facility near 53rd Street and Renner Road (West of I–435). Provide 48–hours advance notice for the delivery of poles and mast arms.

General Notes

1. The contractor shall stake the locations for all poles, controllers, service boxes and junction boxes to be installed. The stations and offsets provided are to the center of the traffic signal equipment. Elevations shall be provided. If obstructions are encountered during installation, the contractor will re–stake those locations affected by the obstruction. The traffic signal inspector shall inspect the staking prior to any excavation/construction.
2. The locations of existing underground utilities, if shown, are approximate location only and have not been independently verified. The contractor shall be responsible for contacting all utility companies for locations of all underground lines prior to excavation and be fully responsible for any and all damages, which might be occasioned by the contractor's failure to exactly locate and preserve any and all underground utilities.
3. The City of Overland Park is on the KS OneCall System. The contractor shall call 811 to obtain locates for streetlighting, traffic signal, and fiber optic conduits/cables. Irrigation systems are not considered an underground utility and identification is not required by the owner.
4. The contractor shall be responsible for removing existing equipment as noted and delivering all salvageable equipment to the City of Overland Park Blue Valley Maintenance Facility, 6869 W. 153RD Street. The contractor shall contact the Inventory Control Specialist at (913) 327–6603 to coordinate delivery (at least 24–hour advance notice shall be provided). All returned equipment shall be disassembled per the instructions of the Traffic Services Division of the City of Overland Park Department of Public Works located on this sheet. The contractor shall be responsible for any damage or loss of salvageable equipment.
5. All conduit trenches and pre–drilled holes within rock/shale shall be backfilled with suitable material and compacted in accordance with the specifications.
6. Conduits shall be installed under all streets, drives and sidewalks prior to paving within the limits of the street improvements. The conduit placement shall be coordinated with the paving operation, if applicable, and inspected by the City Traffic Signal Inspector. (See Trench Details)
7. The conduit shall be installed under any existing underdrain pipe crossings and underdrain blankets. Where pole foundations are to be installed through an existing underdrain blanket, the blanket shall be pre–cut to prevent damage of the blanket. In the event the blanket is damaged, the fabric shall be replaced.
8. HDPE conduit shall be installed continuously between all traffic signal appurtenances. Conduit splices between appurtenances shall not be allowed unless fusion couplings or other fusion methods are used
9. All cable splices from loop detector cable to lead–in cable at junction boxes shall be watertight.
10. Damage to any existing traffic signal equipment due to the construction shall be the responsibility of the contractor. The contractor shall report any operational problems to the Traffic Services Maintenance Department (327–6600). The equipment shall be replaced or repaired (as directed by the City) with approved materials in conformance with the current standard details, specifications, practices and policies. The contractor shall be responsible for any stored existing materials (removed for construction) to be re–installed.
11. All existing traffic signal equipment is to be used in place (U.I.P.) unless otherwise noted in the plans.
12. All areas disturbed by construction shall be sodded as directed by the Engineer. The grass medians shall be seeded and brick medians restored, unless otherwise noted or directed. Sidewalk damaged by construction or removed due to construction shall be replaced as directed, in accordance with the Overland Park Municipal Code requirements.
13. Forms (including rebar cages, etc.) conduit and anchor bolts shall be installed and in place for review by the Inspector a minimum of 24 hours in advance of the proposed concrete placement. No concrete placement shall begin after 3:00 p.m.
14. All loop detectors shall be wet cut with equipment approved by the Engineer. Loops shall be cut prior to the final surface lift, but after review of the pre–marked locations.
15. Luminaire arms shall be oriented in the same vertical plane as the mast arm unless otherwise indicated in the plans.
16. Turn–on of the traffic signal system shall be in accordance with City turn–on procedures.
17. All construction of the traffic signal that will result in taking the existing traffic signal out of operation shall be performed on Sunday between 9:00 a.m. and 6:00 p.m. and completed that same day, unless otherwise directed by the Engineer. The City of Overland Park Police Department shall provide officer control of the intersection when the signal is out of operation. The contractor shall notify the Police Department and the City Traffic Services Division at least 72 hours in advance. The traffic signal inspector and the traffic signal specialist shall be present during this time (unless otherwise directed by the Engineer).
18. The traffic signal contractor shall notify the City of Overland Park Department of Public Works, (913) 895–6027, of the exact construction schedule so that inspection of the traffic signal installation can be made of all phases, including conduit installations.
19. The contractor shall be responsible for any damage incurred to any existing underground sprinkler system during construction. All affected pipes or fittings shall be restored to their original condition and location and new materials used shall be similar to those of the existing system. All restoration work shall be acceptable to the Engineer and owner thereof.
20. The contractor shall be required to submit catalog cuts or shop drawings for all equipment to be installed on this project. All materials shall conform to the City of Overland Park pre–approved materials list which is available at City Hall.
21. The contractor, or their supplier, shall, at the contractor's expense, submit a concrete mix design for approval by the Kansas City Metro Materials Board (KCMMB) prior to placement of any concrete. Additional information regarding KCMMB approved concrete mix designs is available on the following website: www.kcmmb.org
22. All signal cable shall be positively identified at the controller and each pole with phase numbers and colored electrical tape as follows:

Vehicle Phases	Pedestrian Phases
Ø1 – Purple & White	Ø6 – Purple and Orange
Ø6 – Purple	Ø2 – Blue and Orange
Ø5 – Blue & White	Ø8 – Yellow and Orange
Ø2 – Blue	Ø4 – Red and Orange
Ø3 – Yellow & White	
Ø8 – Yellow	
Ø7 – Red & White	
Ø4 – Red	

23. The contractor shall leave slack cable in poles, service boxes, junction boxes and control center according to the following:
    - Provide 6' min. slack for all cable in service boxes
    - Provide 10' min. slack for all cable in the controller cabinet
    - Provide 3' min. slack for loop cable in the junction box
    - Provide 3' min. slack for loop lead–in cable in the junction box
    - Provide 1' min. slack on each side of the cable splice, and for CCTV, EVP and #10 AWG ground cables, at signal poles.
24. The contractor shall positively identify the detector loop cables in the junction boxes, where they come in from the street, with wraps of white electrical tape corresponding to the loop number. The cables should be identified according to lane. The inside lane shall be marked as number one and increasing outward. All loops shall be connected in series.
25. Within the traffic signal cabinet, the contractor shall use plastic tie–wrap identification tags with permanent marker to identify all of the vehicular and pedestrian heads that are served by each cable. The numbering of the signal heads shall conform to the plan sheets.
26. All non–functioning traffic signal heads shall be covered with approved opaque coverings specifically manufactured for traffic signal heads. The color of the coverings shall be as follows:
    - Orange at locations of new traffic signals, where no previous signal existed.
    - Black at locations of signal modifications such that the coverings do not detract from the functioning signal heads.
27. All existing traffic signals shall remain in operation and be used in place until the permanent traffic signal installation is complete and in operation. Refer to the traffic control plans for additional requirements. The contractor shall coordinate the disconnection of service with Evergy for the existing signal system.
28. All temporary traffic signals installed by the contractor shall be equipped with a 2070 or ASC3 Rackmount controller provided by the contractor for compatibility with the City's signal system.
29. Contractor shall use a polymer lubricating agent to facilitate conduit bores under paved streets. Failure to do so will result in a denial to retrieve bore head by excavation methods, in the case of loss, under any paved street.
30. The ends of all conduits in the controller cabinet shall be plugged with duct seal.
31. All existing concrete foundations, shown to be removed, shall be removed a minimum of 24" below final grade.
32. The traffic signal contractor shall be required to furnish evidence that their insurance meets the requirements of Chapter 13.01 of the City of Overland Park, Kansas, Municipal Code.
33. All traffic control in conjunction with the traffic signal construction shall be in conformance with the Manual on Uniform Traffic Control Devices and the Overland Park Traffic Control Handbook for Street Maintenance and Construction Operations.
34. The traffic signal contractor shall be responsible for removal of all undesirable material (rock and debris) encountered during traffic signal construction. The owner or his/her representative will designate a location on the owner's property for placing all excess rock, debris, etc. before proceeding with construction, The traffic signal contractor shall verify that the right–of–way has been properly graded and in a mowable condition.
35. The contractor shall be required to install inventory stickers on the back of all signs installed on signal poles, or mast arms on the project, and record each respective bar code number on the plan sheet adjacent to the corresponding sign, for delivery to the project inspector. Inventory stickers will be provided by the City.
36. If the final combination signal/streetlight pole is less than ten (10) feet away from the nearest overhead power line, the contractor shall contact Evergy and request them to sleeve their line prior to pole installation, drilling of foundation, or any other associated work. All associated costs shall be the responsibility of the contractor.
37. The contractor shall be required to have all tree branches that obstruct CCTV cameras, radar detection sensors or traffic signal heads trimmed by a licensed arborist.
38. Any equipment the City pre–ordered prior to the contract shall be picked up at the applicable City Maintenance facility at the contractor's expense. All the items must be picked up at one time.
39. The Contractor shall deliver the controller, conflict monitor, Ethernet Switch, CCTV Camera, EVP discriminator, etc. to the Traffic Signal Inspector two weeks prior to signal turn–on so the equipment can be programmed.

CITY OF OVERLAND PARK
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2021 Standard Details

TRAFFIC SIGNAL
GENERAL NOTES (DEV)

SHEET NO. 02 | TOTAL SHEETS 53

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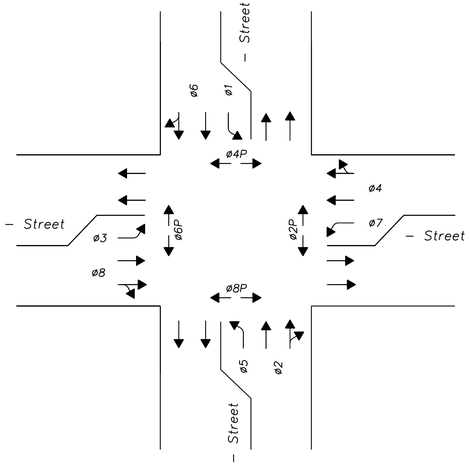
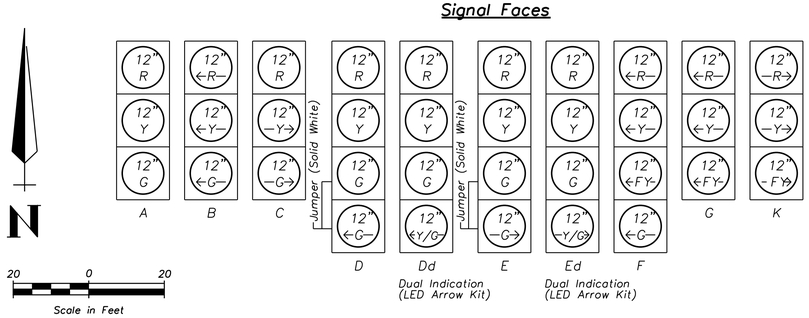


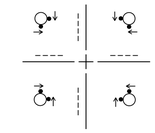
Signal Phasing



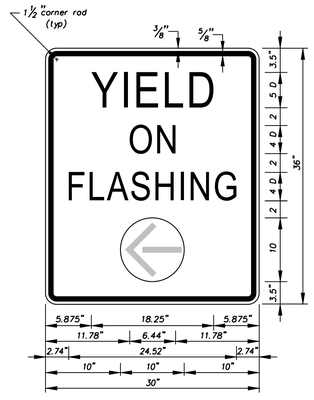
Signal Faces

Phase Timings Plan								
Option	Phase							
	1	2	3	4	5	6	7	8
Phase Minimum Green								
Phase Walk								
Phase Pedestrian Clear								
Phase Passage								
Phase Passage 2								
Phase Maximum 1								
Phase Maximum 2								
Phase Yellow Change								
Phase Red Clear								

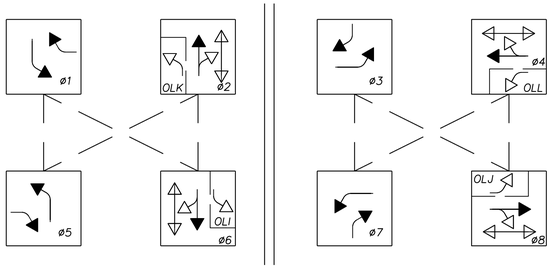
Flashing Operations	
-----	FR
-----	FR
Pedestrian Heads	Dark
– Left	--
– Left	--



Ped. Pushbutton Detail



R10-FYA



Phasing Diagram

Legend

- Permissive Phase
- Protected Phase
- Pedestrian Phase
- OL — Overlap Phase

Construction Notes:

1.

2.

3.

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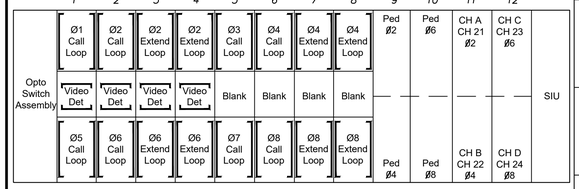
TRAFFIC SIGNAL
PLAN SHEET

SHEET NO. 03 | TOTAL SHEETS 53

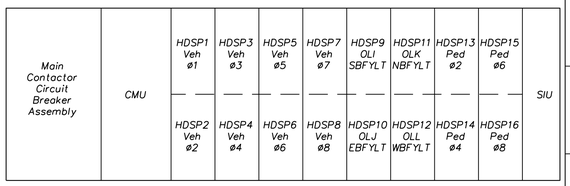


SIU = Serial Interface Unit
EVP = Emergency Vehicle Pre-emption

Video Det — *Input card only if video detection is utilized*

Vehicle Det Loop Assign — *Detector card assignments only if induction loops are utilized*

Input Assembly (Front View)



Output Assembly (Front View)

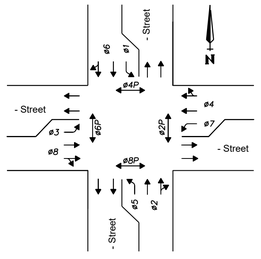
SIU = Serial Interface Unit
CMU = Conflict Management Unit
HDSP = High Density Switch Pack

Field Term.		Indication	Signal Head No.	Notes
CH1 SBLT Ø1	R1	Red		
	R2	Red		
	Y1	Yellow		
	Y2	Yellow		
	G1	Green		
	G2	Green		
CH2 NB Ø2	R1	Red		
	R2	Red		
	Y1	Yellow		
	Y2	Yellow		
	G1	Green		
	G2	Green		
CH3 EBLT Ø3	R1	Red		
	R2	Red		
	Y1	Yellow		
	Y2	Yellow		
	G1	Green		
	G2	Green		
CH4 WB Ø4	R1	Red		
	R2	Red		
	Y1	Yellow		
	Y2	Yellow		
	G1	Green		
	G2	Green		
CH5 NBLT Ø5	R1	Red		
	R2	Red		
	Y1	Yellow		
	Y2	Yellow		
	G1	Green		
	G2	Green		
CH6 SB Ø6	R1	Red		
	R2	Red		
	Y1	Yellow		
	Y2	Yellow		
	G1	Green		
	G2	Green		
CH7 WBLT Ø7	R1	Red		
	R2	Red		
	Y1	Yellow		
	Y2	Yellow		
	G1	Green		
	G2	Green		
CH8 EB Ø8	R1	Red		
	R2	Red		
	Y1	Yellow		
	Y2	Yellow		
	G1	Green		
	G2	Green		

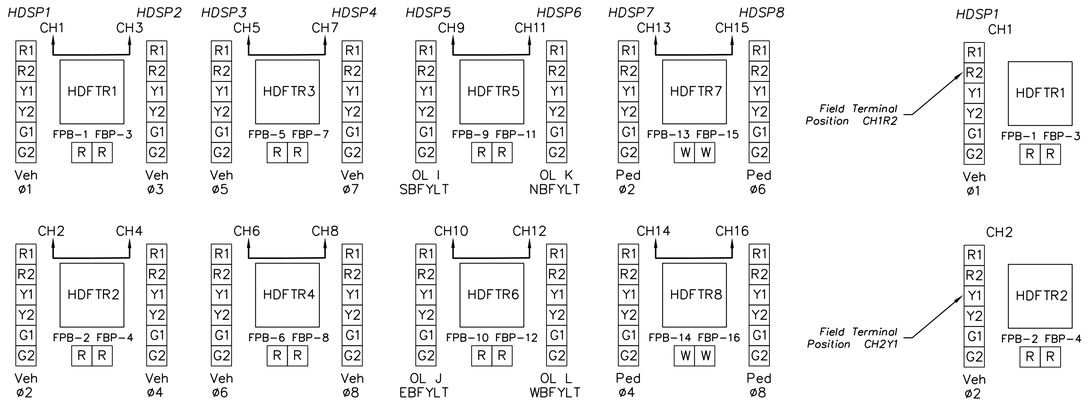
Field Term.		Indication	Signal Head No.	Notes
CH9 OL I SBFYLT	R1	Red		
	R2	Red		
	Y1	Yellow		
	Y2	Yellow		
	G1	Green (FYA)		
	G2	Green (FYA)		
CH10 OL J EBFYLT	R1	Red		
	R2	Red		
	Y1	Yellow		
	Y2	Yellow		
	G1	Green (FYA)		
	G2	Green (FYA)		
CH11 OL K NBFYLT	R1	Red		
	R2	Red		
	Y1	Yellow		
	Y2	Yellow		
	G1	Green (FYA)		
	G2	Green (FYA)		
CH12 OL L WBFYLT	R1	Red		
	R2	Red		
	Y1	Yellow		
	Y2	Yellow		
	G1	Green (FYA)		
	G2	Green (FYA)		
CH13 NBP Ø2P	R1	DONT WALK		
	R2	DONT WALK		
	Y1			
	Y2			
	G1	WALK		
	G2	WALK		
CH14 WBP Ø4P	R1	DONT WALK		
	R2	DONT WALK		
	Y1			
	Y2			
	G1	WALK		
	G2	WALK		
CH15 SBP Ø6P	R1	DONT WALK		
	R2	DONT WALK		
	Y1			
	Y2			
	G1	WALK		
	G2	WALK		
CH16 EBP Ø8P	R1	DONT WALK		
	R2	DONT WALK		
	Y1			
	Y2			
	G1	WALK		
	G2	WALK		

Notes:

1. *Wiring identification shall be consistent with numbers shown for poles, signal heads and detectors.*
2. *For W signal head: Connect the walk and don't walk symbols using green and red cables, respectively, and orange and black wires from the pushbuttons.*
3. *For A, B, C and K signal head: Connect the green, yellow, and red ball or arrow sections using green, orange, and red cables respectively.*
4. *For Dd signal head: Connect the green, yellow, and red ball sections of head No. __ to field terminals __, __ and __ using green, orange and red cables, respectively. Connect the left green arrow and the left yellow arrow sections to field terminals __ and __ using blue and black cables, respectively.*
5. *For Ed signal head: Connect the green, yellow, and red ball sections of head __ to field terminals __, __ and __ using green, orange and red cables, respectively. Connect the right green arrow and the right yellow arrow sections to field terminals __ and __ using blue and black cables, respectively.*
6. *For F signal head: Connect the solid green arrow section of head No. __ to field terminal __ using blue cables. Connect the flashing yellow arrow, solid yellow arrow and solid red arrow sections to the overlap field terminals __, __ and __ using green, orange and red cables, respectively.*
7. *For G signal head: Connect the flashing yellow arrow, solid yellow arrow and the solid red arrow sections of head No. __ to the overlap terminals __, __ and __ using green, orange and red cables respectively.*
8. *For D and E signal head: Connect the green, yellow and red ball sections of head No. __ to field terminals __, __ and __ using green, orange and red cables respectively. Connect the green ball and green arrow sections with the white jumper cables.*



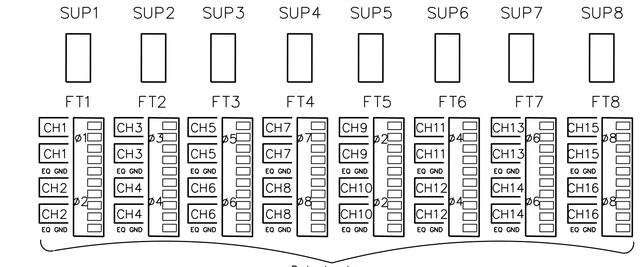
Signal Phasing



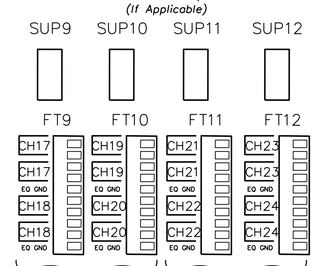
Field Output Assembly (In Signal Cabinet)

LEGEND:

HDSP = High Density Switch Pack
HDFTR = High Density Flash Transfer Relay
FT = Field Terminal
FPB = Flash Plug Block (R=Red, W=White)



Detector Loops (If Applicable)



Pedestrian Pushbuttons (See Pedestrian Pushbutton Wiring Diagram)

EVP Terminals (See EVP Detector Wiring Diagram)

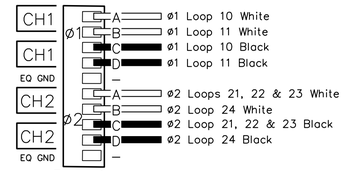
Field Input Terminal Assembly
(In Signal Cabinet)

SUP = Suppressor

Loop Number	Phase, FT No. & Channel	Terminal Number
_____	Ø1 FT1CH1	AC
_____	Ø1 FT1CH1	BD
_____	Ø2 FT1CH2	AC
_____	Ø2 FT1CH2	BD
_____	Ø3 FT2CH3	AC
_____	Ø3 FT2CH3	BD
_____	Ø4 FT2CH4	AC
_____	Ø4 FT2CH4	BD
_____	Ø5 FT3CH5	AC
_____	Ø5 FT3CH5	BD
_____	Ø6 FT3CH6	AC
_____	Ø6 FT3CH6	BD
_____	Ø7 FT4CH7	AC
_____	Ø7 FT4CH7	BD
_____	Ø8 FT4CH8	AC
_____	Ø8 FT4CH8	BD
_____	Ø2 FT5CH9	AC
_____	Ø2 FT5CH9	BD
_____	Ø2 FT5CH10	AC
_____	Ø2 FT5CH10	BD
_____	Ø4 FT6CH11	AC
_____	Ø4 FT6CH11	BD
_____	Ø4 FT6CH12	AC
_____	Ø4 FT6CH12	BD
_____	Ø6 FT7CH13	AC
_____	Ø6 FT7CH13	BD
_____	Ø6 FT7CH14	AC
_____	Ø6 FT7CH14	BD
_____	Ø8 FT8CH15	AC
_____	Ø8 FT8CH15	BD
_____	Ø8 FT8CH16	AC
_____	Ø8 FT8CH16	BD

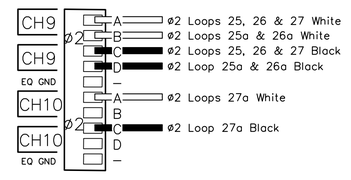
Detector Wiring Diagram

FT1

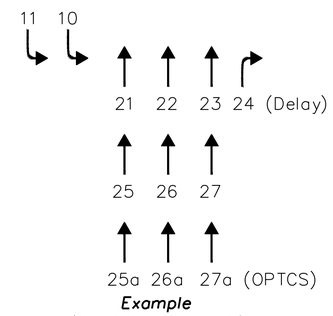


Example (ø1 & 2 Loops)

FT5



Example (ø2 Loops)



Example (ø1 & ø2 Loop Assignments)

Induction Loop Wiring Assignment Detail

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TRAFFIC SIGNAL
INPUT/OUTPUT ASSEMBLY DETAILS

SHEET NO. 04 | TOTAL SHEETS 53

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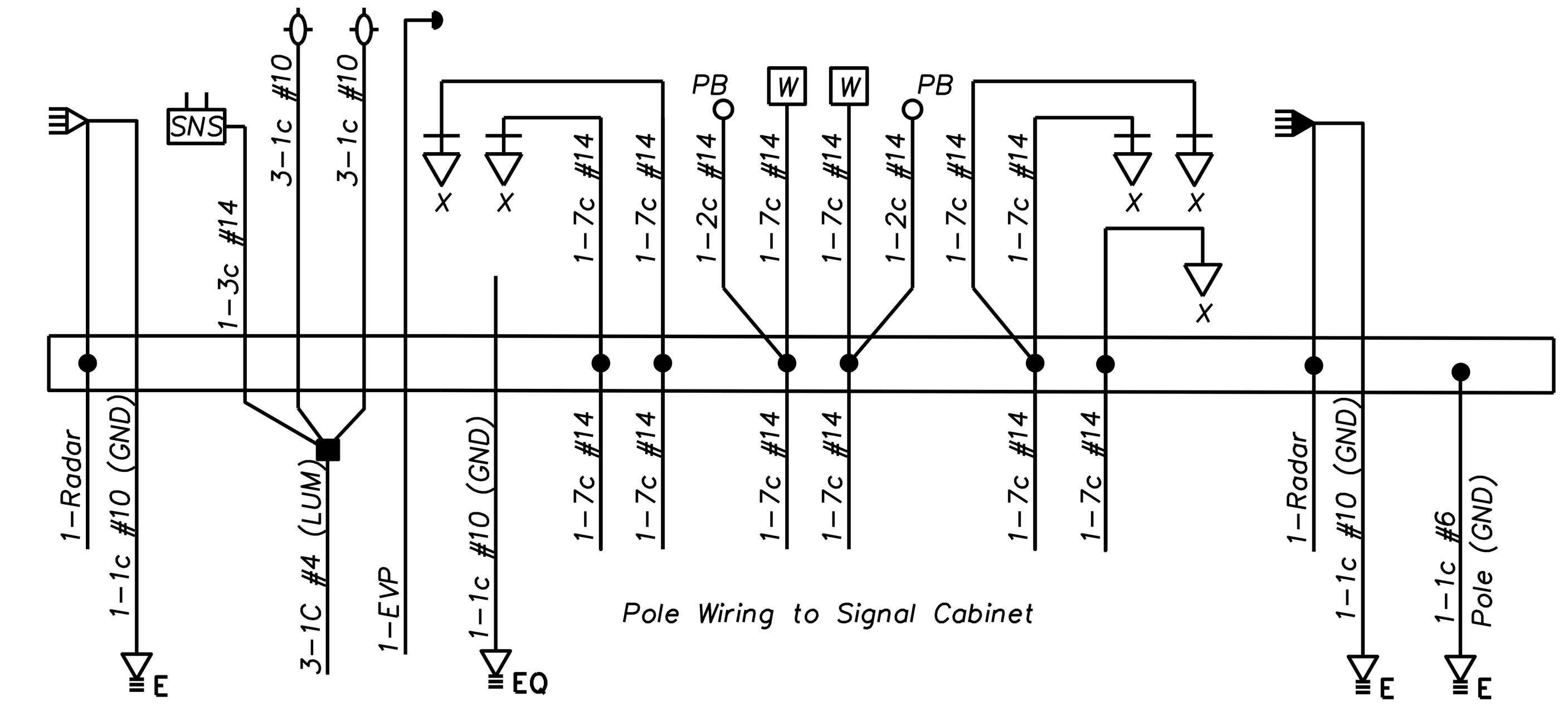
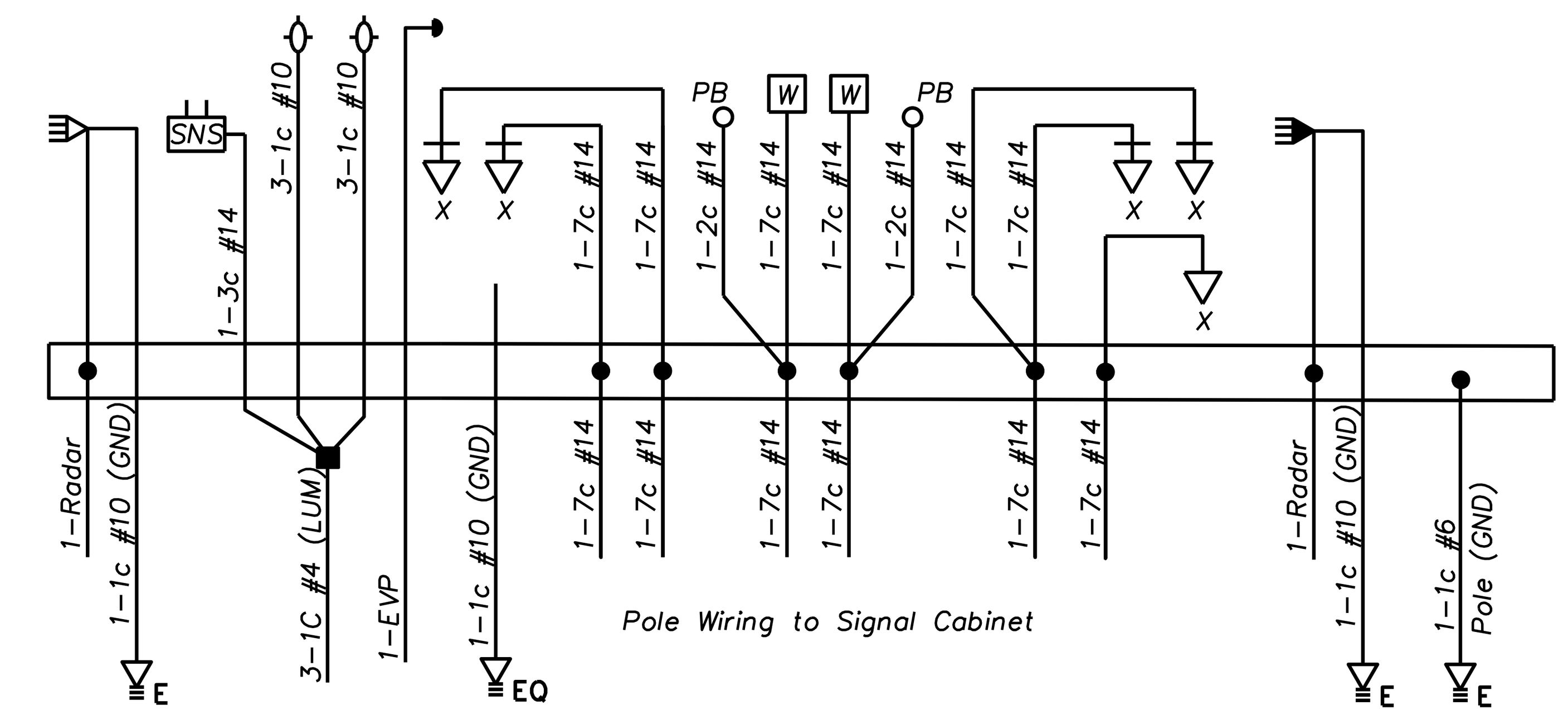
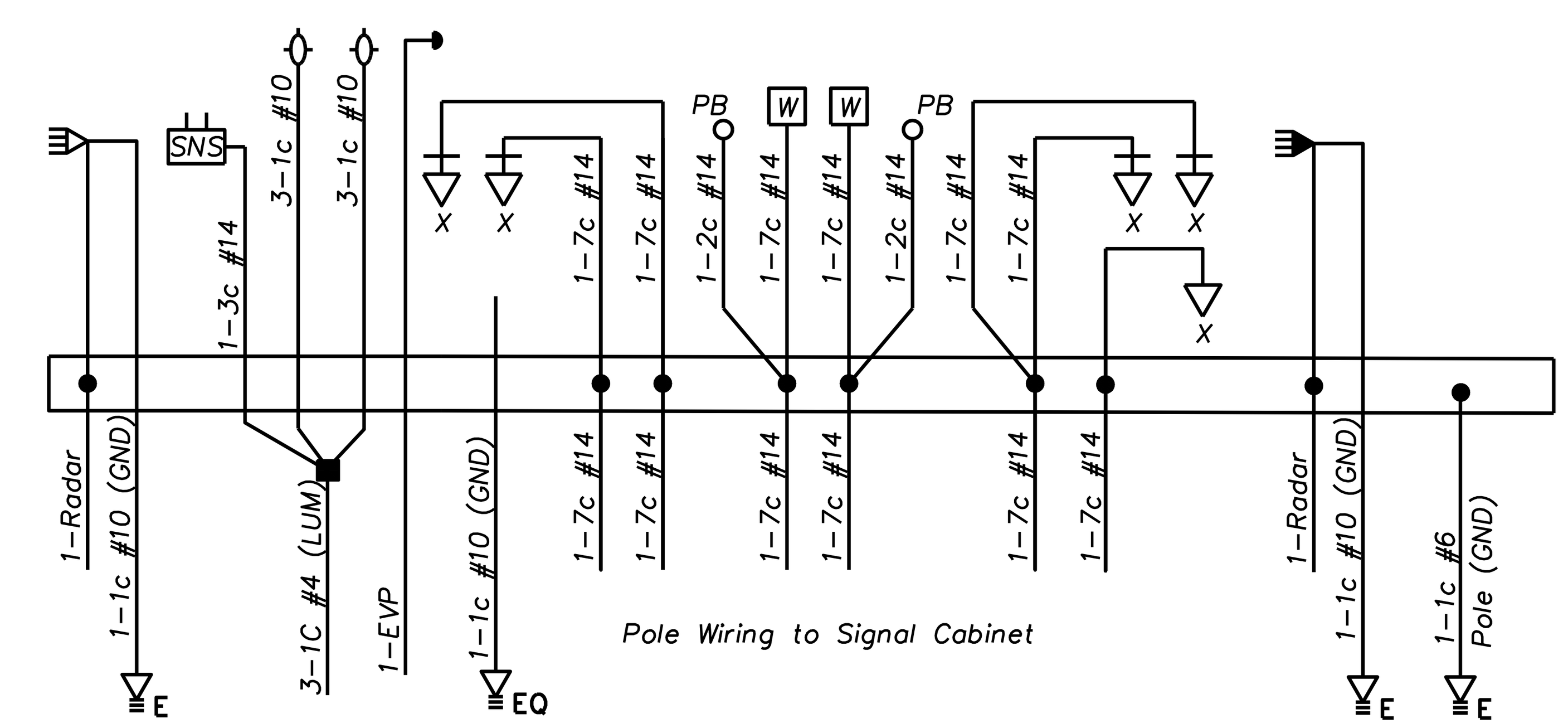


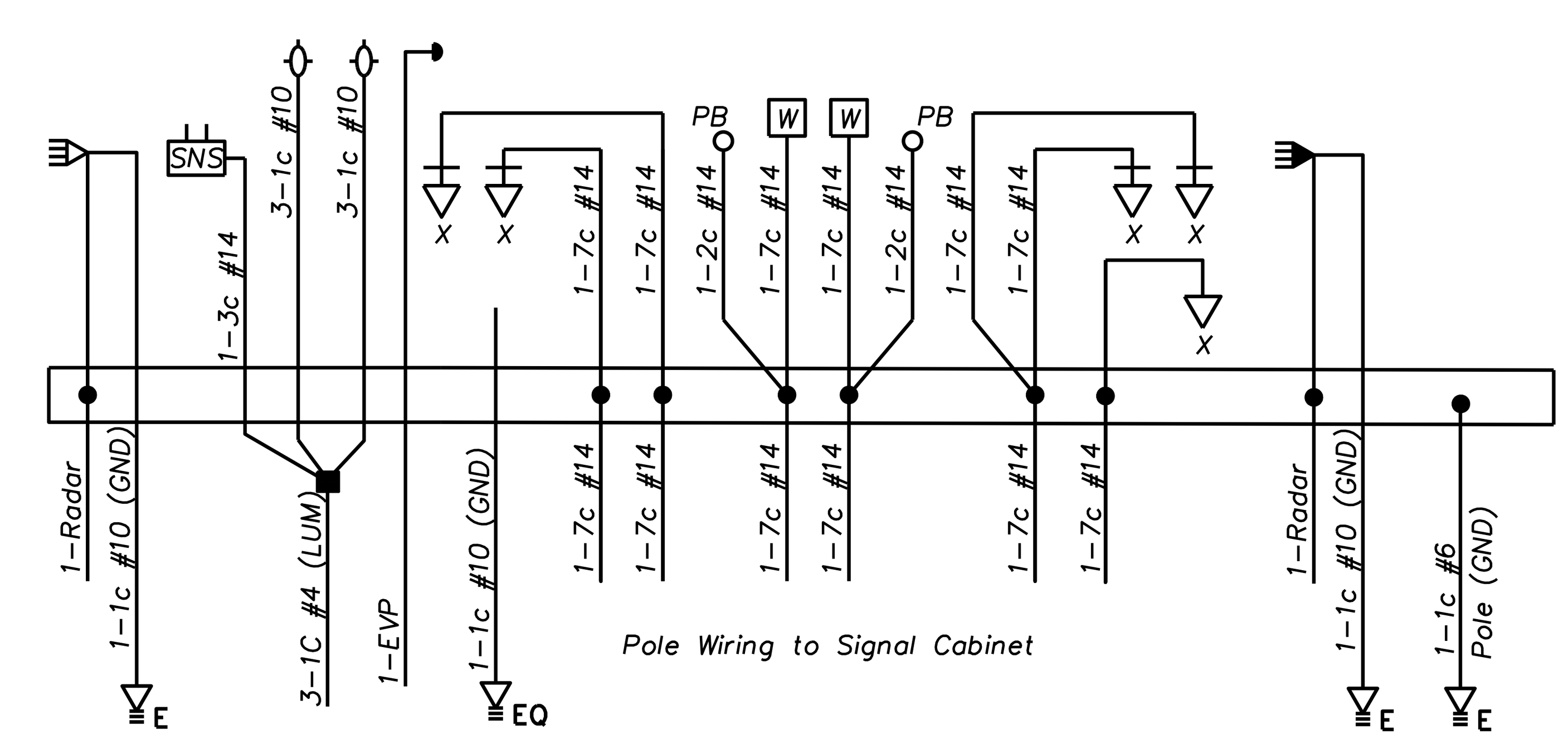
Pole # ____



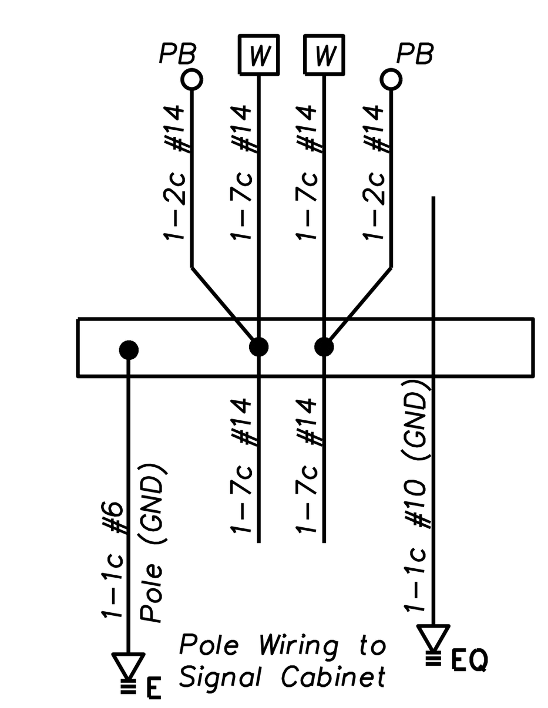
Pole # ____



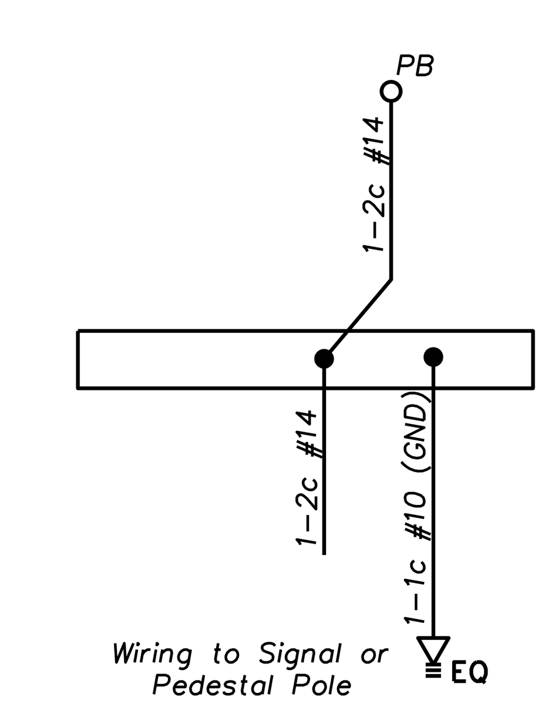
Pole # ____



Pole # ____



Pole # ____



Pole # ____

Legend

- Video Detection Camera
- Advance Radar Detector
- Presence Radar Detector
- Closed Circuit TV (CCTV) Camera
- EVP Detector
- SNS Illuminated Street Name Sign (If Applicable)
- Streetlight
- Traffic Signal Head
- W Pedestrian Signal Head
- PB Pedestrian Pushbutton
- Streetlight Electrical Connectors
- Connection in Pole Base
- E Earth Ground
- EQ Equipment Ground

Notes:

1. Tape individual wire nuts or connectors at the base of each pole. Then tape all groups of wire together.
2. Wiring for CCTV and emergency pre-emption (EVP) detectors shall be continuous with no splices to the controller. Provide 2' of slack at the base of the pole.
3. Pigtail connectors from the radar detection sensors to the base of the pole shall be performed by the supplier. Connections to the home run cable shall be made with self-stripping gel-filled electrical pigtail connectors.

Pole Wiring Details
No Scale

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TRAFFIC SIGNAL
POLE WIRING DETAILS

SHEET NO.	TOTAL SHEETS
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Example:
Order– 'Callout'
2" COND.
1–7c
1–7c (PED)
1–RADAR
1–EVP
1–CCTV
3–1c#4 (LUM)
1–1c#10 (GND)

Notes:

1. All wire to be #14 AWG unless otherwise noted.
2. All conduit to be high density polyethylene conduit (HDPE) (Black w/ White Stripe) unless otherwise noted.
3. 2" COND. Indicates existing equipment to be Used In Place unless otherwise noted.
4. 3–7c Indicates existing cable to be Used In Place unless otherwise noted.
5. ——— Indicates existing cable/conduit
6. ++++++++ Indicates existing equipment to be removed or abandoned as called out in the plans
7. /3–7d/ Indicates existing cable to be removed
8. < > Indicates cable/conduit installed for future use

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CITY OF OVERLAND PARK
DEPARTMENT OF PUBLIC WORKS

TRAFFIC SIGNAL
INTERSECTION WIRING DIAGRAM

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Bill of Materials (1)

Cabinet Related Items

Item	Unit	Quant.	
Compressed Natural Gas (CNG) Generator & Cabinet with Landscaping	Each	–	(7)
Secondary Aluminum Service Enclosure w/30amp Main	Each	–	
Battery Backup UPS System and Accessories	Each	–	(7)
Manual Power Bypass Switch/30amp	Each	–	
ATC Cabinet (Double Wide) w/ 8" Riser	Each	–	
ATC Cabinet (Single Wide) w/ 8" Riser	Each	–	

Concrete Foundation Items

Item	Unit	Quant.
Concrete Controller Cabinet Pad (Single Wide)	Each	–
Concrete Controller Cabinet Pad (Double Wide)	Each	–
Concrete Compressed Natural Gas (CNG) Generator Pad	Each	–
Concrete Traffic Signal Pole Foundation W/ Cap and Anchor Bolts	Each	–
Concrete Pedestal Pole Foundation W/ Cap and Anchor Bolts	Each	–
Concrete Pedestrian Pushbutton Pole Foundation and Anchor Bolts	Each	–
Ground Rod & Clamp(s) (5/8" x 10') for Poles and Cabinet Foundation	Each	–

Conduit / Cable

Item	Unit	Quant.
SDR 13.5 HDPE (Orange) Fiber Optic Conduit 2"	Ln. Ft.	–
SDR 13.5 HDPE (Orange) Fiber Optic Conduit 3"	Ln. Ft.	–
SDR 13.5 HDPE (Black w/ White Stripe) Signal Conduit 1.5"	Ln. Ft.	–
SDR 13.5 HDPE (Black w/ White Stripe) Signal Conduit 2"	Ln. Ft.	–
SDR 13.5 HDPE (Black w/ White Stripe) Signal Conduit 3"	Ln. Ft.	–
SDR 13.5 HDPE (Black w/ White Stripe) Signal Conduit 4"	Ln. Ft.	–
SDR 13.5 HDPE (Black w/ Red Stripes) or Sch 40 PVC (Gray) Electrical Service Conduit 2"	Ln. Ft.	–
Video Detection Cable	Ln. Ft.	–
CNG Monitoring Cable 3c #14 AWG	Ln. Ft.	–
CNG Power Cable 3c #2 AWG	Ln. Ft.	–
CNG Alarm Cable 2c #14 AWG	Ln. Ft.	–
CCTV Camera Cat 6 Data Cable	Ln. Ft.	–
Radar Detector Home Run Cable (3 Pair)	Ln. Ft.	–
Illuminated Street Name Sign Cable 3c #14 AWG	Ln. Ft.	–
Solid Bare Copper Ground Wire 1c #6 AWG	Ln. Ft.	–
Detector Loop Wire 1c #14 AWG THHN/THWN in PVC Tube	Ln. Ft.	–
Shielded Detector Lead-in 2c #14 AWG	Ln. Ft.	–
Multi-Conductor Cable 2c #14 AWG (From Ped Pushbutton to Traffic Signal Pole Base)	Ln. Ft.	–
Multi-Conductor Cable 7c #14 AWG	Ln. Ft.	–
Emergency Vehicle Pre-emption (EVP) Cable	Ln. Ft.	–
Stranded Copper Ground Cable (Green) 1c #10 AWG THHN/THWN	Ln. Ft.	–
Stranded Copper Locating Cable (Red) 1c #10 AWG THHN/THWN	Ln. Ft.	–
Electrical Service Power Cable 3-1c #4 AWG	Ln. Ft.	–
Ethernet Cables (6' long)	Each	–

Detection / CCTV Equipment

Item	Unit	Quant.	
Pedestrian Pushbutton	Each	–	
Audible Pedestrian Pushbutton w/ Accessories and Sign (R10-3e) 9" x 15"	Each	–	
Emergency Vehicle Pre-emption (EVP) Detector	Each	–	
CCTV Dome Camera w/ RJ-45 Connector Kit and High PoE Midspan 1-port	Each	–	
CCTV Quad Camera w/ RJ-45 Connector Kit and High PoE Midspan 1-port	Each	–	
Advance Radar Detector Sensor w/ Harness Cable	Each	–	
Presence Radar Detector Sensor w/ Harness Cable	Each	–	(9)

Mounting Brackets

Item	Unit	Quant.
Mast Arm Bracket (3 Section Head)	Each	–
Mast Arm Bracket (4 Section Head)	Each	–
Side Pole Bracket (Vehicular and Pedestrian Heads)	Each	–
Mini Astro Brac for Emergency Vehicle Pre-emption (EVP) Detector	Each	–
Radar Detector Mounting Bracket	Each	–
CCTV Camera Mounting Bracket Equipment for Specified Camera	Each	–

Signing

Item	Unit	Quant.	
R10-17a (36"x48") Right on Red Arrow After Stop" w/ Bracket	Each	–	(5)
R10-FYA (30" x 36") "Yield on Flashing (Symbolic Yellow Arrow)" w/ Bracket	Each	–	(5)
R3-4 Sign (36" x 36") "No U-Turn" w/ Bracket	Each	–	(5)
R10-11b Sign (36" x 36") "No Turn on (Red)" w/ Bracket	Each	–	(5)
R10-3e Sign (9" x 15") "Pedestrian Push Button" w/ Steel Bands	Each	–	(6)
D3-1 Overhead Street Name Signs (Varies in Size) w/ Bracket	Each	–	(8)
Illuminated Street Name Signs (_____ x 19") w/ Mounting Brackets	Each	–	(8)
Illuminated Street Name Signs (_____ x 24") w/ Mounting Brackets	Each	–	

Streetlighting Equipment

Item	Unit	Quant.	
Class A LED Cobra-Head Luminaire	Each	–	(10)
Class B LED Cobra-Head Luminaire	Each	–	(10)
Class C LED Cobra-Head Luminaire	Each	–	(10)
8 AMP Fuse	Each	–	
Break-Away Non-Fused Connector Kits	Each	–	
Break-Away Fused Connector Kits	Each	–	
Multiple Street Light Tap Connector	Each	–	
Lighting Cable #4 AWG 3-1c Type USE	Ln. Ft.	–	
Pole & Bracket Cable #10 AWG 1c Type THHN/THWN	Ln. Ft.	–	

Miscellaneous

Item	Unit	Quant.
Install City-Supplied Traffic Signal Mast Arm	Each	–
Remove/Relocate Existing Equipment	L.S.	–
Evergy Service Pedestal & Ground Rod (Provided by Evergy and Picked Up By Contractor)	Each	–

Signal Heads

Item	Unit	Quant.
Pedestrian Signal Head (1 Section) (See Chart A)	Each	–
Traffic Signal Head (See Chart A)	Each	–
Backplate 5" (3 Section)	Each	–
Backplate 5" (4 Section)	Each	–
Red Arrow LED Kit	Each	–
Yellow Arrow LED Kit	Each	–
Green Arrow LED Kit	Each	–
Red Ball LED Kit	Each	–
Yellow Ball LED Kit	Each	–
Green Ball LED Kit	Each	–
Dual Indication Green/Yellow LED Arrow Kit	Each	–
Orange/White "Hand/Person" Countdown LED Kit	Each	–

Signal Faces

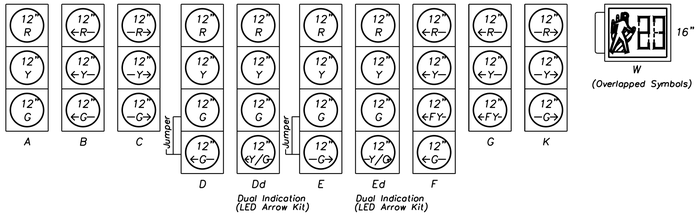

Chart A - Signal Head Summary

No. Sections	Signal Face Arrangement	Bracket Type	Quantity
–	–	Mast Arm Bracket	–
–	–	Mast Arm Bracket	–
–	–	Mast Arm Bracket	–
–	–	Pole Bracket	–
–	–	Pole Bracket	–
–	–	Pole Bracket	–
–	–	Pole Bracket	–
–	–		–
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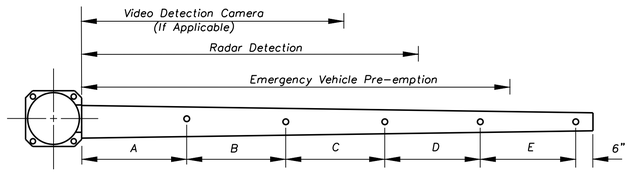
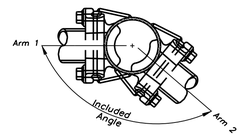


Signal Component Spacing Detail



Included Angle Detail for Dual Mast Arms

Traffic Signal Poles

Item	Unit	Quant.
Traffic Signal Steel Pole (See Chart B)	Each	–
Traffic Signal Aluminum Pedestal Pole (14') and Base	Each	–
Traffic Signal Aluminum Pedestal Pole (13') and Base	Each	–
Traffic Signal Aluminum Pedestal Pole (9') and Base	Each	–
Traffic Signal Aluminum Pedestrian Push Button Pole	Each	–
Traffic Signal Mast Arm (See Chart B)	Each	–
Luminaire Bracket Arm (12 ft) (See Also Chart B)	Each	–
Luminaire Bracket Arm (8 ft) (See Also Chart B)	Each	–

Traffic Signal Boxes

Item	Unit	Quant.
Service Box Type 1	Each	–
Service Box Type 2	Each	–
Junction Box Type 1	Each	–
Junction Box Type 2	Each	–
Fiber Optic Service Box Type 1	Each	–
Fiber Optic Service Box Type 2	Each	–
Ground Rod & Clamp (5/8" x 8') for Service Boxes	Each	–

Major Electronic Equipment Items

Item Description	Unit	Quant.
ATC Controller Unit w/ Firmware	Each	–
Cabinet Monitor Unit (CMU)	Each	–
High Density Switch Pack	Each	–
High Density Flash Transfer Relay	Each	–
Serial Interface Unit (SIU)	Each	–
Auxiliary Display Unit (ADU)	Each	–
Cabinet Alarm Panel	Each	–
242 DC Isolator	Each	–
Surge Protector (Traffic Signal Cabinet)	Each	–
Utility Power Surge Protector (Secondary Service Pedestal)	Each	–
EVP Discriminator Module 2-Channel	Each	–
EVP Discriminator Module 4-Channel	Each	–
Radar SDLC Cabinet Interface Device (4-Port)	Each	–
Radar SDLC Cabinet Interface Device (6-Port)	Each	–
RJ-45 Data Protector for CCTV Cameras	Each	–
Two Channel Detector Card	Each	–
Four Channel Detector Card	Each	–

Bill of Materials Notes:

(1) These approximate quantities were prepared solely for the contractor's convenience. It is not guaranteed that this list of materials constitutes all items required for the completion of the work. Unless otherwise noted, the installation/modification shall be bid "lump sum" for all necessary equipment.
(2) City to furnish equipment for contractor installation, if designated.
(3) Quantities for these items are included in the street lighting bill of materials.
(4) Quantities for these items are included in the fiber optic bill of materials.
(5) All sign sheeting shall be micro-encapsulated prismatic sheeting (Type XI).
(6) Quantities for these items are included in the overhead street name sign quantity table.
(7) A certified field service technician shall be on site at turn-on of CNG generators and battery backup systems.
(8) See illuminated street name signs details for wiring diagrams, sizes and location.
(9) Supplier shall set up count zones for each intersection approach.
(10) All LED Cobra-Head luminaires shall have a minimum 10 year manufacturer's warranty.

Chart B - Traffic Signal Pole Summary (1)

Pole No.	Pole Designation (See Traffic Signal Structures Detail Sheet): Mast Arm Length No. 1	Combo Pole Type	Luminaire Arms: Arm No. 1	Luminaire Arms: Arm No. 2	Mast Arm Length No. 2	Included Angle	No. of Signals on Mast Arm: Mast Arm No. 1	No. of Signals on Mast Arm: Mast Arm No. 2	Signal Component Spacing (See Signal Component Spacing Detail) (2): Mast Arm No. 1: A	B	C	D	E	EVP	PRAD	ARAD	Mast Arm No. 2: A	B	C	D	E	EVP	PRAD	ARAD

Chart B Notes:

(1) Manufacturer shall certify that all poles conform to the 2013 edition of the AASHTO standard specifications for structural supports for highway signs, luminaires and traffic signals.
(2) Engineer to confirm signal component spacing prior to arm drilling and head installation.
(3) When combination traffic signal/street light poles are specified to be supplied without the mast arms, The pole manufacturer shall be required to provide a steel or aluminum plate attachment to the mast arm plate with hardware to cover the cable entry hole.

Chart B Legend:

PRAD = Presence Radar Detector
ARAD = Advance Radar Detector
EVP = Emergency Vehicle Pre-emption Detector

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TRAFFIC SIGNAL
BILL OF MATERIALS

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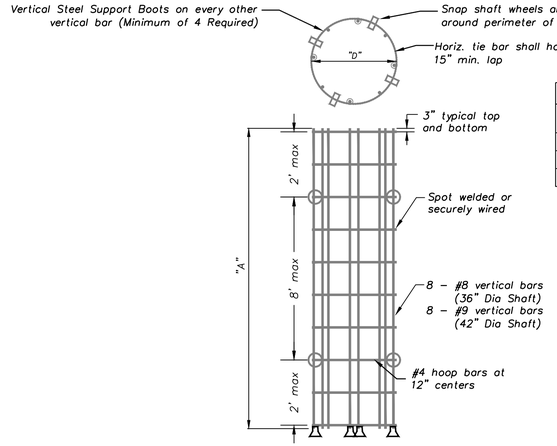
Pole Foundation Notes:

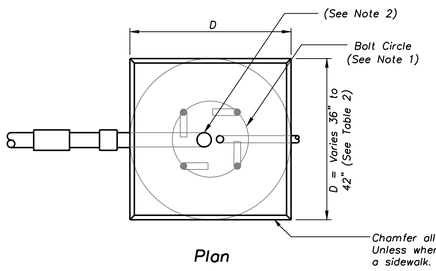
1. Final pole, anchor bolt size, anchor bolt projection, and bolt circle shall be as per manufacturer's recommended practices (See Table 1). Rotate anchor bolt to maintain minimum clearance from edge of hole. All anchor bolt threads and nut surfaces shall be lubricated prior to tightening with stick wax or approved alternative.
2. All conduits and anchor bolts for all the new pole bases shall be rigidly installed before concrete is placed. Anchor bolts shall be spaced by means of a factory certified template or drawing, the center of which shall coincide with the center of the base.
3. All concrete used in this work shall meet the requirements of the Overland Park Municipal Code and shall be KCMMB5K concrete (f'_c = 5,000 psi) with a 7" slump. Poles shall not be erected until concrete has reached 3,500 psi.
4. Maintain 3" minimum clearance from reinforcing steel to edge of hole or form.
5. The drilled shaft foundation details presented herein are intended for installation into soil foundations. A special foundation investigation and design shall be conducted for residual soils with an "N" value of 4 or less or characterized as very soft to soft clay.
6. These standard designs assume a minimum compactive effort of 90% of Standard or Modified Proctor for cohesive fill material.
7. In the event excavation for the drilled shaft encounters sound limestone short of the required length shown in the table of dimensions, the shaft may be shortened to a minimum length of 8 feet with a minimum inclusive rock socket of 3 feet.
8. Shale foundation material will be considered as a stiff clay. Drilled shafts in shale must satisfy the dimensions on Table 2.
9. All concrete pole bases shall be consolidated by an internal type vibrator.
10. Final 6" of concrete foundation (pole cap) shall be formed square. The cap shall be formed and poured after the mast arm is erected and the pole plumb. Pole cap for pedestal pole shall be required at inspector discretion. Final top elevation shall match ADA sidewalk ramp.
11. PVC conduit elbows in concrete foundations shall be connected to HDPE conduit with PVC pipe nipple and approved PVC to HDPE couplings. All PVC pipe nipples, elbows, and couplings shall be considered subsidiary to the traffic signal pole base.
12. Bare No. 6 solid copper ground conductor shall be connected from internal pole grounding nut with a ring terminal to the clamp on the ground rod. Connect 1c#10 AWG system ground wire to separate ground rod clamp.
13. All reinforcing steel shall be ASTM A615 Grade 60 for KCMMB5K concrete.
14. All concrete surfaces should be brushed and sealed with curing compound.
15. Contractor shall use drill shaft wheels and rebar support boots to maintain 3" clearance to shaft wall and shaft bottom, respectively, for all mast arm foundations.
16. Contractor to provide ground rod(s) as required for maximum 25 ohms resistance to ground. Contractor shall be required to test with the inspector present.
17. Contractor shall be required to place concrete foundations within 48 hours after completion of drilling. Contractor shall maintain the integrity of the hole until concrete is placed.



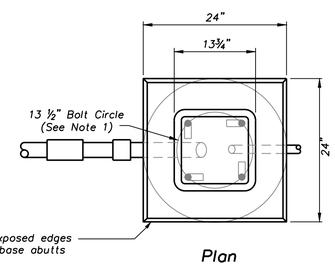
Rebar Cage Detail

Horizontal Rebar			
Pole Fnd. Dia.	Pole Fnd Depth	Rebar Cir. "D"	Spacing
24"	30"	18"	12" MAX.
36"	11'–13'	30"	12" MAX.
42"	15'–21'	36"	12" MAX.

Vertical Rebar		
Pole Fnd. Depth	Length "A"	No. of Spacers
30"	2'–3"	4
11'–0"	10'–6"	8
12'–0"	11'–6"	8
13'–0"	12'–6"	12
15'–0"	14'–6"	12
17'–0"	16'–6"	12
21'–0"	20'–6"	16

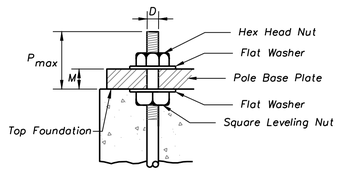


Plan

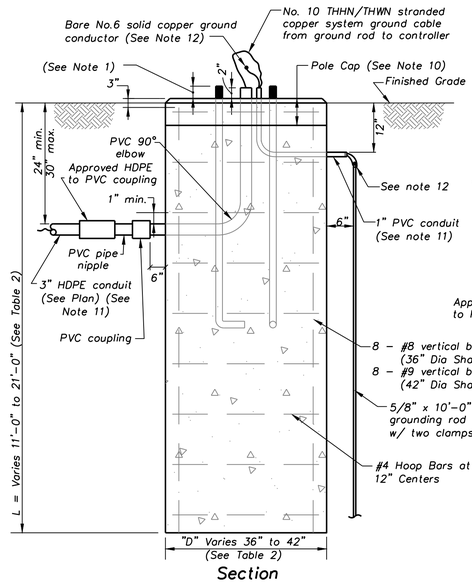


Plan

Table 1 – Anchor Bolt Projection Dimensions		
Bolt Diameter	Plate Thickness "M"	Maximum Bolt Projection "P"
0.75"	0.75"	2 ¼" ± ¼"
1.50"	2.00"	6 ¼" ± ¼"
1.75"	2.00"	6 ¾" ± ¼"
1.75"	2.25"	7" ± ¼"
2.00"	2.25"	7 ½" ± ¼"



Anchor Bolt Detail



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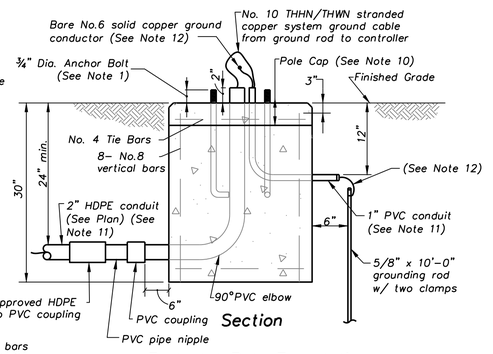

Section

Pedestal Pole Foundation

Traffic Signal Pole Foundation

Table 2 Signal Pole Foundations Drilled Shaft Dimensions		
Length of Mast Arm	"D" Diameter	"L" Length
< 22'	36"	11'
22' to 28'	36"	12'
30' to 36'	36"	13'
38' to 50'	42"	15'
52' to 58'	42"	17'
60' to 70'	42"	21'
> 70'	Requires Special Design	

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TRAFFIC SIGNAL
POLE FOUNDATION DETAILS

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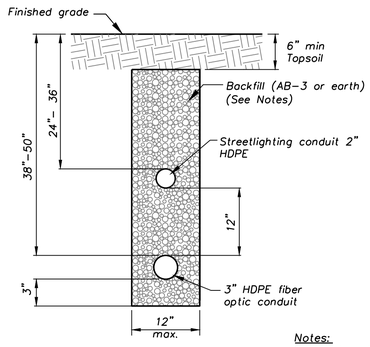
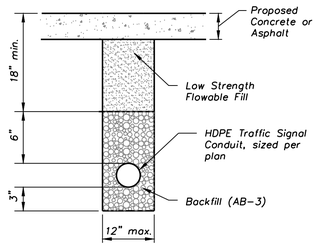


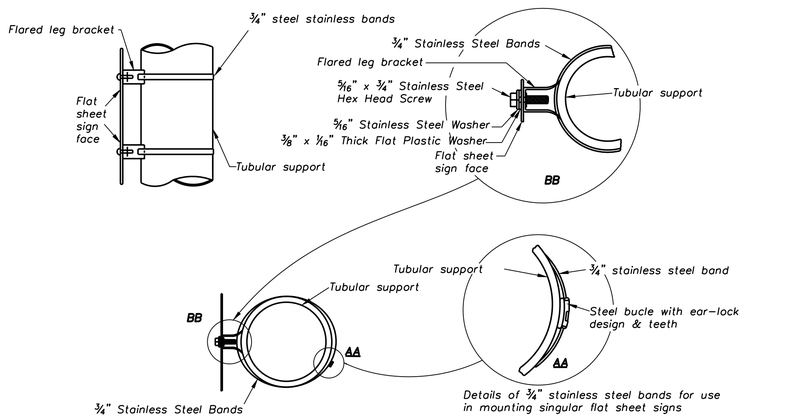
Trench in Unpaved Areas



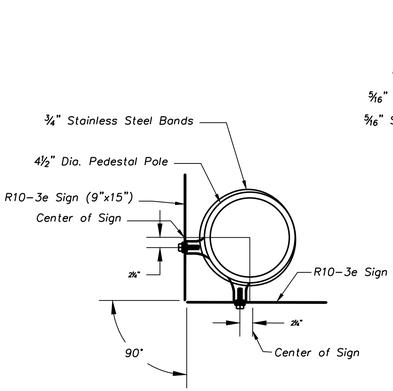
Trench w/ Single Conduit

Notes:
1. All trenches for conduit under proposed paved surfaces (drives, streets, and sidewalks) shall be backfilled with AB-3 to 6" above the conduit and then low strength flowable fill to below the proposed paved surface or existing terrain, unless otherwise directed.
2. Backfill in unpaved areas shall be free of rubble and rock.
3. If multiple conduits are installed, they shall have a minimum of 12" horizontal or vertical clearance between them.
4. Details are typical and information for the separation of multiple conduits are applicable whether trenching in unpaved or paved areas.

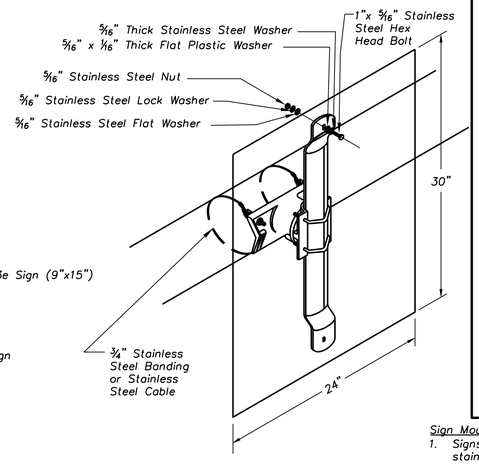
Trenching Details



Side of Pole Sign Mounting Detail



Pedestal Pole Sign Mounting Detail

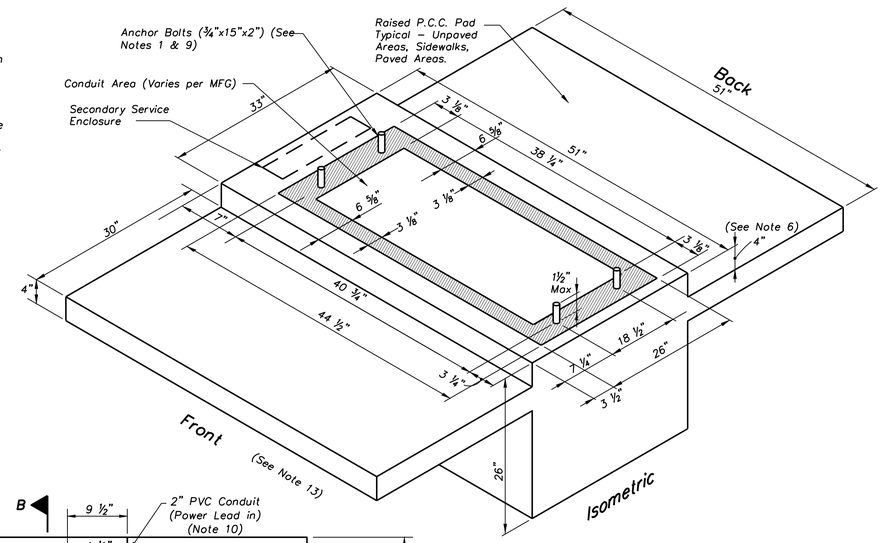


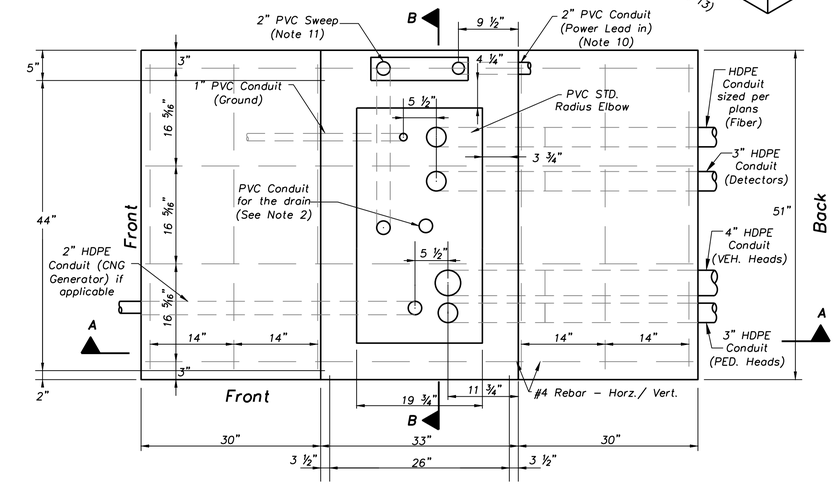
Mast Arm Sign Mounting Bracket Detail

Sign Mounting Notes:
1. Signs on side of pole shall be attached with two (2) brackets and stainless steel bands.
2. Holes in sign for attachment to the mounting brackets shall be offset a minimum of 2" from the edge of sign.
3. Holes in sign shall be located such that the sign is plumb and level.
4. This detail is not intended for r10 series signs attached to signal mast arms.
5. When only one R10-3e sign is used on the pedestal pole, mount with the bolts centered on the sign.

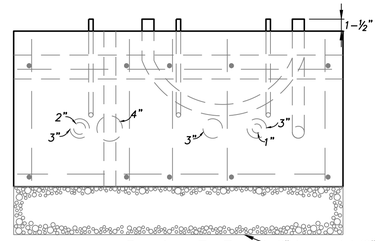
Sign Mounting Details

Signal Controller Pad Notes:
1. All conduits and anchor bolts shall be rigidly installed before concrete is placed.
2. Top of pad to be sloped to drain toward PVC drain. Drain can be relocated as necessary to match conditions.
3. A 1-c#10 THHN/THWN stranded copper system ground cable shall be installed through one of the HDPE conduits between the controller and closet service box (See controller cabinet grounding detail).
4. Duct seal shall be applied at all conduit entrances after cable installation.
5. A watertight seal shall be applied along the inside and outside edges of the cabinet where it abuts to the concrete pad and around the secondary service enclosure where it abutts to the cabinet.
6. 4" is nominal dimension. 2"x4" forms are acceptable except where otherwise noted or directed (exposed concrete surfaces shall be formed by other means for an acceptable finished appearance).
7. HDPE conduit (orange in color) with a #10 AWG stranded copper locating cable and polypropylene pull rope sized per plan.
8. PVC conduit elbows in concrete foundations shall be connected to HDPE conduit with PVC pipe nipple and approved PVC to HDPE couplings. All PVC pipe nipples, elbows and couplings shall be considered subsidiary to the traffic signal controller pad.
9. Contractor to install concrete anchors and bolts per manufacturer's recommendation (bolt spacing varies per manufacture) to anchor secondary service enclosure and signal cabinet to concrete foundation. Also anchor to signal cabinet with sheet metal screws.
10. Contractor shall install a 36" radius, large sweep 90° elbow at each end of power lead-in conduit. Material shall be Schedule 40 PVC (gray) or SDR 13.5 HDPE (black with red stripe).
11. Contractor shall install 180° PVC conduit sweeps from secondary service pedestal sweeping up into the controller cabinet.
12. Contractor to provide ground rod(s) as required for maximum of 25 ohms resistance to ground. Contractor shall be required to test with the inspector present.
13. Cabinet shall be oriented such that when the technician is facing the front of the cabinet, he can look over the top and see the intersection ahead of them.
14. All reinforcing steel shall be ASTM A615 GR40.
15. All concrete surfaces shall be brushed and sealed with curing compound.
16. All concrete used in this work shall meet the requirements of the City of Overland Park Municipal Code and shall be KCMMB4K concrete (f'c=4,000 psi) with a 4" slump.

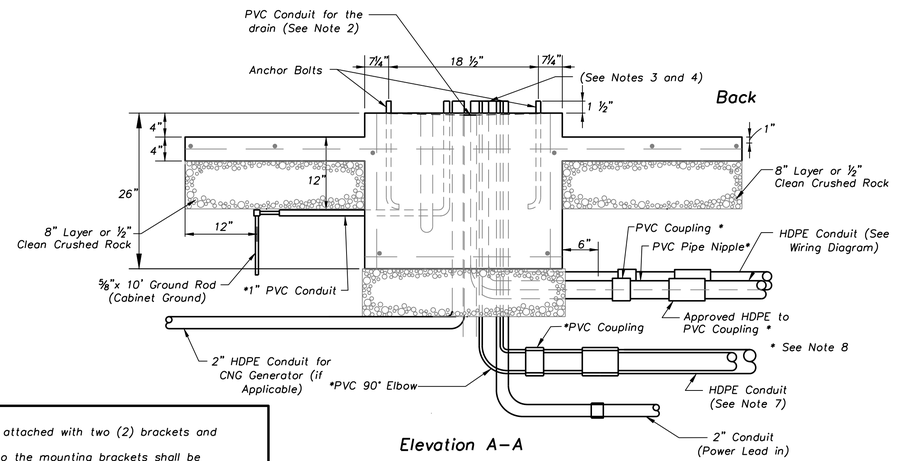




Plan View

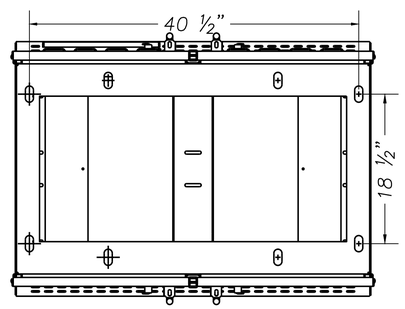


Section B-B



Elevation A-A

Controller Cabinet Pad Details (Double Wide)



Signal Controller Foundation Bolt Pattern

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TRAFFIC SIGNAL
CONTROLLER FOUNDATION & MISC. DETAILS

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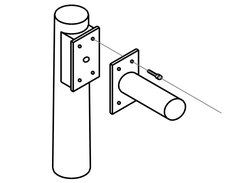
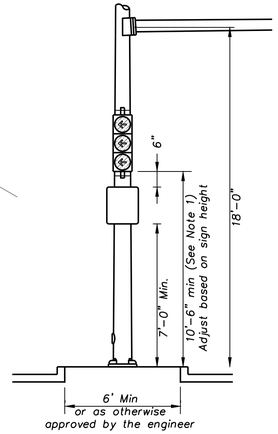
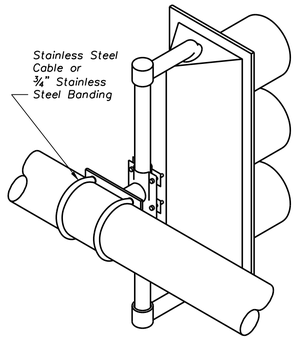


Mast Arm Attachment

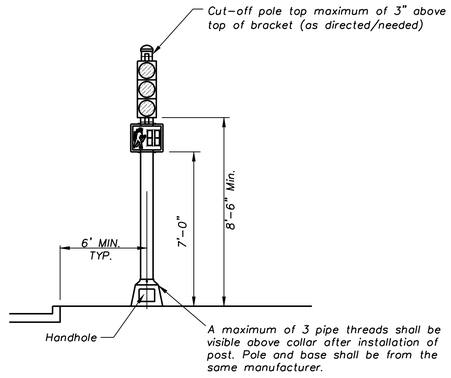


Median Mounted Steel or Steel Combination Streetlighting & Signal Pole

Note:
1. Mount vehicular signal head at 8'-6" if no traffic sign specified.

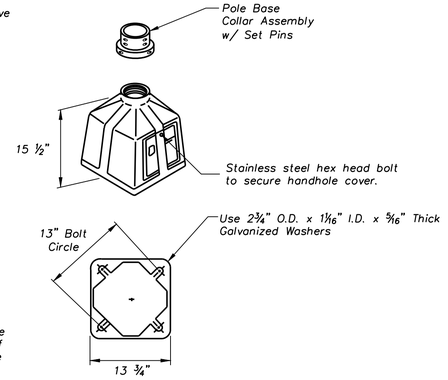


Mast Arm Signal Mounting Bracket

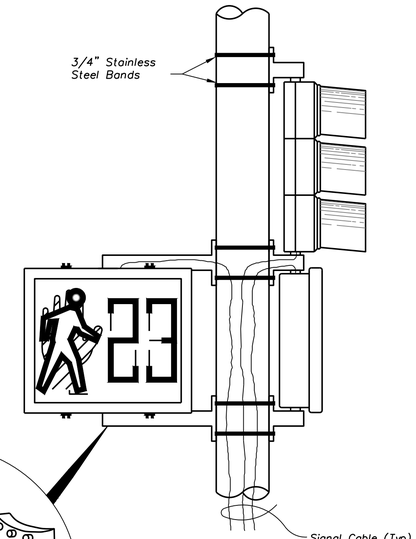


Aluminum Signal Pedestal Pole

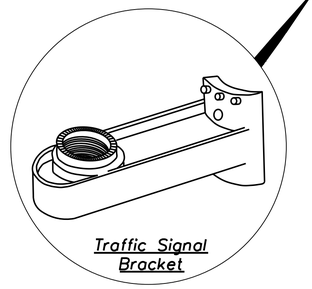
Notes:
1. Orient handhole toward the sidewalk opposite the direction of opposing traffic.



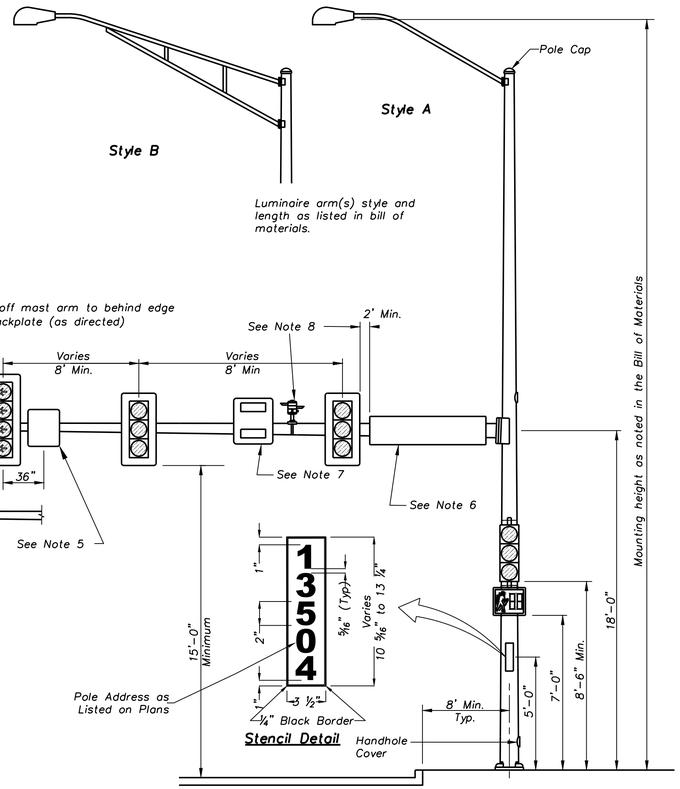
Pedestal Pole Base Detail



Pole Band and Bracket Mounting Detail



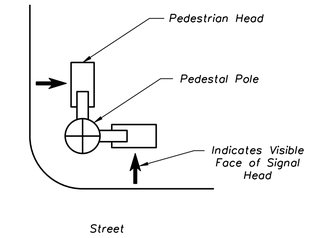
Traffic Signal Bracket



Steel Combination Streetlighting & Signal Pole

Notes:

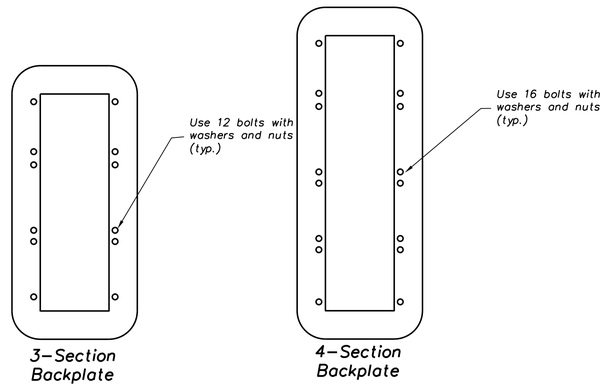
1. Detail applies when there are only pedestrian signal heads.
2. When vehicular signal heads are mounted on the same pole as pedestrian signal heads, they shall both be mounted in the same vertical plane with the pedestrian signal head mounted below the vehicle signal head with a shared bracket.



Pedestrian Signal Head Orientation Detail

Notes:

1. Handhole cover, and mast arm & pole caps shall be shipped with the poles and be installed prior to final acceptance of the traffic signal system.
2. Install corresponding colors of signal heads at the same elevation – adjust for mast arm rake.
3. Each vehicular signal head (mast arm and/or pole mounted) shall be covered with a black or orange (unless otherwise noted) signal head cover during construction until the system is made operational.
4. The side of pole signal head mounting heights shown are to the bottom of the housing and not to the brackets.
5. All R10-11b, R10-17a, R10-FYA, or R3-4 signs to be mounted on the traffic signal poles or mast arms shall be provided and installed by the contractor. All signs shall conform to the Manual on Uniform Traffic Control Devices, latest edition for color, size, letter and legend. (See sign details and specifications)
6. Contractor to provide and install overhead street name sign. (See mounting detail and overhead street name sign detail.)
7. Vehicle advance radar detection unit shall be mounted as close to the center of the through traffic lane(s) per manufacturer's recommendation.
8. Emergency Vehicle Pre-emption (EVP) detector shall be mounted near the center of the through traffic lane(s) to the right or left of the radar detection unit.
9. All hardware not specifically shown in the details shall be in accordance with manufacturer's recommendation. Any deviations shall be submitted for approval.
10. Minor adjustments in the location of traffic signal poles or signal controller cabinet should be made in the field during construction in order to maintain a minimum 4'-0" clearance from the centerline of any fire hydrant to the face of pole or cabinet.
11. All traffic signal heads shall have two ¼"diameter drain holes drilled in the bottom housing.
12. Address Stencil shall have 2" high black EC film letters and numerals applied to a one piece Type XI retro-reflective sheeting with a black EC film border by the contractor. Apply on 'street side' of pole facing the referenced street address.



Traffic Signal Backplates

CITY OF OVERLAND PARK
DEPARTMENT OF PUBLIC WORKS

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1	09/01/2021	2021 Standard Details	LJK
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TRAFFIC SIGNAL POLE AND
SIGNAL HEAD MOUNTING DETAILS

SHEET NO. 10 | TOTAL SHEETS 53

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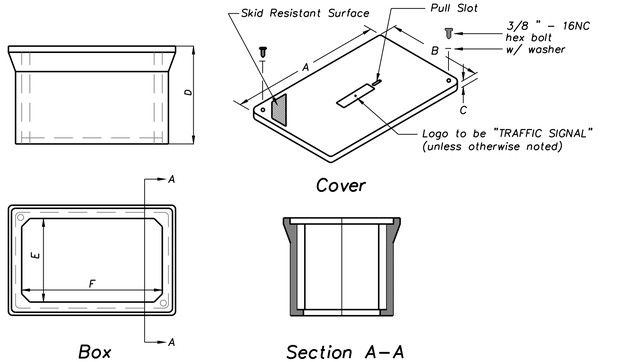
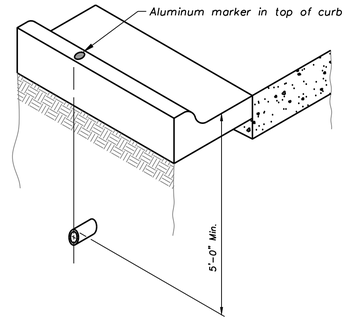


Type	Approximate Dimension (Inches)					
	A	B	C	D	E	F
1 – Junction	12 7/8"	12 7/8"	3/4"	12 3/4"	9 3/4"–10 1/2"	9 3/4"–10 1/2"
2 – Junction	18"–18 1/2"	11 1/4"–11 1/2"	2"	12"	9 1/2"–10 1/4"	16 1/2"–17 1/4"
1 – Service	35 5/8"	24"	3"	24"	22 1/4"	33 7/8"
2 – Service (Note 2)	47 5/8"	30 1/8"	3"	24"	28 1/8"	45 5/8"

Fiberglass Reinforced Polymer Concrete Junction & Service Box Details

Box Notes:

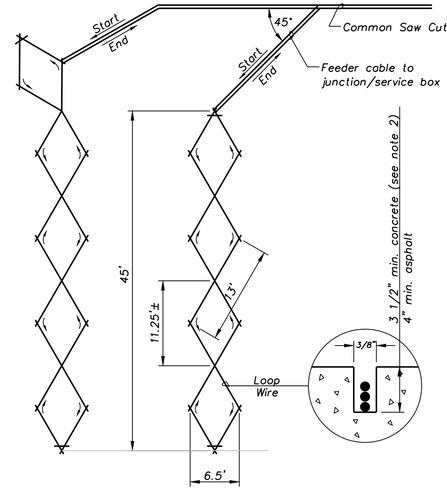
1. Attach 1c #10 THHN/THWN stranded copper system ground wire to ⅝"x 8'–0" ground rod in service box. Multiple #10 ground cables introduced at signal poles shall be terminated at ground rod with an additional clamp.
2. The Type 2 Service Box shall have a two–piece overlapping cover.
3. Cover label shall be applied with epoxy.



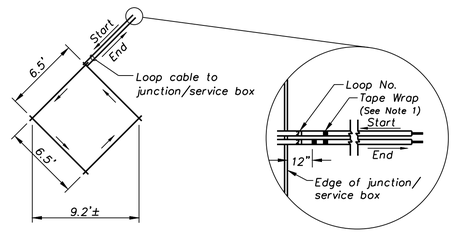
Conduit Marking Detail Notes

1. Conduit under all roadway surfaces shall be placed a minimun of 5'–0" below the top of pavement and shall extend to signal appurtenances as indicated in the plans. Refer to the City of Overland Park Horizontal Directional Drilling Guidelines Handbook, latest edition for further requirements for conduit installation under roadway surfaces. The conduit shall be installed to drain, and all ends shall be capped if not being used. An aluminum marker shall be placed in the top of the curb, or outside edge of shoulder, directly over the conduit with epoxy. Markers shall be embedded such that the top is flush. Aluminum markers will be furnished by the City of Overland Park.
2. The contractor shall notify the City of Overland Park, Department of Public Works, Traffic Services Division at 895–6000 for inspection of the conduit installation by the City Inspector. At least 24 hours notice shall be provided. The conduit shall not be covered so as to ensure proper depth, correct conduit material, and proper conduit end treatment as described above.

Conduit Marking Detail



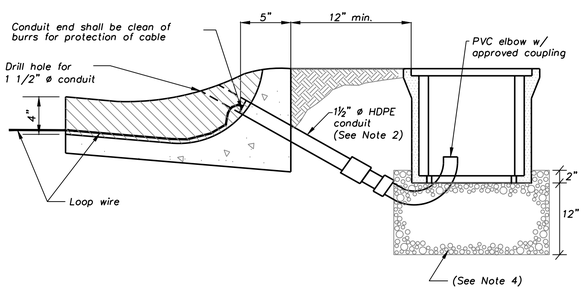
Multi Diamond Loops



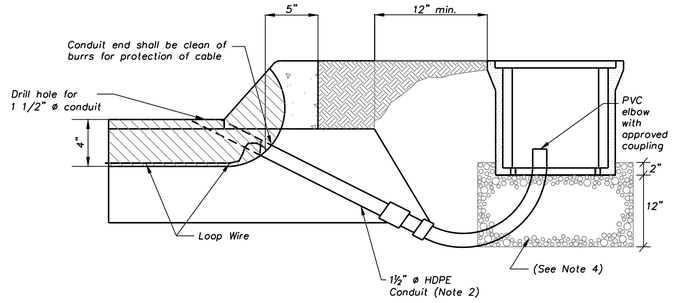
1 – Diamond Loop

Notes:

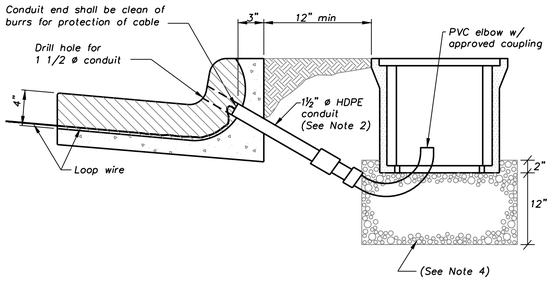
1. Diamond presence and advance loops to be one continuous wire placed in three turns. All loops to be wound in same direction, with start and end clearly marked at junction box / service box. Each loop shall be identified with the loop number as shown on the plans, the start identified with one wrap of tape and the end identified with two wraps of tape. Three feet of excess cable shall be coiled in the box.
2. Slot in pavement for loops to be cut 3/8" wide and 4" deep minimum in asphalt or 3 1/2" deep minimum in concrete (unless otherwise directed by the engineer in charge of construction). Fill slots with an approved asphalt sealer (asphalt pavement), or an approved elastic epoxy sealant (concrete pavement) to within 1/8" of pavement surface.
3. Other than the splice from the 1c#14 loop cable to the shielded detector home–run cable, wire shall be of continuous run with no splices. All connections to be watertight.
4. All leads for individual loops to be kept in common saw cut and loop wire between the loop and the feeder cable connection shall be twisted 3 turns per foot.
5. All loops shall be wet cut with equipment approved by the engineer into the asphalt base course prior to the final lift of asphalt surface course, if applicable
6. Sealants shall be installed by injector wand, cartridge guns or air pump method. Hot pour sealants are allowed only if applied neatly without overfill, drips or runs.
7. Loop sealant in concrete pavements shall be gray in color.
8. All loops shall be connected in series.
9. Five diamond loops shall be used for left turn lanes with permissive or protected/permissive phasing. Four diamond loops shall be used for through lanes or left turn lanes with protected only left turns.
10. See Field Input Terminal Assembly for wiring diagrams and loop assignments.



Junction Box Detail (Type 'A' Curb)



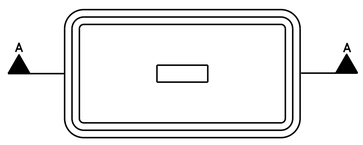
Junction Box Detail (Type 'D' Curb)



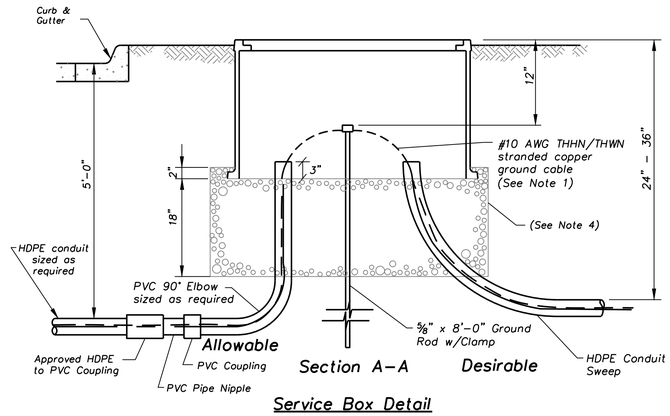
Junction Box Detail (Type 'B' or 'E' Curb)

Notes:

1. Saw cuts and conduit entrance to be sealed with a pliable non–hardening duct sealant.
2. PVC conduit may be used continuous from curb to junction box if distance from back of curb to center of junction box is less than 10 feet.
3. Crushed rock shall be extended toward curb to underdrain if present.
4. A layer of ½" clean, crushed rock, as approved by the engineer, shall be constructed below all boxes for drainage purposes. See details for thickness.



Service Box Detail (Plan)



Service Box Detail

CITY OF OVERLAND PARK
DEPARTMENT OF PUBLIC WORKS

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1	09/01/2021	2021 Standard Details	LJK
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TRAFFIC SIGNAL
LOOP DETECTORS AND BOX DETAILS

SHEET NO. 11 | TOTAL SHEETS 53

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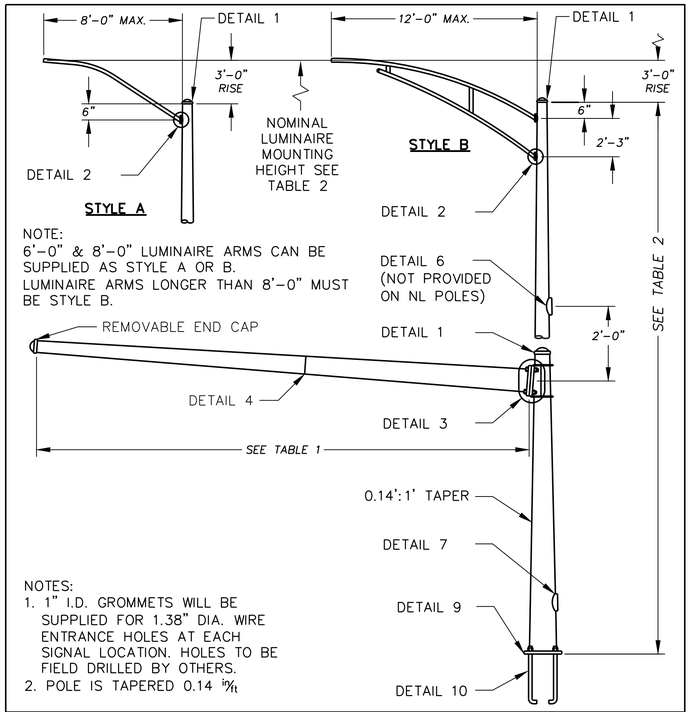


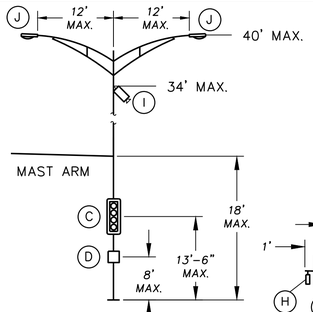
OP POLE SERIES

DEVICE	DESCRIPTION	PROJ. AREA (FT^2)	WEIGHT (LBS)
A	12"–4 SEC. SIGNAL HEAD W/ BACK PLATES	12.00	54
B	12"–3 SEC. SIGNAL HEAD W/ BACK PLATES	10.00	42
C	12"–4 SEC. SIGNAL HEAD W/ NO BACK PLATES	6.00	40
D	16"x18"–1 SEC. PEDESTRIAN SIGNAL	3.00	20
E	36"x36" FLATSHEET ALUMINUM SIGN(MAX)	9.00	20
F	24"x96" ILLUMINATED STREET NAME SIGN(MAX)	16.00	120
G	ADVANCE RADAR DETECTOR	1.00	15
H	PRESENCE RADAR DETECTOR	1.00	15
I	CCTV CAMERA	1.00	15
J	LUMINAIRE	1.00	30
K	EMERGENCY VEHICLE PRE–EMPTION DETECTOR	0.50	5
L	36"x36" FLATSHEET ALUMINUM SIGN(MAX)	9.00	20

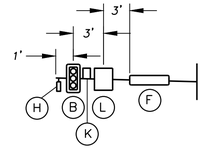
THESE DIAGRAMS ARE FOR STRUCTURAL CALCULATIONS ONLY AND SHOULD NOT BE USED AS DETAILS FOR CONTRUCTION PURPOSES

The mast arm traffic structures shown on this drawing have been designed in accordance with the loading and the allowable stress requirements of the 2013 AASHTO "Standards Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," Sixth Edition, LTS–6. The wind loads were calculated from a basic wind velocity of 90 MPH with a recurrence interval of 25 years, and a fatigue category of 2. The fatigue loads were calculated on the requirements of Section 11 of the Code, and the following design conditions.

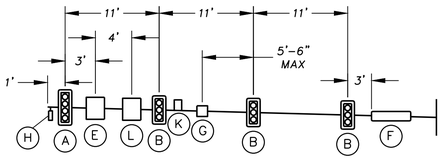
- –Structures are designed to resist natural wind gusts based on the yearly mean wind velocity of 11.2 MPH.
- –Structures are not designed to resist galloping–induced cyclic loads.
- –Truck–induced gust loads are excluded per the requirements of the code.



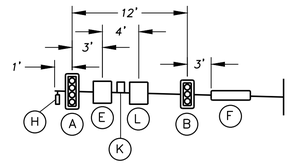
TYPICAL POST LOADING



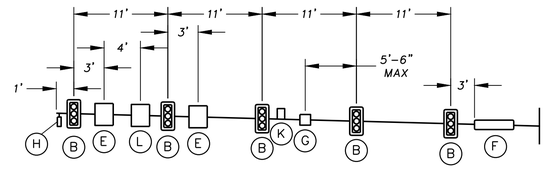
8'THRU 20' SIGNAL ARMS



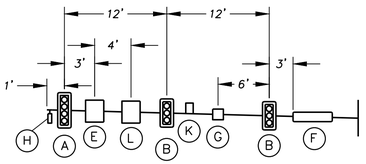
38'THRU 50' SIGNAL ARMS



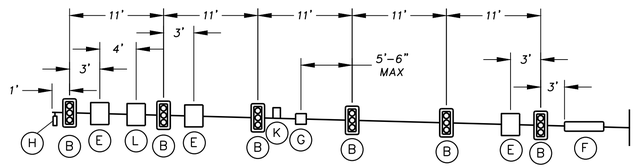
22'THRU 28' SIGNAL ARMS



52'THRU 58' SIGNAL ARMS



30'THRU 36' SIGNAL ARMS



60'THRU 70' SIGNAL ARMS

MAXIMUM LOADING INFORMATION

TABLE 1: POLE AND SIGNAL ARM DATA

DESIGNATION KEY							POLE DATA			BASE PLATE DATA					ANCHOR BOLT DATA					SIGNAL ARM DATA				SIGNAL ARM ATTACHMENT DATA				
POLE SERIES	SIGNAL ARM SPAN (FT)	LUMINAIRE ARM TYPE	ARM 1 STYLE	ARM 1 SPAN (FT)	ARM 2 STYLE	ARM 2 SPAN (FT)	BASE DIA. (IN)	LENGTH	WALL GAUGE OR THK.	SQUARE "S" (IN)	BOLT CIRCLE "F" (IN)	THK. "M" (IN)	CENTER HOLE "P" (IN)	BOLT HOLE "Z" (IN)	DIA. "K" (IN)	LENGTH "J" (IN)	HOOK "H" (IN)	THREAD LENGTH "U" (IN)	BOLT QTY.	FIXED END DIA (IN)	FREE END DIA (IN)	GAUGE OF THK (IN)	SIGNAL ARM SPAN (FT)	SQUARE "A" (IN)	THK. "D" (IN)	BOLT SIZE "N" (IN)	BOLT PATTERN "B" (IN)	CENTER HOLE "C" (IN)
OP	20	NL,LR,MR,HR	A OR B	6–12	A OR B	6–12	12.00	SEE TABLE 2	7	17.0000	16.00	2.00	10.50	1.75	1.50	54.00	6.00	8.00	4	8.00	5.20	7	20.00	17.25	2.00	1.25 X 6.25	14.00	7.00
OP	22	NL,LR,MR,HR	A OR B	6–12	A OR B	6–12	12.50		5	17.50	16.50	2.00	11.00	1.75	1.50	54.00	6.00	8.00	4	9.00	5.92	7	22.00	17.75	2.00	1.25 X 6.25	14.50	7.64
	24																			9.00	5.64	7	24.00	17.75	2.00	1.25 X 6.25	14.50	7.64
	26																			9.00	5.36	7	26.00	17.75	2.00	1.25 X 6.25	14.50	7.50
	28																			9.00	5.08	7	28.00	17.75	2.00	1.25 X 6.25	14.50	7.50
OP	30	NL,LR,MR,HR	A OR B	6–12	A OR B	6–12	13.00		3	18.50	17.50	2.00	11.50	2.00	1.75	84.00	6.00	8.00	4	10.00	5.80	7	30.00	18.25	2.00	1.25 X 6.25	15.00	8.50
	32																			10.50	6.02	7	32.00	18.25	2.00	1.25 X 6.25	15.00	8.75
	34																			11.00	6.24	7	34.00	18.25	2.00	1.25 X 6.25	15.00	9.00
	36																			11.00	5.96	7	36.00	18.25	2.00	1.25 X 6.25	15.00	9.00
OP	38	NL,LR,MR,HR	A OR B	6–12	A OR B	6–12	16.00		0.250	22.00	21.00	2.25	14.00	2.00	1.75	84.00	6.00	8.00	4	13.00	7.68	3	38.00	21.25	2.00	1.25 X 6.25	18.00	11.50
	40																			13.00	7.76	DET. 4	40.00	21.25	2.00	1.25 X 6.25	18.00	10.50
	42																			13.00	7.48	DET. 4	42.00	21.25	2.00	1.25 X 6.25	18.00	10.50
	44																			13.00	7.20	DET. 4	44.00	21.25	2.00	1.25 X 6.25	18.00	10.50
	46																			14.00	7.92	DET. 4	46.00	21.25	2.00	1.25 X 6.25	18.00	11.25
	48																			14.00	7.64	DET. 4	48.00	21.25	2.00	1.25 X 6.25	18.00	11.25
	50																			14.50	7.86	DET. 4	50.00	21.25	2.00	1.25 X 6.25	18.00	11.75
OP	52	NL,LR,MR,HR	A OR B	6–12	A OR B	6–12	17.00		0.250	23.00	22.00	2.25	14.75	2.25	2.00	84.00	6.00	10.00	4	14.00	7.08	DET. 4	52.00	23.25	2.50	1.50 X 7.50	19.50	11.75
	54																			15.00	7.80	DET. 4	54.00	23.25	2.50	1.50 X 7.50	19.50	12.50
	56																			15.00	7.52	DET. 4	56.00	23.25	2.50	1.50 X 7.50	19.50	12.50
	58																			15.50	7.74	DET. 4	58.00	23.25	2.50	1.50 X 7.50	19.50	13.00
OP	60	NL,LR,MR,HR	A OR B	6–12	A OR B	6–12	20.00		0.250	28.00	27.00	2.25	14.25	2.25	2.00	84.00	6.00	10.00	4	16.00	7.98	DET. 4	60.00	26.75	2.50	1.50 X 7.50	23.00	8.75
	62																			16.50	8.20	DET. 4	62.00	26.75	2.50	1.50 X 7.50	23.00	9.25
	64																			17.00	8.42	DET. 4	64.00	26.75	2.50	1.50 X 7.50	23.00	9.50
	66																			17.50	8.64	DET. 4	66.00	26.75	2.50	1.50 X 7.50	23.00	9.75
	68																			18.50	9.36	DET. 4	68.00	26.75	2.50	1.50 X 7.50	23.00	10.50
	70																			18.50	9.08	DET. 4	70.00	26.75	2.50	1.50 X 7.50	23.00	10.50

TABLE 2: ELEVATIONS

ELEVATIONS	TYPE			
	NO LUM (NL)	LOW RISE (LR)	MEDIUM RISE (MR)	HIGH RISE (HR)
LUMINAIRE MOUNTING HEIGHT	N/A	30'–0"	35'–0"	40'–0"
POLE LENGTH	20'–6"	27'–0"	32'–0"	37'–0"

TABLE 3: MATERIAL DATA

COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)
ALL TAPERED SHAFTS	A595 GR.A OR A572	55
BASE PLATE	A572 GR. 50	50
SIMPLEX PLATE	A572 GR.50	50
LUM ARM ATTACHMENT	A27 GR. 65–35 OR A36	35
LUMINAIRE ARM – 2" SCHEDULE 40 PIPE	ASTM A501, A513, A618 OR A500 GR. B	36
LUMINAIRE CONN. BOLTS	SAE GR.5	––
ANCHOR BOLTS	F1554 GR.55	55
GALVANIZING–STRUCTURES	A123	––
GALVANIZING–HARDWARE	HOT DIP ZINC	––

CITY OF OVERLAND PARK
DEPARTMENT OF PUBLIC WORKS

NO.	DATE	REVISIONS	BY
1	09/01/2021	2021 Standard Details	LJK
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TRAFFIC SIGNAL STRUCTURE DETAILS

SHEET NO. 12 TOTAL SHEETS 53

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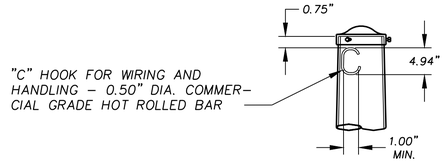
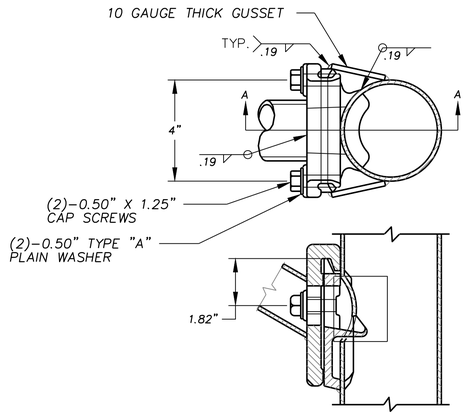
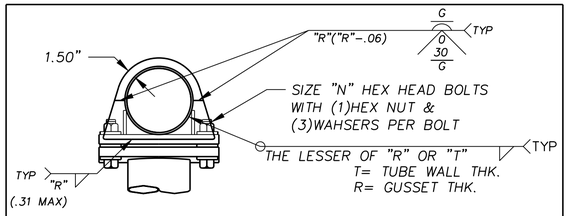
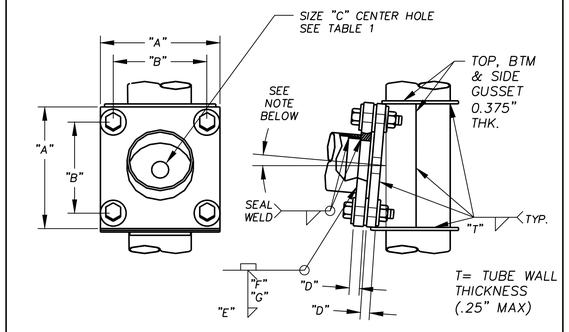


DETAIL 1 | POLE TOP



DETAIL 2 | LUMINAIRE ARM ATTACHMENT

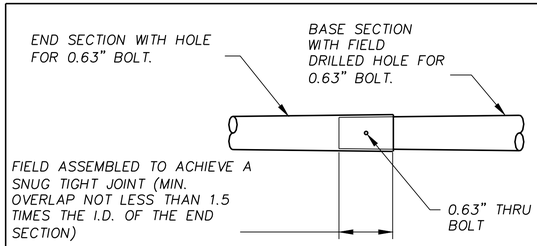




RISE NOTE:
RISE SHALL BE BUILT IN THE MOUNTING PLATE ATTACHED TO THE POLE. RISE IN MTG PLATES MAY VARY DEPENDED UPON POLE SIZE AND MAST ARM LOADING.

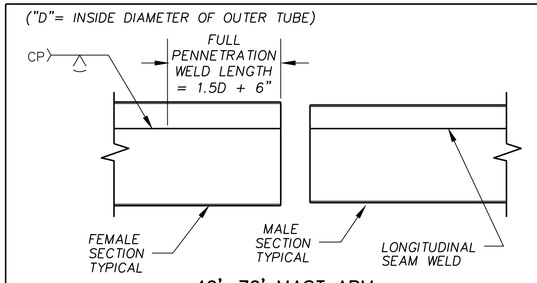
ARM SHAFT WALL THK.	ARM–TO–PLATE WELD "E"	BEVEL "F"X"G"
ALL	(ARM THK.+.25") X ARM THK.	.19" X 30°

DETAIL 3 | SIGNAL ARM ATTACHMENT



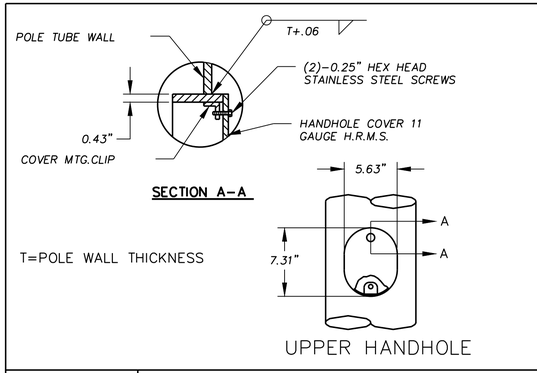
SPAN (FT)	BASE SECTION		END SECTION		
	LENGTH (FT)	GAUGE/THK. (IN)	BASE DIA. (IN)	LENGTH (FT)	GAUGE/THK. (IN)
40.00	19.29	0.313	11.00	23.15	7
42.00	19.29	0.313	11.00	25.15	7
44.00	19.29	0.313	11.00	27.15	7
46.00	26.43	0.313	11.00	22.01	7
48.00	26.43	0.313	11.00	24.01	7
50.00	15.97	0.313	13.00	36.72	7
52.00	19.42	0.375	12.00	35.15	7
54.00	19.54	0.375	13.00	37.15	7
56.00	19.54	0.375	13.00	39.15	7
58.00	23.11	0.375	13.00	37.58	7
60.00	19.75	0.375	14.00	43.07	0.188
62.00	19.83	0.375	14.50	45.05	0.188
64.00	19.92	0.375	15.00	47.02	0.188
66.00	27.00	0.375	14.50	41.88	0.188
68.00	27.08	0.375	15.50	43.93	0.188
70.00	27.08	0.375	15.50	45.93	0.188

DETAIL 4 | 40'–70'SIGNAL ARM SLIP JOINT



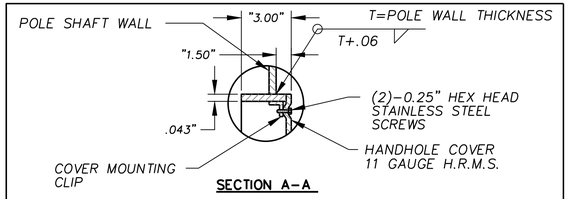
40'–70' MAST ARM WELD REINFORCEMENT

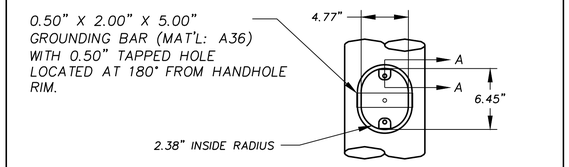
DETAIL 5 | MAST ARM WELD REINFORCEMENT



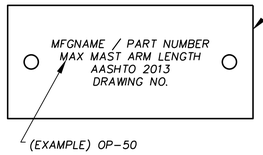
UPPER HANDHOLE

DETAIL 6 | UPPER HANDHOLE

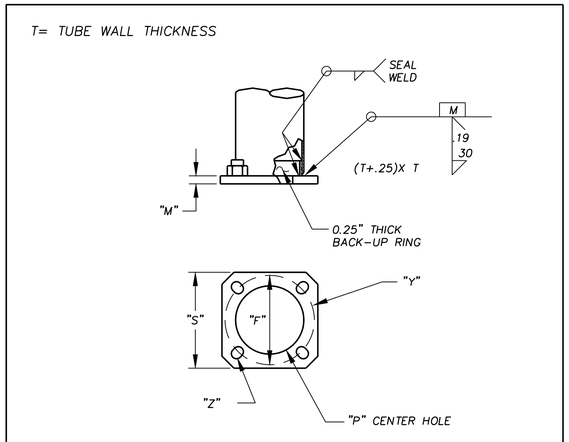




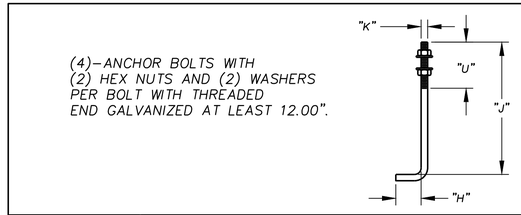
DETAIL 7 | LOWER HANDHOLE



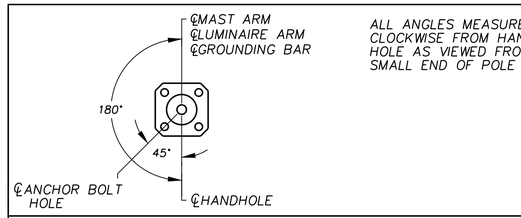
DETAIL 8 | I.D. TAG



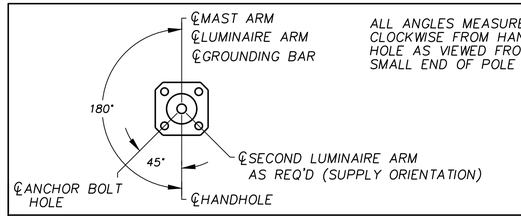
DETAIL 9 | POLE BASE



DETAIL 10 | ANCHOR BOLT



RADIAL INDEX – SINGLE LUMINAIRE



RADIAL INDEX – DOUBLE LUMINAIRE

TABLE 3: MATERIAL DATA

COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)
ALL TAPERED SHAFTS	A595 GR.A OR A572	55
BASE PLATE	A572 GR. 50	50
SIMPLEX PLATE	A572 GR.50	50
LUM ARM ATTACHMENT	A27 GR. 65–35 OR A36	35
LUMINAIRE ARM – 2" SCHEDULE 40 PIPE	ASTM A501, A513, A618 OR A500 GR. B	36
LUMINAIRE CONN. BOLTS	SAE GR.5	––
ANCHOR BOLTS	F1554 GR.55	55
ARM CONNECTING HARDWARE	A325	––
GALVANIZING–HARDWARE	HOT DIP ZINC	––

FINISH DATA

STANDARD FINISH	OPTIONAL FINISH
SYSTEM: GALVANIZED (GV)	SYSTEM: FINISH PAINT/GALVANIZED (FPGV)
BASE COAT: HOT–DIP GALV. TO ASTM A123	BASE COAT: HOT–DIP GALVANIZED TO ASTM A123
PRIME COAT: NONE	PRIME COAT: HIGH BUILD EPOXY POWDER
FINISH COAT: NONE	FINISH COAT: TGIC POLYESTER POWDER
COLOR: NONE	COLOR: TBD
SPEC: F–1	SPEC: TBD

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TRAFFIC SIGNAL STRUCTURE DETAILS

SHEET NO. 13 | TOTAL SHEETS 53

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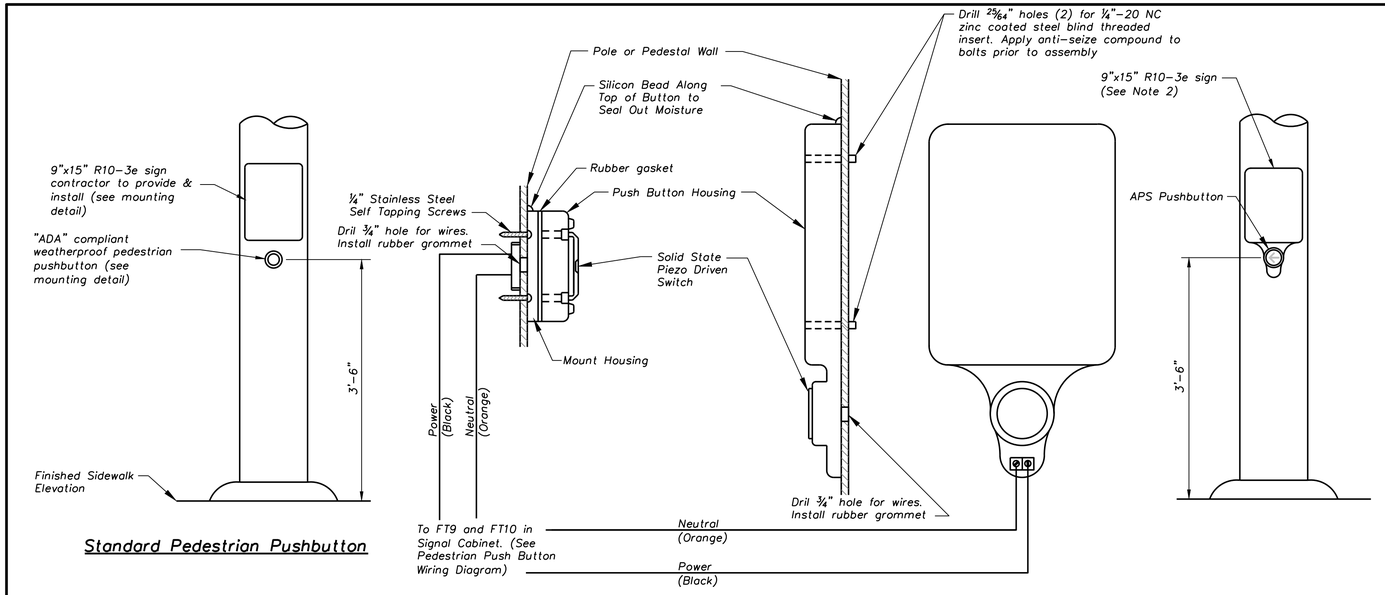
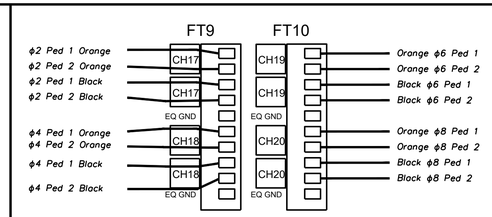


Standard Pedestrian Pushbutton

Pushbutton Mount Details

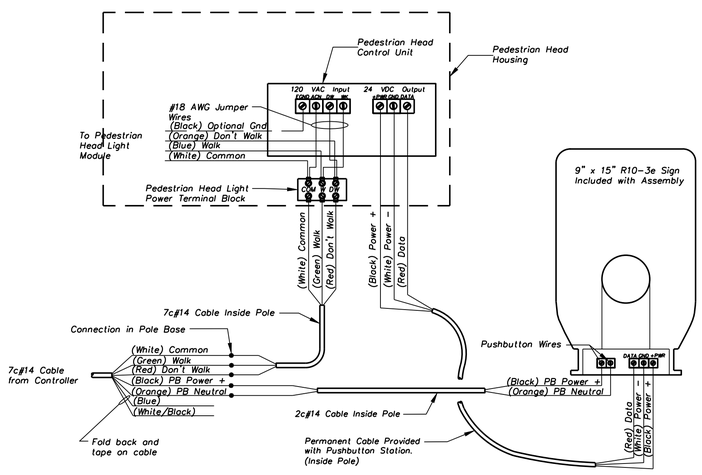
Audible Pedestrian Pushbutton

Notes:
1. Placement and orientation of the pushbutton station is critical. Mount the button so that the face is parallel with the associated crosswalk. Pedestrian pushbuttons to be located in the field by the engineer.
2. Maintain a 10" maximum reach from an accessible sidewalk to the pedestrian pushbutton. Mounting extension brackets are available if a 10" maximum reach from an accessible sidewalk cannot be achieved.
3. Include a 9"x15" R10-3e sign with each pedestrian pushbutton.

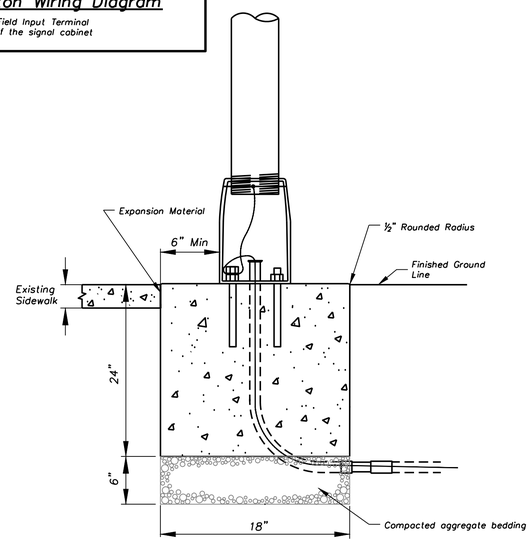


Pedestrian Pushbutton Wiring Diagram

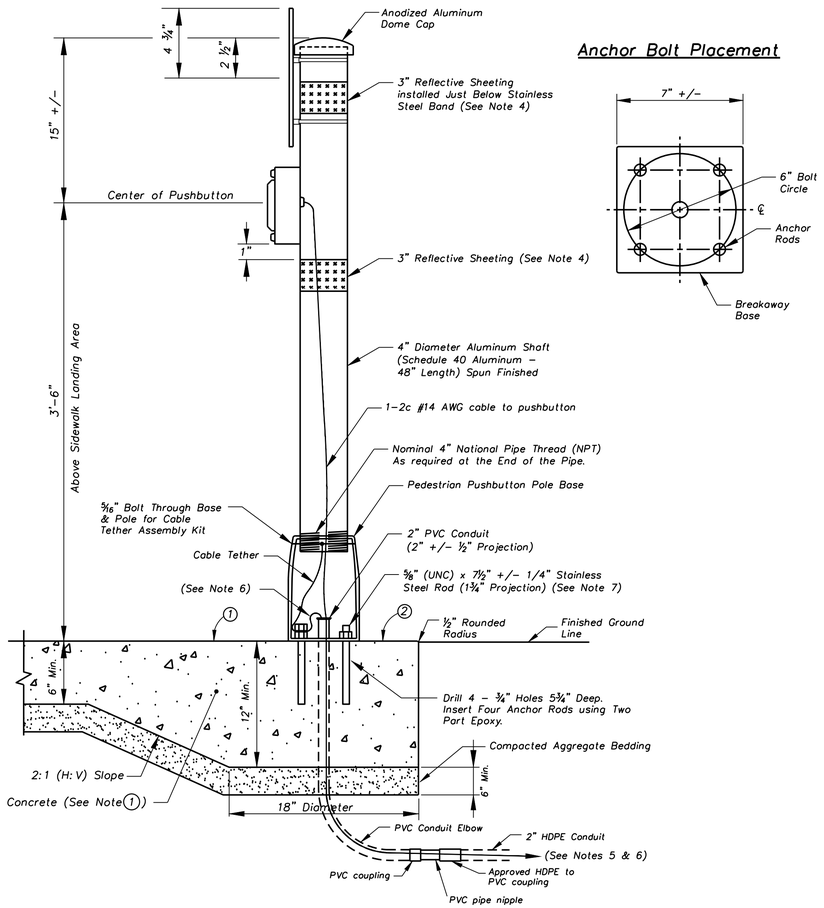
FT9 and FT10 on the Field Input Terminal Assembly in the back of the signal cabinet



Audible Pedestrian Pushbutton Wiring Diagram



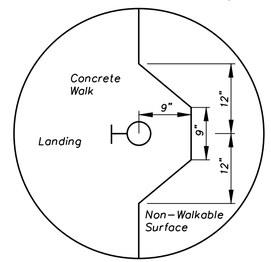
Stand Alone Installation



Anchor Bolt Placement

Monolithic Sidewalk Installation

Contractor must use this detail when the pushbutton is shown at the edge of walk. (See Note 2)



For Monolithic Installation Only

1. The push button station foundation is monolithic (poured at one time) with the sidewalk. Provide a 2:1 (H:V) slope grade where the 6" min sidewalk depth transitions to the 12" min foundation depth. Maintain the compacted aggregate bedding and thickness used for the sidewalk throughout the slope and foundation grading. Provide 2:1 (H:V) slope grading 360 degrees for the transition from the sidewalk to the foundation when the foundation is not located near the edge of sidewalk and is surrounded by concrete walk.
2. Ensure concrete control joints and edge of concrete walk are a minimum 9" from the center of the push button foundation.

Pushbutton Pole Notes:

1. Screw the pole shaft tightly into the base before mounting pushbutton unit to the shaft.
2. Orient access opening on the breakaway pedestal directly below the pushbutton.
3. Plumb the push button station with stainless steel washers.
4. Install reflective sheeting on pole shaft above and below pushbutton. Use white at intersection corners and yellow in center medians.
5. Install 1-2c #14 AWG cable from the pedestrian pushbutton through the nearest service box and then to the base of the signal pole containing the associated pedestrian signal head. Splice the 7c #14 AWG for the corresponding signal head to the 1-2c #14AWG cable from the pedestrian pushbutton in the base of the signal pole.
6. Install a 1c #10 AWG stranded ground cable from anchor rods to the ground rod at the nearest service box.
7. Use one 8 ½" stainless steel rod with a 2 ¾" bolt projection for the rod with the double nut and tether cable connection.

Pushbutton Pole Foundation Notes:

1. All concrete used in this work shall meet the requirements of the Overland Park Municipal Code and shall be KCMMB (f'_c =4,000 psi)
2. Install the concrete pad as level as possible to minimize leveling washers.
3. An 18" diameter x 6" deep fiber forming tube may be used for the lower half of he foundation with conditions do not allow for the hole to stand open.

Pedestrian Push Button Pole Details

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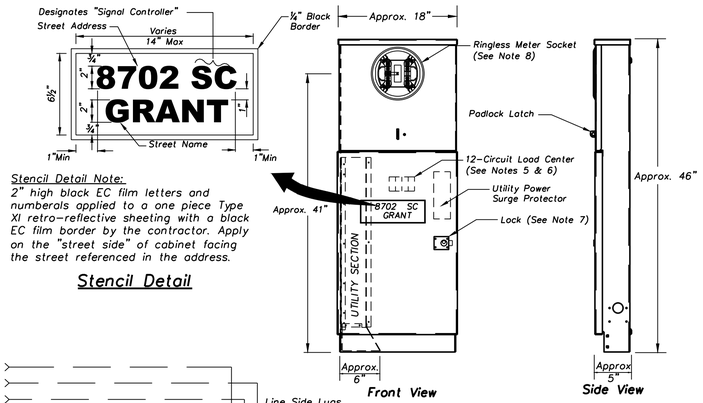
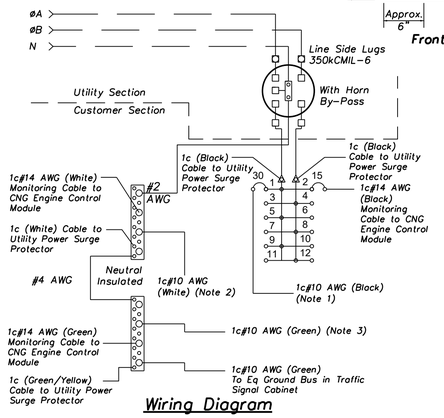
TRAFFIC SIGNAL
PEDESTRIAN PUSH BUTTON & POLE DETAILS

SHEET NO. 14 | TOTAL SHEETS 53



Stencil Detail Note:
2" high black EC film letters and numberals applied to a one piece Type XI retro-reflective sheeting with a black EC film border by the contractor. Apply on the "street side" of cabinet facing the street referenced in the address.

Stencil Detail

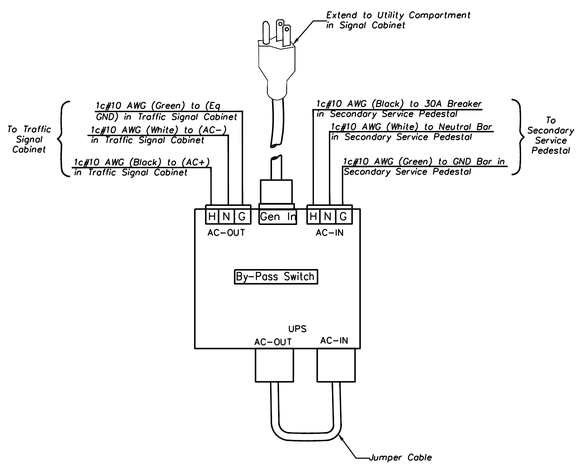


CIRCUIT DIRECTORY			
NO.	DESCRIPTION	AMP	POLE
	METERED		
1	Signals	30	1
2	Generator	15	1
3	Space		
4	Space		
5	Space		
6	Space		
7	Space		
8	Space		
9	Space		
10	Space		
11	Space		
12	Space		

Wiring Diagram

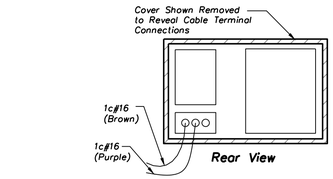
Secondary Service Enclosure Notes:
1. Connect to "AC-In H" on power by-pass switch if there is no battery/UPS or CNG generator backup power specified. Connect to "To Utility H" on UPS by-pass switch if there is battery/UPS or CNG generator backup power specified.
2. Connect to "AC-In N" on power by-pass switch if there is no battery/UPS or CNG generator backup power specified. Conned to "To Utility N" on UPS by-pass switch if there is battery/UPS or CNG generator backup power specified.
3. Connect to "AC-In G" on power by-pass switch if there is no battery/UPS or CNG generator backup power specified. Connect to "EQ GND" on Power Service Assembly in the Traffic Signal Cabinet if there is battery/UPS or CNG generator backup power specified.
4. 30 AMP circuit breaker for signals.
5. 15 AMP circuit breaker for CNG Generator, if applicable.
6. Mount utility power surge protection device to inside of secondary service pedestal.

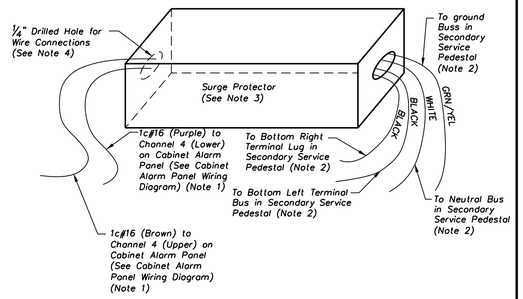
Standard Secondary Service Enclosure Detail



Power By-Pass Switch Wiring Diagram

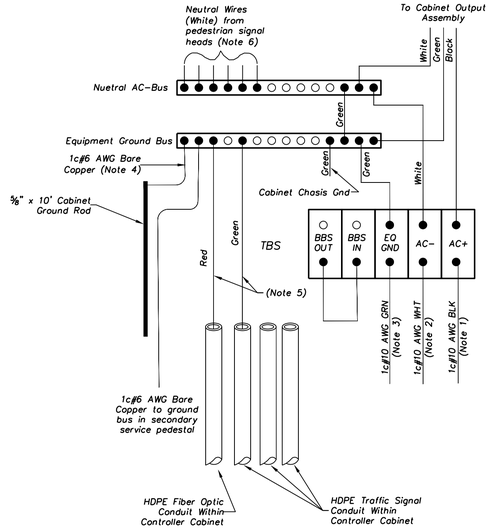
Applicable when no battery backup/UPS or CNG generator is used for backup power





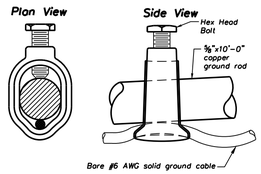
Notes:
1. Use preterminated twisted cable provided with battery backup/UPS system.
2. Wire leads should be as short as possible and not longer than 30". Do not extend cable with pigtails. Surge protection device location may need to be adjusted to keep wire leads as short as possible.
3. Install surge protector in secondary service pedestal, above door lock.
4. Drill ¼" hole in back of unit for wire connections. Seal hole around cable with silicon after cables are connected as shown in Rear View.

Utility Power Surge Protector Detail

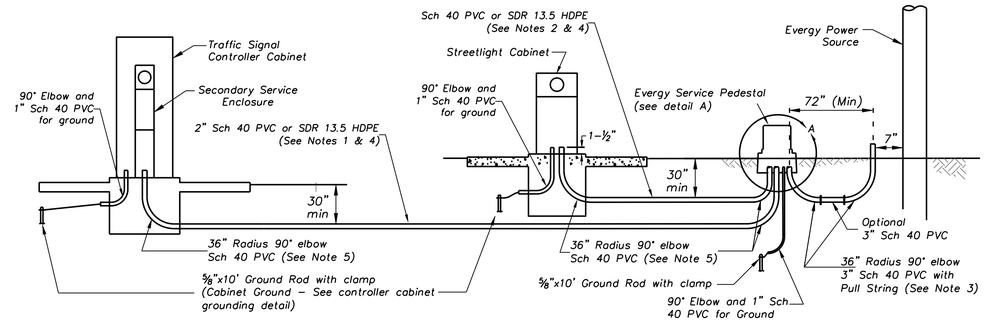


Controller Cabinet Wiring Notes:
1. The contractor shall install a 1c#10 AWG (Black) power cable from the AC+ TBS Power Terminal Block to either the Power Transfer Switch or the UPS Bypass Box, as applicable.
2. The contractor shall install a 1c#10 AWG (White) neutral cable from the AC- TBS Power Terminal Block to either the Power Transfer Switch or the UPS Bypass Box, as applicable.
3. The contractor shall install a 1c#10 AWG (Green) ground cable from the EQ GND TBS Power Terminal Block to either the Power Transfer Switch or the Ground Bus in the secondary service pedestal, as applicable.
4. The contractor install a 1c#6 AWG bare copper ground wire continuous from the Equipment Ground Bar to the ⅝" x 10' long cabinet ground rod.
5. The contractor shall install a 1c #10 AWG THHN/THWN stranded copper ground wire (Green) from the Equipment Ground Bus through the traffic signal conduit system and a 1c#10 AWG THHN/THWN stranded copper locating wire (Red) from the Equipment Ground Bus through the fiber optic conduit system.
6. The contractor shall install the neutral wires (White) for the signal vehicular and pedestrian signal heads to the Neutral AC- Bus.

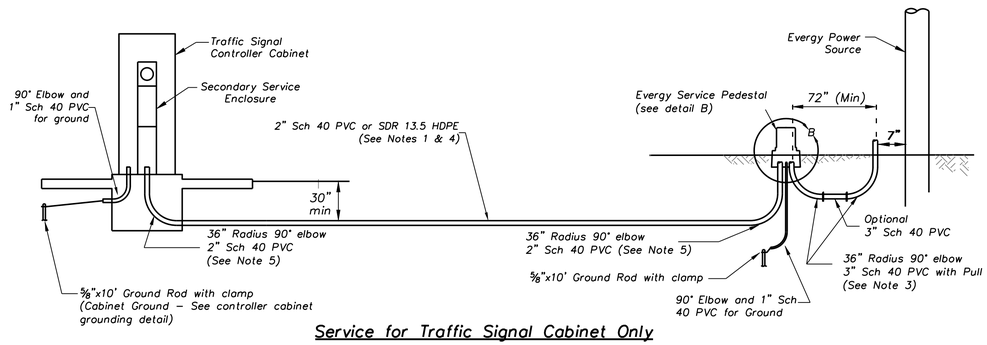
Controller Cabinet Wiring Detail



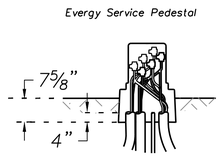
Ground Rod Clamp Connection Detail



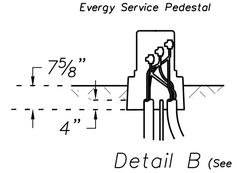
Service for Traffic Signal Cabinet and Street Light Cabinet



Service for Traffic Signal Cabinet Only



Detail A (See Note 6)



Detail B (See Note 6)

Service Connection Notes:
1. Contractor shall trench Schedule 40 PVC (Gray) or bore/trench SDR 13.5 HDPE (Black w/Red stripes) conduit from the secondary service enclosure to the Evergy service pedestal. The conduit shall be installed 30" deep with a 36" radius 90° PVC elbows where indicated.
2. Contractor shall trench Schedule 40 PVC (Gray) or bore/trench SDR 13.5 HDPE (Black w/ Red Stripes) conduit (2" for single circuit controller or 3" for four circuit controller) from the streetlight controller cabinet to the Evergy service pedestal. The conduit shall be 30" deep with 36" radius 90° PVC elbows where indicated.
3. Sweep conduit elbow to within 7" from the base of the Evergy power pole. If possible:
   - When there are multiple conduits on the power pole, the conduit should be installed adjacent to, and in contact with, the existing conduits. Verify with Evergy.
   - Do not stub the conduit up underneath a pole mounted transformer
   - Install the conduit on the side of the pole opposite the direction of approaching traffic and the side away from the street.
4. Contractor shall install electrical service power cable from the secondary service enclosure or streetlight controller cabinet to the Evergy service pedestal and connect cables to the meter lugs. Coil 24" of extra cable inside the service pedestal for Evergy to make connections.
5. If HDPE conduit is used between the secondary service enclosure and the Evergy service pedestal, the contractor shall transition to PVC elbows with approved couplings.
6. Contractor shall pick up Evergy supplied service pedestal from Evergy facility at 19950 Newton Dr. Stillwell, KS 66085. Call 48 hours in advance to coordinate. Installed as indicated according to Detail A or Detail B as appropriate.

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TRAFFIC SIGNAL
CABINET WIRING DETAILS

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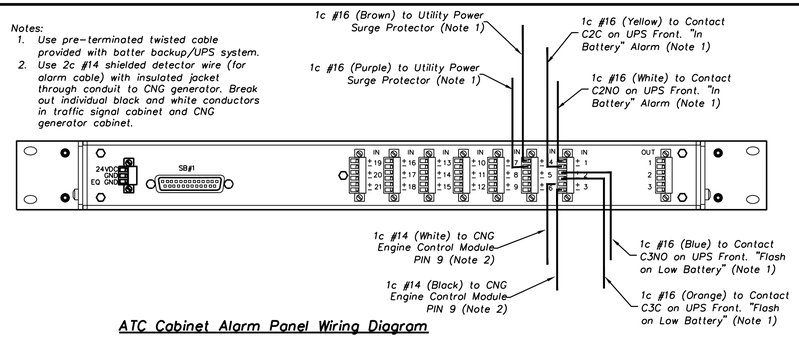
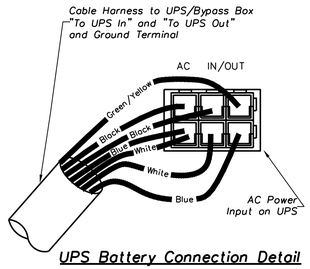
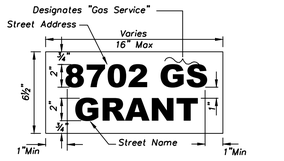
Notes:
1. Use pre-terminated twisted cable provided with batter backup/UPS system.
2. Use 2c #14 shielded detector wire (for alarm cable) with insulated jacket through conduit to CNG generator. Break out individual black and white conductors in traffic signal cabinet and CNG generator cabinet.



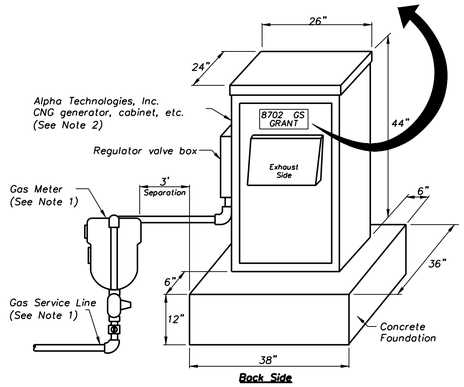
ATC Cabinet Alarm Panel Wiring Diagram



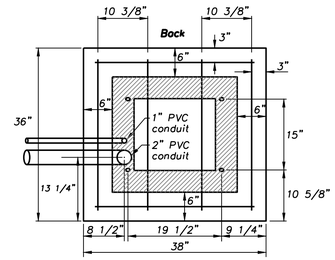
UPS Battery Connection Detail



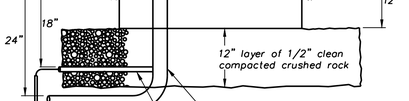
Stencil Detail Note:
2" high black EC film letters and numerals applied to a one piece Type XI retro-reflective sheeting with a black EC film border by the contractor. Apply on *street side* of cabinet facing the street referenced in the address.



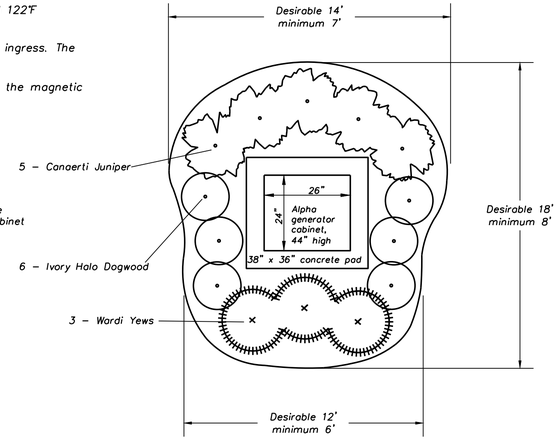
Compressed Natural Gas (CNG) Generator Detail



Notes:
1. Gas company will provide and install the gas service line and the gas meter. A licensed contractor shall perform the tap to the gas main and the connection to the CNG generator regulator valve box.
2. Contractor to provide and install the CNG generator per manufacturer's recommendations. The CNG generator shall have the following characteristics:
   - Independent outdoor enclosure with recessed locking doors
   - Designed to NFPA 37,54,58 standards
   - 48v dc output voltage
   - 96a max dc output current (rectified)
   - 10.5hp rated single ohv engine
   - 13.5 VDC ignition charger voltage
   - 6 amp max. ignition charger current
   - 2800-3600 RPM (max) variable speed
   - 80 cubic ft/hr, 1000 btu/ft
   - 0.5 - 2 PSI gas inlet pressure
3. Contractor to provide and install 2" PVC conduit w/1-3c #2 AWG (power) & 1-3c #14 AWG (monitoring) and 1-2c #14 AWG (alarm) electrical cable from CNG generator to traffic signal cabinet.
4. Contractor to install concrete foundation with anchor bolts to mount cabinet. See details. All soil shall be completely compacted prior to installing to avoid settlement.
5. Allow 36" clearance to other cabinets to allow the front and rear doors to open completely.
6. Shall be equipped with a cold weather starting kit for operational temperature range between -40°F and 122°F consisting of a battery heating mat and engine block heater.
7. A 25+ year continuous vapor barrier must be used between the enclosure and pad to prevent moisture ingress. The vapor barrier material shall be a continuous duct seal band installed prior to setting the cabinet.
8. Contractor shall ensure that the pad shear sensor is installed per manufacturer's recommendations with the magnetic sensor firmly glued to the concrete pad.



Compressed Natural Gas (CNG) Generator Foundation Detail

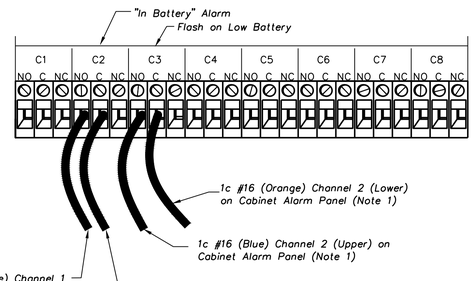


Compressed Natural Gas (CNG) Generator Landscape Plan

Min. Qty.	Desirable	Scientific Name	Common Name	Planting Size
3	5	Juniperus Virginiana 'Canaertii'	Canaerti Juniper	5" B & B
4	6	Cornus Alba 'Bailhalo'	Ivory Halo Dogwood	7 Gal.
3	3	Taxus x Media 'Wardii'	Wardi Yew	24"-30" B & B

Landscaping Notes:
1. All landscape beds will consist of 3" shreaded oak hardwood mulch.
2. All disturbed areas outside of landscape beds will be sod and/or seed.
3. Landscape fabric will be used to retard weed growth.
4. A manicured "garden edge" will be constructed to a depth of 6" to retain mulch.
5. Minimum and desirable quantities are based on overall size of landscaped area. Quantities should be based on "desirable" quantities unless otherwise determined by the engineer.

CONTACTS MAXIMUM RATING: 1A, 120 V
C: COMMON NC: NORMALLY CLOSED NO: NORMALLY OPEN
PROGRAMMABLE CONTACTS

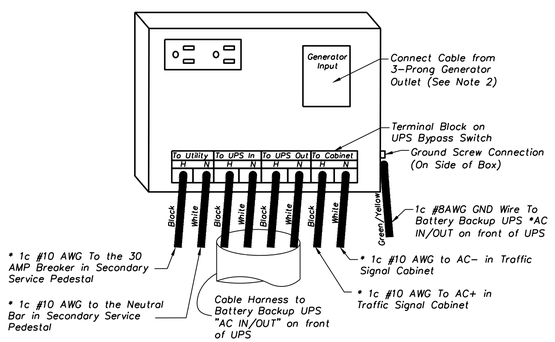


Notes:
1. Use pre-terminated twisted cable provided with battery backup/UPS system.
2. Use 2c #14 shielded detector wire (for alarm cable) with insulated jacket through conduit to CNG generator. Break out individual black and white conductors in traffic signal cabinet and CNG generator cabinet.

UPS Contact Closure Wiring Diagram
(Contact Closures Located on Front of UPS)

Physical wire location varies per manufacturer. All wire should be connected to "normally open"(NO) or "Common" (C)

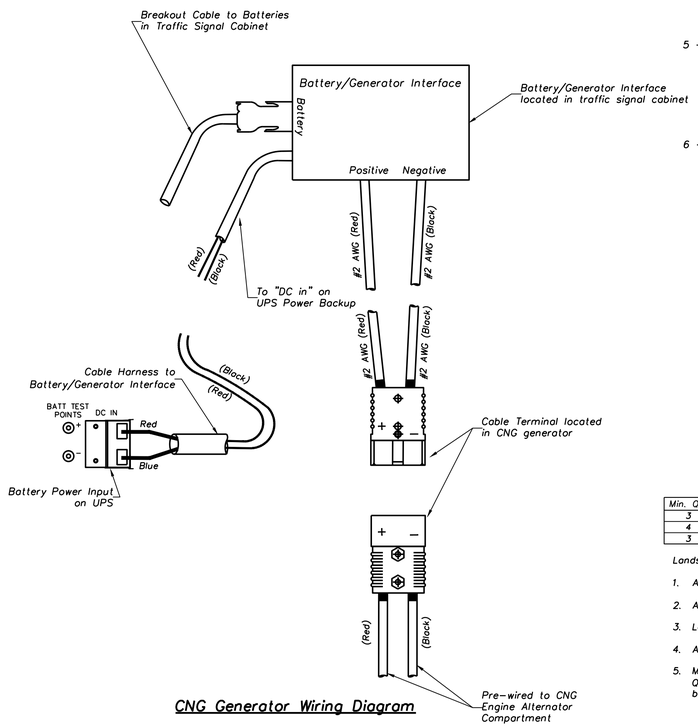
Notes:
1. Use pre-terminated twisted cable provided with battery backup/UPS system.



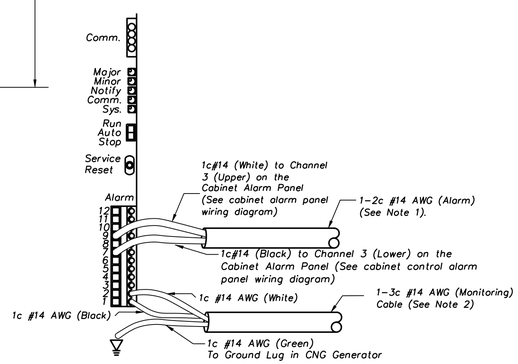
Notes:
1. Cables designated with * shall be terminated with crimp on terminal connectors.
2. Generator input plug is required for stand alone battery backup systems with a 3-prong generator outlet and 8' cable.

UPS/Bypass Box Wiring Diagram

Applicable when battery backup/UPS or CNG generator is used for backup power



CNG Generator Wiring Diagram



Notes:
1. Use 1-2c #14 AWG shielded detector wire (for alarm cable) with insulated jacket through conduit to field terminal rear panel in signal cabinet. Break out individual black and white conductors in traffic signal cabinet and CNG generator.
2. 1-3c #14 AWG (monitoring) cable with insulated jacket through conduit to secondary service pedestal cabinet. Break out individual conductors at each end.

Engine Control Module Wiring Diagram (in CNG Generator)

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TRAFFIC SIGNAL
CNG GENERATOR & BATTERY BACKUP DETAILS

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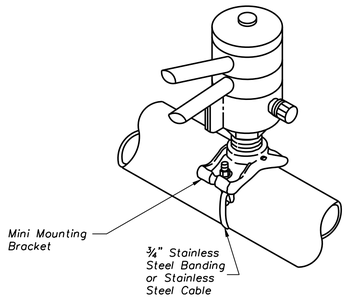
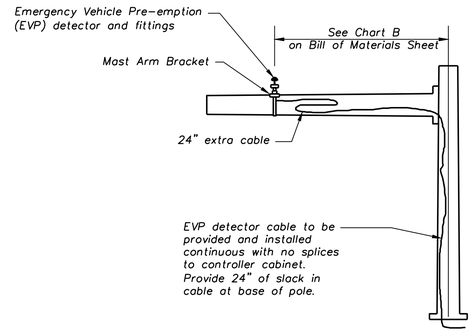
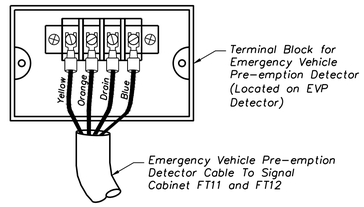
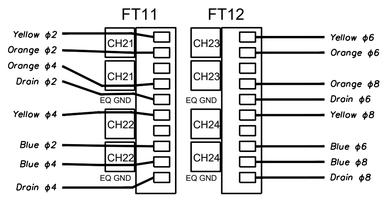


Bracket Attachment Detail



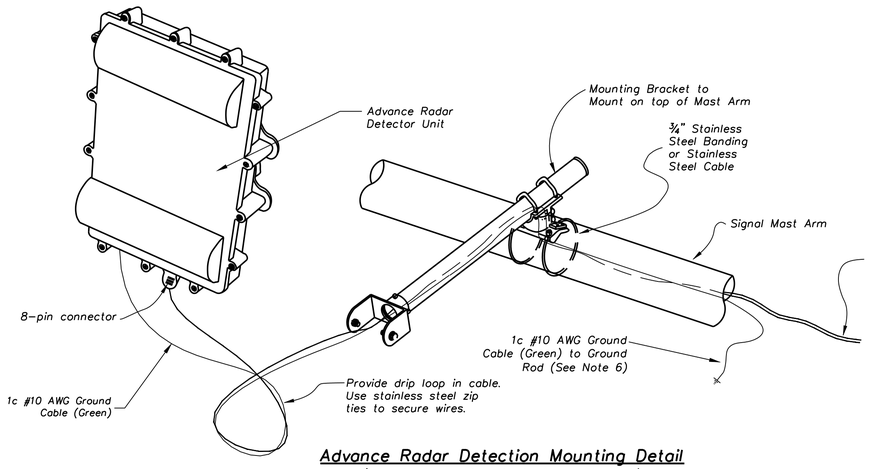
Emergency Vehicle Pre-Emption System Detail





Notes:
1. Cabling is shown for four pre-emption detectors.
2. FT11 and FT12 are part of the Field Input Terminal Assembly in the signal cabinet

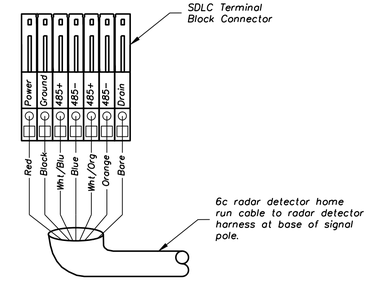
Emergency Vehicle Pre-Emption Detector Wiring Diagram



Advance Radar Detection Mounting Detail (Mast Arm Bracket Arm Mount)

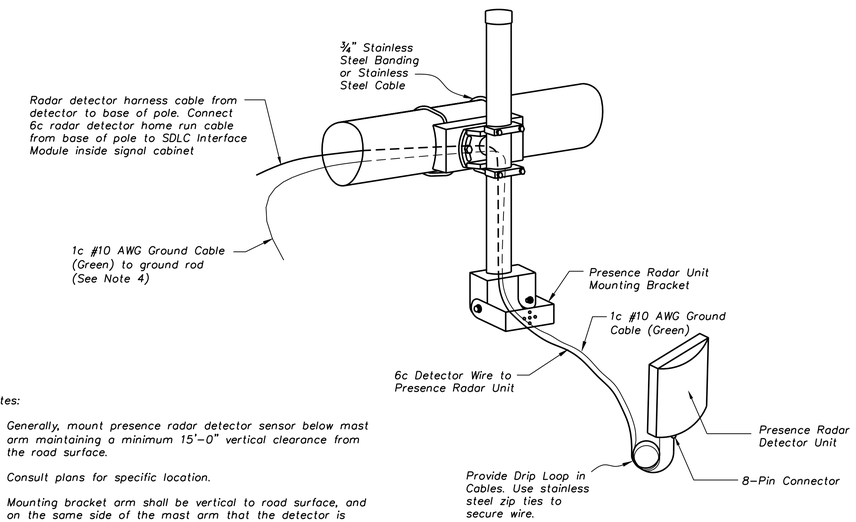
Notes:

1. Maintain offsets from center of the desired lane less than 24 feet.
2. Apply silicon dielectric compound into the connector at the base of the radar detector
3. Orient advance radar detector straight ahead with no downward tilt.
4. Install presence radar detector below mast arm and orient as indicated for maximum detection.
5. Mounting bracket arm shall be horizontal to road surface, and fastened to the bottom of mast arm. Maintain a minimum of 15' clearance from the sensor to the road surface.
6. Install the 1c#10 AWG ground cable from the sensor to the ground rod in the closest service box adjacent to the pole the sensor is mounted on. Use a separate ground rod clamp for each sensor.



Radar Detection Notes:
1. Plug cable connection into the SDLC cabinet interface module.
2. One connection is required for every presence and advance sensor.

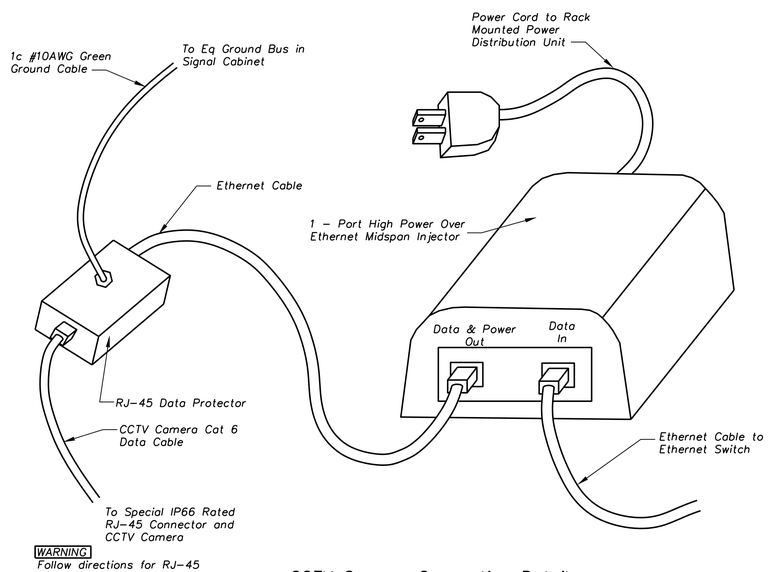
Radar Detection Rack Wiring Diagram
Applies to both presence and advance radar



Notes:

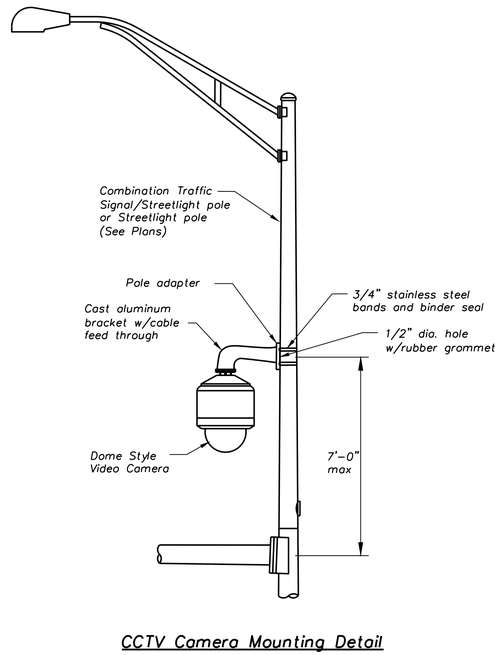
1. Generally, mount presence radar detector sensor below mast arm maintaining a minimum 15'-0" vertical clearance from the road surface.
2. Consult plans for specific location.
3. Mounting bracket arm shall be vertical to road surface, and on the same side of the mast arm that the detector is aimed, unless otherwise directed.
4. Install the 1c#10 AWG ground cable from the sensor to the ground rod in the closest service box adjacent to the pole the sensor is mounted on. Use a separate ground rod clamp for each sensor.

Presence Radar Detection Mounting Detail (Mast Arm Bracket Arm Mount)



WARNING
Follow directions for RJ-45 Connector Installation

CCTV Camera Connection Detail



CCTV Camera Mounting Detail

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TRAFFIC SIGNAL
DETECTOR WIRING & MOUNTING DETAILS

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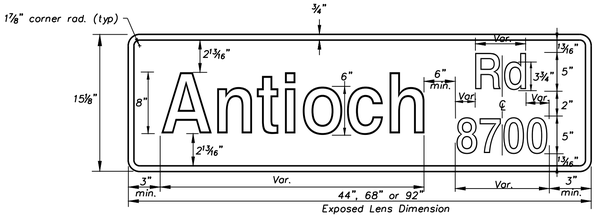
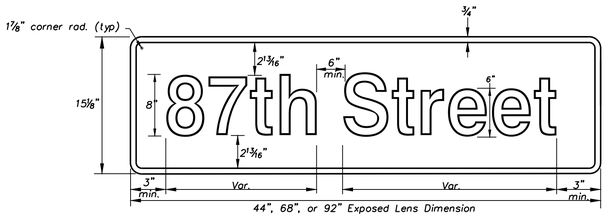
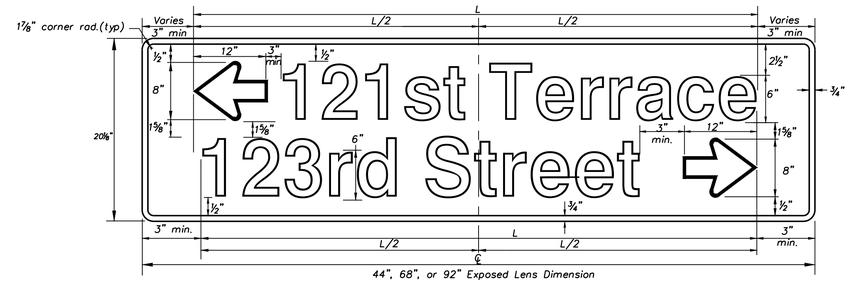
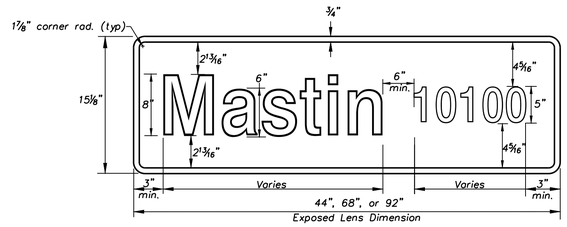
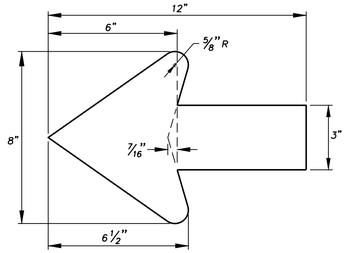










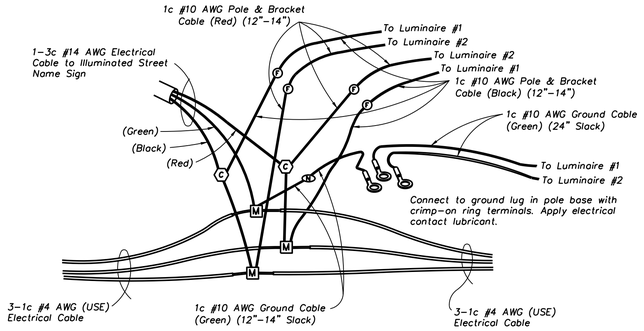
Arrow Dimensions (Inches)

Table 1 (Alpha Streets)	
Standard Abbreviation List	
Avenue	Ave
Boulevard	Blvd
Circle	Cir
Court	Ct
Creek	Crk
Drive	Dr
Highway	Hwy
Lane	Ln
Parkway	Pkwy
Place	Pl
Plaza	Plz
Road	Rd
Street	St
Terrace	Ter
Trail	Tr
Way	Way
Table 2 (Numbered Streets)	
Standard Abbreviation List	
First	st
Second	nd
Third	rd
Fourth to Ninth	th

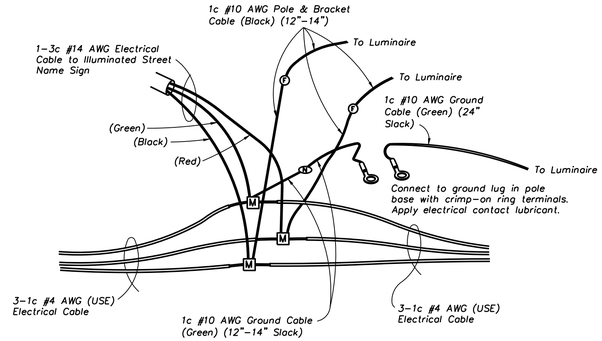
Illuminated Street Name Sign Summary Chart						
Pole #	Sign Design	A	B	C	Cable Side	
					Left	Right
	SP-1					
	SP-2					
	SP-3					
	SP-4					

Sign Housing Dimensions

Dimension A is either 19" or 24"
Dimension B is either 48", 72", or 96"



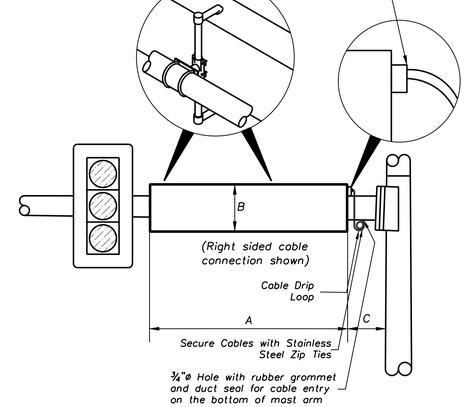
Illuminated Street Name Sign (240–Volt)
Electrical Connector Kit Schematic
(Twin Luminaires)

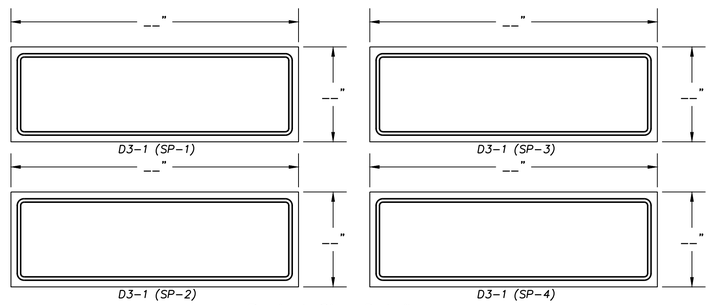


Illuminated Street Name Sign (240–Volt)
Electrical Connector Kit Schematic
(Single Luminaire)

LEGEND

- (M) Multi–Tap Electrical Connector
- (F) Break–Aaway Fused Electrical Connector with 8 AMP Fuse
- (N) Break–Away Non–Fused Electrical Connector with Ground "Slug"
- (C) Silicone Filled Wire Nut Connector or Equivalent

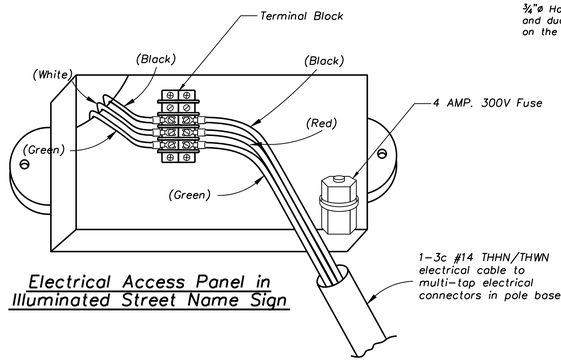




Project Sign Details
(Shown with Actual Sign Housing Dimensions)

Notes:

1. Signs shall be one sided.
2. Signs shall be rigid mounted top and bottom with brackets per the approved materials list.
3. Signs shall be mounted with the sign centered vertically on and approximately level with the mast arm.
4. Sheeting Requirements: Translucent micro–encapsulated retro–reflective sheeting (Type XI) with Electro Cutable Film.
   Legend and Border: White
   Background: Green
5. Text Series: Emod 2000 sized as indicated in the examples.
6. Power supply shall be self–sensing 120/240 volt.
7. The contractor shall submit a detailed shop drawing indicating the legend and sign spacing for approval prior to fabrication.
8. Red cables shall be connected to west and north oriented luminaires. Black cables shall be connected to east and south oriented luminaires.



Electrical Access Panel in Illuminated Street Name Sign

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TRAFFIC SIGNAL
ILLUMINATED STREET NAME SIGN DETAILS

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