TRAFFIC SIGNAL INSPECTOR CHECKLIST

October 2013

PROJECT NUMBER: _____ **DATE:** _____

PROJECT ENGINEER: _____

PROJECT INSPECTOR: _____

IMSA INSPECTOR: _____ **ID#:** _____

INTERSECTION LOCATION: _____

MAINTAINING AGENCY: _____

CONTRACTOR: _____

ENGINEER OF RECORD: _____

TYPE OF INSPECTION: _____

NUMBER OF INSPECTIONS: _____

ATTENDEES:

NAME:	AGENCY:	PHONE NUMBER:

Checklist Contents

1) INTERSECTION DESIGN:

	YES	NO
a) Were supplemental agreements or change orders required for signal work?		
b) Did special provisions contain any technical special provisions?		
c) Was equipment installed consistent with that shown on CS-201?		

d) What type of support system is used? _____

Additional Comments: _____

2) TRAFFIC SIGNAL CONTROLLER:

(Pub 408 Sec 952.2, 954.2, 1104.01, 1104.03)

Manufacturer: _____ Model/Serial #: _____ Certification #: _____

	YES	NO
a) Has the controller been installed at plan location?		
b) Are timings per plans?		
c) Does controller receive vehicle/pedestrian calls?		
d) Signal phasing per plans?		

Additional Comments: _____

3) TRAFFIC SIGNAL CONTROLLER CABINET:

(Pub 408 Sec 952.2, 954.2, 1104.01, 1104.03, 1104.05)

Manufacturer: _____ Model/Serial #: _____ Certification #: _____

	YES	NO
a) Is the orientation of the movements consistent with plans?		
b) Is the orientation of the movements consistent with the policy of the maintaining agency?		
c) Do the following service switches operate per specifications?		
(1) Signals on-off		
(2) Auto-Flash		
(3) Aux power on-off		
(4) Vehicle detectors		
d) Is the police panel per the following specifications?		
(1) Auto-Flash		
(2) Manual on-off		
(3) Manual Jack		

	YES	NO
e) Is the following documentation provided?		
(1) Phasing diagram		
(2) Loop chart		
(3) PennDOT Certification sticker		
(4) Controller and monitor manual		
(5) Cabinet prints		
(6) Terminal connection tag		
(7) Copy of submittal data sheet		
f) Is the peripheral equipment installed consistent with plans and submittals?		
g) Are all connections secured?		
h) Are MOV and load resisters installed on field signal and loop terminal strip correctly?		
i) Is the transient suppressor for service line installed correctly?		
j) What type of cabinet is installed?		
(Circle one): (NEMA TS1) (NEMA TS2 Type 1) (NEMA TS2 Type 2) (Type 170/2070)		
k) Is the cabinet base free from honey combing?		
l) Is the cabinet pad the correct height?		
m) Has the tech pad been installed?		
n) Has the cabinet to base connection been secured and sealed properly?		
o) Are all cables identified in cabinet?		
p) Does the conduit in the cabinet extend at least 2” above pad?		
q) Is the correct number of spare conduits supplied?		
r) Are spare conduits terminated and capped in a pull box?		
s) Have the cables runs and wiring been secured?		
t) Does the wiring present a neat and orderly appearance?		
u) Are all conduits sealed?		
v) Is the control for the illuminated street name sign installed (if applicable)?		
w) Is there a separate terminal block for loop splicing?		
x) Is the cabinet grounded in accordance with Min Spec and Standard Spec Section 620?		
y) Is the interface panel the correct type and installed properly?		
z) Does cabinet contain all equipment called for (load switches, flashers, transfer relays, detector harnesses, etc.) per contract?		

	YES	NO
aa) Are the directions of conduit stub outs marked in the cabinet base?		
bb) Are the lugs on the field signal wires?		

Additional Comments: _____

3.1) Load Switches:

Manufacturer: _____ Model/Serial #: _____ Certification #: _____

Additional Comments: _____

3.2) Flasher:

Manufacturer: _____ Model/Serial #: _____ Certification #: _____

Additional Comments: _____

3.3) Conflict Monitor/ Malfunction Management Unit:

Manufacturer: _____ Model/Serial #: _____ Certification #: _____

	YES	NO
a) Is the PennDOT certification sticker attached?		
b) Does the program card match cabinet prints?		
c) Are all cables secured?		
d) Does monitor sense conflict?		
e) Is time and date correct?		

Additional Comments: _____

4) ELECTRICAL POWER SERVICE ASSEMBLY:

(Pub 408 Sec 956.2, 1104.07(a)3.a)

	YES	NO
a) Has the service been to the requirements of the NEC and local codes?		
b) Does the power feed have the proper clearance above any road or drive way?		
c) Is the breaker in the load center a greater value than the main in the cabinet?		
d) Are the service elements secured properly?		
e) Is the surge suppressor connected correctly?		
f) What is the voltage at the line side of the meter?		
g) Have ground rod connections been exothermically attached?		
h) Is the center of the meter can per specifications?		
i) Is service meter can and load center locked?		

	YES	NO
j) What size wire was used for service? ____AWG		
k) Are surfaces free of scratches or damage?		
l) Is lightning arrestor installed?		
m) Is the black service neutral wire identified per the NEC?		
n) Is the conduit supported per specifications?		
o) Is the conduit terminated with ground and plastic bushings?		
p) Is the service grounded per PennDOT specifications?		
q) Is the disconnect per specifications?		
r) Is the weather head higher than telephone and cable TV, and proper height bellow neutral?		

Additional Comments: _____

5) SIGNAL INSTALLATION GROUNDING:

(Pub 408 Sec 1104.05 and 1101.11)

	YES	NO
a) Is all grounding per PennDOT specifications and Standard Drawings?		
b) Were exothermic welds used to attach bonding wire to grounding electrode?		
c) Has the contractor installed the bonding network connecting all poles back to service ground?		
d) Has the contractor provided ground connection to the junction box cover where required?		
e) Has the span wires been tied to the pole ground wire?		
f) Have all pedestrian features been bonded as required?		
g) Has the drain wire for loop returns been tied to ground?		
h) Was a sketch showing the location of all ground nodes in intersection provided		

Additional Comments: _____

6) JUNCTION BOXES:

(Pub 408 Sec 954.2, 1104.05(c)):

Manufacturer: _____ Model/Serial #: _____ Certification #: _____

	YES	NO
a) Are lids stamped "Traffic Signal"?		
b) If required, has the ground rod been installed?		
c) Are covers secured to the boxes?		
d) Where required are covers grounded?		
e) Has the required amount of pea gravel been installed under box?		
f) Are all conduits sealed?		
g) Have boxes been located where required?		
h) Have the cables in the boxes been labeled?		
i) Are the boxes flush with surrounding grades when in concrete?		
j) Are junction boxes installed per specifications and standard drawings?		
l) Have the junction boxes been grounded per specifications?		

Additional Comments: _____

7) CONDUIT:

(Pub 408 Sec 954.2, 1104.05(a))

	YES	NO
a) Does the conduit comply with the Specifications?		
b) Was conduit installed per plan location?		
c) Does any conduit run have more than 360 degrees of bends?		
d) Was an approved conduit used for above ground locations?		
e) Was the underground service feed an approved conduit?		
f) Was schedule 80 PVC or fiberglass conduit used on bridge decks?		
g) Was a pull wire installed in all spare conduits?		
h) Was expansion fittings installed on bridge conduit were required?		
i) Was conduit installation in compliance with the NEC?		
j) Was the size of conduit used in compliance with plans and specifications?		
k) Are ends of metal conduit protected by a bushing?		
l) Are all conduits sealed correctly?		
m) Was restoration of the trench in compliance with specifications?		

	YES	NO
n) Was all above ground conduit strapped per NEC requirements?		
o) Is the radius of curvature of the inner edge of any bend in compliance with Standard Specifications?		
p) Do as-builds plans reflect any deviations from plan location for the conduit runs?		
q) Was the depth of the conduit in compliance with plans and specifications?		
r) Were directional bores done with approved equipment?		
s) Where underground nonmetal conduit transitions to above ground metallic conduit is there at least 6" of metal conduit underground?		

Additional Comments: _____

8) SIGNAL and INTERCONNECT CABLE:

(Pub 408 952.2, 954.2, 1104.03(f))

	YES	NO
a) Is the cable IMSA certified?		
b) Is the color code correct?		
c) Are all connections tight?		
d) Was a calibrated crimper used to crimp terminals?		
e) Were sufficient conductors supplied for present and future heads?		
f) Was the correct strain relief device used?		
g) Have all unused conductors been secured properly?		
h) Have all cables been labeled in pole bases, pull boxes and cabinet?		
i) Has the insulation on any cable or conductor been chaffed?		
If so, list location. _____		
j) Has sufficient cable been coiled in the cabinet?		
k) Are required spares been provided for in all signal and pedestrian cables?		
l) Is there one neutral per approach?		
m) Has Appendix B been completed in the back of this checklist?		

Additional Comments: _____

9) SIGNAL POLES

9.1) Mast Arm:

	YES	NO
a) Are the uprights plumb?		
b) Are the leveling nuts installed?		
d) Is the correct amount of thread exposed above the nut?		
e) Does the end of the arm fall below the center of the arm at the attachment point?		
f) Has the correct strain relief for the signal cable been installed?		
g) Does the upright have a terminal compartment?		
h) Do the bolts holding the arm to the upright have the correct reveal?		
i) Have the signal brackets been installed properly?		
j) Is the cable jacket intact inside the bracket?		
k) Has the grommet been installed in the drilled cable entrance hole?		
l) Is the head aligned correctly?		
m) Have all the pole covers been installed?		
n) Are there any dents or scratches that have not been repaired?		
o) Has the mast arm been installed in the correct location and have the proper alignment?		
p) What is the distance from head to stop bar? Min._____ Max_____		
q) Is the grout cap installed including drainage?		
r) Arm securely fastened to pole?		
s) All holes not used are plugged?		
t) Has all mast-arm hardware been installed?		
u) Is mast-arm assembly upright and square to the road?		
v) Are poles installed per plans and PennDOT specifications?		
Additional Comments:		

9.2) Steel Strain Pole:

	YES	NO
a) Was the pole secured to the foundation properly?		
b) Is the pole free from scratches and defects?		
c) Is the pole cap in place and secured?		
d) Was the proper strain relief provided?		
e) Was all hardware secured correctly?		

	YES	NO
f) Was the pole bonded correctly?		

Additional Comments: _____

9.3) Signal Pole Foundation:

	YES	NO
a) Was the foundation installed in compliance with the drill shaft plan?		
b) Was all slurry removed?		
c) Was the depth and size of the foundation in accordance with plans?		
d) Was the placement of the steel cage in accordance with plans and standard drawings?		
e) Was the concrete to steel clearance correct?		
f) Was the proper number of conduits stubbed out?		
g) Was the anchor bolt pattern correct?		
h) Were the anchor bolts the right size and length?		
i) Did the anchor bolts extend the proper height above the foundation?		
j) Was the foundation the proper width and depth?		
k) Did the concrete used conform to the design mix?		
l) Was the batch time and revolutions for the mix checked?		
m) Is the foundation grounded per PennDOT specifications?		
n) Is the finish of the foundation top acceptable?		
o) Does it hold water?		

Complete chart below:

POLES	MFG	MATERIAL	TYPE	LENGTH	QUADRANT	**
1						
2						
3						
4						
5						
6						
7						
8						

Additional Comments: _____

10) OVERHEAD EQUIPMENT

	YES	NO
a) Are signals weather-tight?		
b) Have two ¼" holes been drilled in base of signal head?		
c) Do 5 section doors open properly (swing outward)?		
d) Is signal lamp filament in an upright position, forming a "W"?		
e) Are all lamps the correct wattage?		
f) Are the signal heads installed per plans? (correct number and location of signals per plans)		
g) Are signals installed per plans and PennDOT specifications (vertical/horizontal and distance from stop bar)?		
h) What is the distance from head to stop bar? Min._____ Max_____		
i) Is at least one head for each approach between 40' and 150'?		
j) Is all hardware tight and secure?		
k) Have the span wires been tensioned properly?		
l) Has the signal cable been attached properly?		
m) Are drip loops the correct size and secured properly?		
n) Is there at least 8' horizontal separation between heads facing the same direction?		
o) Are 1-way signal heads plugged at the bottom section?		
p) Are vehicle traffic signal lamps PennDOT certified?		
q) Does signal head door swing open properly (downward or out to correct side)?		
r) Lock washers installed and nuts tight, inside signal heads on brackets?		
s) Lenses installed properly? ("TOP" on top of lens in signal head)?		
u) Do the adjustable drop hangers have the correct overlap and number of bolts (per manufacturer's instructions)?		

Record Signal head heights (Mast Arms)

POLE #	ARM #	1	2	3	4	5	6	7	8

Additional Comments: _____

Record Signal head heights (Span Wire)

POLE #	ARM #	1	2	3	4	5	6	7	8

Additional Comments: _____

11) VEHICULAR TRAFFIC SIGNAL ASSEMBLY:

(Pub 408 Sec 955.2, 1104.01(a), 1104.06(a), 1104.06(h))

Manufacturer: _____ Model/Serial #: _____ Certification #: _____

	YES	NO
a) Are the number and location of signals as per the plans?		
b) Are the signals installed per the plans and PennDOT specifications (i.e. vertical/horizontal and distance from stop bar)?		
c) Are signals within the required minimum and maximum heights per Standard Specs?		
d) Are lenses, lamps, and visors installed in proper direction?		
e) Do horizontally mounted signal head doors open downwards?		
f) Are all the hardware used made of stainless steel type 304/316?		
g) Are the Brackets securely fastened with cable tied downs?		
h) Are all the required conductors terminated with calibrated ratchet type crimp tool?		
i) Are all the spare conductors individually and properly capped?		
j) Is the signal head surface free of scratches and dents?		
k) Disconnect Hanger:		
1) Are cable entrance bushings installed in accordance with specifications?		
2) Are unused cable entrances plugged?		
3) Are adaptor hubs tight?		
4) Are nuts tight and lock washers installed on tri-stud bolts?		
5) Are the correct number of disconnects installed per plans?		
6) Have all unused conductors in the Jones plug been secured?		
l) Are cotter pins installed in span wire clamps?		

	YES	NO
m) Are lock washers installed and nuts tight in span wire clamps?		

12) PEDESTRIAN SIGNAL ASSEMBLY:

(Pub 408 Section 1104.06)

Manufacturer: _____ Model/Serial #: _____ Certification #: _____

	YES	NO
a) Are the signals not less than 8' from ground and no more than 10'?		
b) Are the pedestrian signals housing weather proof and doors open downward?		
c) Are the pedestrian detectors at proper distances per specifications?		
d) Is the pedestrian detector and sign pointing in the same direction as the corresponding crosswalk?		
e) Are ped signal surfaces free from scratches and dents?		
g) Are the correct wattage lamps installed?		
h) Are signals weather-tight?		
i) Are pedestrian signals installed per specifications and plans?		
j) Are pedestrian detectors weather tight (sealant installed around mounting bolts/conduit)?		
k) Is the pedestal installed per standard specs and drawings?		
l) Is the correct number of signals, pedestals, signs, etc, installed per plans?		
m) Are pedestrian detectors' locations handicap accessible and do they meet ADA requirements?		

12.1) Pedestrian Features:

	YES	NO
On tight corners are the pedestrian heads located such that the chance of a turning truck striking the head is minimized?		
Do the indications match plans?		
Are the pedestrian detectors in compliance with ADA?		
Do any audio /tactile pedestrian features function correctly?		
Do the heads line up with crosswalks?		
Are there spares in each pedestrian signal cable?		
Is the pedestrian clearance time sufficient to clear pedestrians?		

Additional Comments: _____

13) VEHICLE DETECTION:

Type of detection: _____

Manufacturer: _____ Model/Serial #: _____ Certification #: _____

	YES	NO
a) Has the contractor provided the correct documentation?		
b) Do all detector units detect?		
c) Are all loops (or alternate detection device cabling) labeled and attached to the correct terminals?		
d) Are loops (or alternate detection device cabling) labeled in junction boxes and in cabinet as to location and movement number?		

13.1) Inductive Loops:

	YES	NO
a) Were the slot for the loops and home runs cut to the proper depth per specifications and standard drawings?		
b) Are there more than 4 home run cables in a saw cut?		
c) Was the window installed correctly?		
d) Was the loop window cut the proper size and sealed properly?		
e) Was the correct wire installed (size and insulation)?		
f) Are the loops to home run connection watertight?		
g) Is there conduit installed from window to junction box?		
h) Loop Sealant: (PennDOT Certification number:_____)		
Was the correct sealant used?		
Was the sealant applied per manufacturers requirements?		
Was the excess sealant removed?		
i) Were the drain wires attached?		
j) Is there an individual run for each loop back to the cabinet?		
k) If more than one loop is connected to a detector are they connected in series?		
l) Was this connection of multiple loops done on a separate terminal block in the cabinet?		
m) Are adjacent loops wound in opposite directions?		
n) Was the home run cable the correct size and type?		
o) Were all loop parameters within tolerance?		
p) Has the contractor provided loop data sheet?		
q) Was an inspector present during loop cutting and while ground rod were driven?		

	YES	NO
r) Are there any loop leads exposed?		
s) Is the splicing of the loops in accordance with Pub 408 and standard drawings?		
t) Are the loop lead-in bare wires terminated per contract plans?		
u) Do all loops meet meg-ohms specification requirement?		
v) Is the loop saw cut depth per specifications and standard drawings?		

Additional Comments: _____

13.1.1) Inductive Loop Detector Amplifiers:

	YES	NO
a) Have the loops been installed according to plans (i.e.; type of loop; location of loop)?		
b) Has the loop sealant been installed neatly and evenly?		
c) Has the loop wire been installed as per standard specifications, drawings and plans?		
d) Has the contractor recorded the inductance meg reading on a PennDOT Traffic Signal Resistance Measurement Data Sheet? (if yes, attach copy)		
e) Have the loops/lead-ins been spliced in accordance specifications and standard drawings?		
f) Have lead-in shields been grounded?		

Additional Comments: _____

13.1.2) Inductive Loop Test

Record Loop Readings

DIRECTION	PHASE	LOOP#	L	R	Q	FREQ	DELTA L	TYPE

Additional Comments: _____

14) SIGNING:

	YES	NO
a) Were the street name signs installed per plans?		
b) Was the logo correct?		
e) Was a drip loop provided at the cable entry point (if internally illuminated)?		
f) Was the correct cable type used to wire sign (if internally illuminated)?		
g) Do all lamps function in illuminated signs?		
h) Have manufacturer and date stickers been applied to back of signs?		
i) Have galloping mitigation devices been installed where applicable?		
j) Are sign surface free of scratches of damage?		
k) Is all hardware stainless steel?		

Additional Comments: _____

15) PAVEMENT MARKING:

	YES	NO
a) Have markings been installed per plans?		
b) Do new crosswalks line up with ped signals and handicap ramps?		
c) Are stop bars no closer than 40' and no further away than 150' from traffic signals?		
d) Are stop bars laid out properly in relation to vehicle loops?		
e) Have conflicting markings been removed?		
f) Is general appearance and clean-up is acceptable?		

Additional Comments: _____

16) SIDEWALK, CURB & GUTTER:

	YES	NO
a) Are ramps in an accessible location?		
b) Is concrete stamped properly (in ramps)?		
c) Is any new concrete cracking?		
d) Has concrete over spray been removed from painted structures, (where applicable)?		
e) Is general appearance and clean-up is acceptable?		
f) Does new concrete installed match existing concrete (color, finish, etc.)?		

Additional Comments: _____

17) REMOVAL ITEMS:

	YES	NO
a) Have all existing foundations been removed entirely or lowered 2' below grade?		
b) Have all existing pavement markings and signs in conflicts with new installation been removed?		
c) Have all removals involving excavation been restored appropriately?		
d) Have all abandoned junction boxes been removed and restored appropriately?		
e) Has all clean-up, backfill, dressing, and sod work needed to make a quality job been completed?		

Additional Comments: _____

18) SIGNAL TURN ON:

	YES	NO
a) Measure and record line voltage. _____		
b) Measure and compare voltage at furthermost indication. _____		
c) Is the voltage between the two readings greater than 5% of line voltage?		
d) Does the test button work on the GFI?		
e) Verify the field wiring for each movement to insure continuity to the appropriate signal head and record any discrepancies.		
f) Does police flash operate correctly?		
g) Have all connection been checked to insure they are secured?		
h) Do light, fan, and thermostat function correctly?		
i) Are any of the detectors showing a fault or chattering?		
j) Record time and date of turn on for flash and stop and go. Flash Full		
k) Did the contractor have qualified personnel at turn on who could program the controller and trouble shoot the system?		
l) Are all heads aimed correctly?		
m) Do loops call the correct movement?		
n) Do the pedestrian detectors call correct movement?		

	YES	NO
o) Measure and record the signal head to stop bar distance for each approach.		

APPROACH	MIN	MAX

	YES	NO
p) Did the installation function properly at turn on?		
q) Was signal ready to turn on at the scheduled time?		
r) Are all cables labeled and neatly arranged?		

Additional Comments: _____

APPENDIX A

ITEMS	MFG	MODEL #	SERIAL #	TYPE	PHASE
CONTROLLER					
CABINET					
SIGNAL HEADS					
SIGNAL MONITOR					
FLASHER					
COORDINATION UNIT					
PRE-EMPT UNIT					
SIGNAL HEADS					
SIGNAL HEADS (PEDS)					
DISCONNECT HANGER					
DETECTIONS					

VENC_____THERMOSTAT_____FAN_____HANDSWITCH_____LINE FILTER_____**

SIGNAL HEADS	1	2	3	4	5	6	7	8	9
CLEARANCE HT.									

NOTES _____

_____

_____

_____

_____

_____

APPENDIX B

CABLE RUN IDENTIFICATION

Darken Lines Appropriate For Intersection

Draw in Cabinet Location (Symbol: ⊠)

Draw in Signal and Ped Heads, with Head Numbers - Record all Cable ID (Color or Number) - Record Conductor Size - Record Number of Conductors in each Cable

Example: Green or 1-14/12